

# THE CLASSIFICATION OF KNOWLEDGE IN ISLAM BY IMAM AL- GHAZALI AND AL- FARABI: A COMPARATIVE STUDY

BY

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# ABSTRACT

- It is undeniable fact that history is the record of past events and civilization is an advance development in the society marked by rapid progress in economy, politics, science, knowledge and Information technology. Down the centuries, Islam as a religion of comprehensive way of life has paid a huge attention to the issue of knowledge, it invites people to seek it at all costs; it also urges them to think and contemplate in order to reach the true meaning of ontological reality. If that indicates something, it proves that Islam is totally against ignorance and illiteracy. Based on this fact Islamic civilization during its golden era has witnessed some gigantic Muslim scholars



- who shoulder the message of Islam and whose contributions to the field of different knowledge can not be underestimated. For instance, Imam Al- Ghazali(Hujjah Al-Islam) and Alfarabi are renowned Muslim scholars of all time. They both contributed immensely to the field of social sciences , humanities and mysticism. Their contributions to these field have become splendid references to contemporary Muslim scholars in their academic researches. Thus, the main objective of this paper is to investigate the classification of knowledge by Imam Al- Ghazali and Al- Farabi respectively. Yet, in order to achive our objective the comparative approach is applied followed by brief conclusion and some recommendations

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- Keywords: Imam Al- Ghazali, Al- Farabi, Classification of knowledge,, Islam, Qur'an, Sunnah.
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# BRIEF INTRODUCTION

- The classification of knowledge in Islam had been discussed by many Islamic scholars. Down the centuries , the Muslim scholars such as Abu Al-Hamid Al-Ghazali and Al Farabi have contributed immensely to classification of knowledge, their tireless efforts and their unique endeavours in this dimation have become a great reference for scholars and academicians alike. Indeed, this conference paper aims to explore the biography of these two Muslim scholars followed by their classification of knowledge. Therefore, the paper will apply a comparative approach. In order to achieve the aims and objectives, that is by drawing comparision between the classification of knowledge by Imam Al-Ghazali and the classification of Knowledge by Alfarabi. Lastly, the brief conclusion will be provided, followed by some suggestions and some recommendations .



# General Classification of Knowledge in Islam

Absolute Knowledge

Limited Knowledge

Gifted Knowledge

Acquired Knowledge

Sacred

Instinct (ilham)

Blame worthy

Praiseworthy

By external influence

By itself

Fardu 'Ain

Fardu Kifayah

**CLASSIFICATION OF KNOWLEDGE ACCORDING  
TO  
IMAM AL-GHZALI AND AL-FARABI**



# CLASSIFICATION OF KNOWLEDGE ACCORDING TO IMAM AL-GHZALI

## *Brief Biography Of Imam Ghazali*

- His actual name is Abu Hamid Muhammad al Gazali, al-Tusi famous in the world of learning as al-Ghazzali. The Imam was a jurist, Philosopher, and debater, theologian, mystic, expert in the principles of doctrine and those of jurisprudence. He was born in 450 AH (1058 A.D). in Tus (modern Mash'had in NE Persia). He attended the village madrassa and as a young man went to the Nizamia Madrassa, which was a very famous educational institution in Nishapur. He was a clever and keen student who took interest in all subjects His cleverness as a student was commented upon in court circles in Persia and the Grand Mufti took special interest in his progress and encouraged him to devote himself to the pursuit of knowledge.

- Furthermore, Al-Ghazzli justified the confidence shown in him by his patron and graduated from the Nizamia Madrassa at Nishapur, with distinction.
- Al-Ghazali died at Tabran in Jamadi al Ukhra 505 AH (1111 A.D) at the age of 53 years. Imam al-Ghazali today is known as Hujjat al-Islam, Arabic for “the Proof of the Religion”.
- Ludwig W. Adamec (2009), Historical Dictionary of Islam, Scarecrow Press, p. 109



# HERE ARE SOME IMPORTANT BOOKS OF IMAM AL-GAZALI

- Tahafut al-falasifa (The Incoherence of the Philosophers), (1095)
- Mi'yar al-'ilm (The Standard Measure of Knowledge) (1095)
- Ihya' 'ulum al-din (The Revival of the Religious Sciences) (1096-7)
- Mishkat al-anwar (The Niche of the Lights) (1096-7)
- Al-Munqidh min al-dalal (The Deliverer from Error) (1108). And many more..



In short, knowledge according to imam al- Gazali is the realization of the meaning of things. Therefore, he classified the knowledge as followed:

- a. Theoretical and practical
- b. Presential and acquired
- c. Religious and intellectual
- d. Individual obligatory- and communal obligatory.

## 1. THEORETICAL & PRACTICAL

Makes known the states of beings as they are.

Deals with man's actions in finding out the human activities conducive to men's well-being in life here & hereafter.

## 2. PRESENTIAL & ACQUIRED

Direct, immediate, supra-rational, intuitive, and contemplative.

Indirect, rational, logical, and discursive.

## 3. RELIGIOUS & INTELLECTUAL

*Al-'ulum al-syar'iyah:*  
more specific than transmitted knowledge.

*Al-'ulum al-'aqliyyah:*  
attained by human intellect alone.

## 4. FARD 'AYN & FARD KIFAYAH

A religious obligation that binding on every Muslim.

Divinely ordained and binding for the Muslim community as a whole.

Lastly, Al-Ghazali divides the knowledge of wisdom into the theoretical and practical parts. The first part which is theoretical part discussed about the conditions of beings. For the second part which is practical parts discussed about how to deal with man's actions. The aim is to find out the human actions and his well-being in this life as well as in the hereafter such as Ulum shar'iyah.



# CLASSIFICATION OF SCIENCES ACCORDING TO AL-FARABI

## *BRIEF BIOGRAPHY OF AL- FARABI*

- His name is Abu Nasr Muhammad ibn Muhammad ibn Turkhan al-Farabi. He was born of Turkish stock in Turkistan about 265/878 . He was brought to Baghdad by his father where he learned Arabic, mathematics, medicine and philosophy. He started his life in Damascus where he devoted himself to read philosophical books.



- He subsequently left for Baghdad where he learned from two gigantic logicians of that time namely; Mata Ibn Yunus and Yuhana Ibn Haylan. He was known and famous as Muallim Thani (The second teacher).



- Simply because he reconstructed the science of logic founded by Aristotle, then commented and wrote treatise on it. He died in 339/950.
- Here are some Primary sources of Al-farabi which have been translated into English



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## PRIMARY SOURCES (FĀRĀBĪ) IN ENGLISH TRANSLATION

- Al-Farabi's Commentary and Short Treatise on Aristotle's *De interpretatione*, Oxford: Oxford University Press, 1981.
- Short Commentary on Aristotle's *Prior Analytics*, Pittsburgh: University of Pittsburgh Press, 1963.
- Alfarabi, *The Political Writings*, Volume II. "Political Regime" and "Summary of Plato's Laws", Ithaca: Cornell University Press, 2015.



# AL- FARABI CLASSIFICATION OF SCIENCES

- Al Farabi classified sciences in his book Kitab Ihṣā' 'Ulūm (The book of the Enumeration of the Sciences) in this book, Al- Farabi categorised the various disciplines of knowledge under seven heading namely: 1. the linguistic, 2. the mathematical 3. the logical 4. the physical 5. the metaphysical 6. the judicial 7. and the political sciences



Thus, Al Farabi had provided an excellent classification of knowledge. His *Kitab Ihsa* ( *The book of Enumeration*) has significantly demonstrated this fact ,where Abu Nasr Muhammad ibn Muhammad ibn Turkhan al-Farabi categorized different discipline of Knowledge unde seven heading. May God bless his soul.

## CONCLUDING REMARKS

- The immense contribution of Muslim scholars to the field of knowledge is remarkable. Down the centuries the early Muslim scholars such as Al-Farabi, Imam Al-Ghazali have contributed largely to the classification of knowledge. For example, Al-Ghazali classified the knowledge into. Theoretical and practical. Presential and acquired, Religious and intellectual, Individual obligatory- and communal obligatory.

- Whereas Al- farabi categorised the various disciplines of knowledge under seven heading namely: the linguistic, the mathematical, the logical, the physical, the metaphysical the judicial and the political sciences Their classification of knowledge has become a great reference for the contemporary Muslim scholars,



# SUGGESTIONS AND RECOMMENDATIONS

**1. The contributions of early Muslim scholars (such as Al-Farabi and Al-Ghazali) to the field of various knowledge can not be measured in small scale. This shows their love for knowledge for the sake of knowledge.**



- 2. Exercising Ijtihad and creativity are highly needed for contemporary Muslim Ummah, which can enable them to solve the various problem and predicaments faced by the ummah today.



3. There's a need for mutual beneficial reciprocal relationship between the contemporary Muslim scholars and Muslim leaders, so that the scholars will be able to produce meaningful researches that will benefit the Muslim ummah at large.



4. The great lesson that we can learn from the glory of our early Muslim scholars and from the golden age of the Islamic civilization is that, the strength of any civilization is based on knowledge and knowledge is power.



# Conference Proceedings



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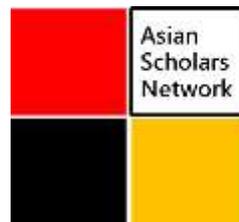
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## Table of Contents

1. Analysis of Study Materials Related to Preposition-Teaching: A Few Observations from ESL Classroom in Saudi Arabia.....	1
2. Analyzing the Architectural Characteristics of Tadao Ando’s Museum Projects.....	11
3. Bibliometric Analysis of Ethics and Online Learning Using VOSviewer Software.....	28
4. Building Information Modelling (BIM) in Construction: State of Acceptance .....	44
5. Business Zakat Payment Compliance among Small Business Owners in Kedah, Malaysia: Mediation Effects of Awareness and Attitude.....	53
6. Demand on Malay Traditional Dessert during Wedding Festival.....	68
7. Design of Ergonomic Table and Chair to Reduce Musculoskeletal Complaints with Anthropometric Approaches and Reverse Engineering in the Gatot Kaca MSME ....	73
8. Factors affecting Purchase Intention of Electric Vehicles in Thailand .....	84
9. Factors Influencing Consumer Preference of Suboptimal Food towards Purchase Decision in Selangor .....	90
10. Idioms: Malay's Viewpoint About The Royal Institution In Classical Texts.....	101
11. Interactive Learning Environment Through Visualization To Promote Creative Thinking Among Non-Major Undergraduate Computer Science Students Learning Computer Programming Subject .....	111
12. Online Learning Challenges Faced By Academicians During The Pandemic .....	120
13. Plastic Pollution: A review .....	128
14. Political Connection and Family Business Create or Destroy Firm Performance: Evidence from Malaysia.....	135
15. Preservation of Malay Local Food Among Young Generation: A Study in Johor ....	148
16. Sexuality Education and Its Implementation: The Views of Students and Teachers of Secondary Schools.....	163
17. Teachers’ Attitudes and Intention Regarding Inclusive Practice in Hong Kong Higher Education.....	176
18. The Classification of Knowledge in Islam by Imam Al- Ghazali and Al- Farabi: A Comparative Study.....	191



19. The Effect of Ease, Speed, and Security on Customer Satisfaction of LIVIN By Mandiri Users in Bogor City .....	199
20. The Factor that Influences Customer Satisfaction on Food Delivery Service During the New Norm .....	211
21. The Main Car-Buying Characteristics of A Young Generation .....	221
22. The Relationship of Gender to Students' Level of Depression .....	227
23. The Study on the Potential Efficiency of Enhanced Learning within the Educational Environment .....	239
24. Utilizing Traditional Japanese Mathematics, <i>Wasan</i> , as an Aid for Programming Education: A Preliminary Study .....	246
25. Kertas Konsep Kajian Pembangunan Kerangka Amalan Kreativiti Pengajaran Guru Lukisan Kejuruteraan (AKPG-LK) .....	262
26. Pembinaan Kerangka Konseptual Kajian Mengenai Rangka Kerja Pembangunan Ilmu Metakognitif Untuk Work-Based Learning (WBL) Politeknik Malaysia .....	276



# Analysis of Study Materials Related to Preposition-Teaching: A Few Observations from ESL Classroom in Saudi Arabia

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**Abstract:** *The current paper assesses the learning difficulties associated with prepositions among Saudi learners. The study included students (A2 and B1 levels according to the CEFR) from first- and second-year undergraduate programmes. The paper compares and contrasts the occurrences of prepositions in Arabic and English. Prepositions have always been difficult for L1 Arabic ESL students to learn. It has been reported in the literature on second language learning contexts for English. Preposition occurrence patterns in Arabic and English are very different. On the one hand, there are only twenty prepositions in Arabic, and only six of them are commonly used, whereas English is said to have around 150 prepositions. Because Arabic prepositions are limited, they do not correspond to all of the English forms. Learners struggle to remember context they may have learned as rules or to assess context from a sentence, forcing them to resort to transferring similar conceptual mapping from L1 to the target language. Textbooks play an important role in the development of various skills in students. It is debatable whether there is sufficient speaking practise of which prepositional activities are required. In general, the book's flaws are outweighed by its strengths, which can be overcome through preposition adaptation and supplementation. At the pre-intermediate level, learners could have been given more prepositions, in addition to prepositions of place to place, manner, time, and so on, which are common uses at the elementary level.*

**Keywords:** prepositions, ESL, Arabic, preparatory year, Saudi Arabia

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## 1. Introduction

The present paper aims to explore and assess the learning difficulties related to prepositions among Saudi ESL learners. The teaching/learning context is the foundation year students of the Northern Border University, Rafha. As an instructor, I taught English language skill courses (A2 and B1 levels as per CEFR) for first and second semester of prospective undergraduate students enrolled for the academic year 2020 - 2021. The university has branches in three neighbouring cities (Arar, Rafha and Turaif), and all the campuses are centrally managed and moderated in terms of teaching pedagogy, course content, assessment, and teachers' training. Due to the strict Islamic laws, educational institutions for boys and girls are segregated and are separately managed by female staff. However, there is no difference in the curriculum and the whole learning and teaching module is followed the same. The instructors were free to design their own practise sets or activities for the students to further reinforce their classroom learning.

The total number of students enrolled in for ELCA 102 and ELCA 101 (classes I taught last semester) was twenty-six and thirty-one, respectively, and the number of weekly teaching hours allotted for each section was 15 hours, and the duration of each session was 90 minutes. Students



were given weekly lab classes in which they practised all four language skills using a virtual self-learning platform (Rosetta Stone) to learn conversational English under the guidance of an instructor. ELCA 102 was offered new headway Special Edition Pre-intermediate (A2-B1) (Soars & Liz, 2013) and ELCA 101 was offered New Headway Special Edition Elementary (A2) (Soars & Liz, 2013). The students are expected to complete all the modules successfully offered in the foundation unit as the English language skills courses are compulsory for the students to further advance in their respective undergraduate programs. Students enrolled in any specialization do undergo the modules offered in the foundation year. The study materials followed in these courses were from the New Headway Plus series published by Oxford University Press. Elementary (equivalent to A2 as per CEFR) Pre-Intermediate (equivalent to A2-B1 as per CEFR) offered in two consecutive semesters (First and Second) for the arts and science stream students, whereas Intermediate (equivalent to B1-B2 as per CEFR) and upper-intermediate (equivalent to B2-C1 as per CEFR) modules are offered to students who would specialize in information technology and pharmacy in their UG programs. The study materials consist of students' book and workbook in both print and digital forms. The teachers get their copies of teaching manual to plan their lessons effectively.

The assignment is organised as follows: Section A focuses on the contrastive look at the similarities and differences in the nature of prepositions in Arabic and English. Section B illustrates the problems faced by the learners in the learning of prepositions and the differences in prepositional patterns at the level of form, meaning, the usage of the prepositions. Section C assesses the strengths and weaknesses of the materials followed in the teaching and learning process.

### Section A: Prepositions in English and Arabic

Prepositions are one of the other grammatical categories in the English language, which is an interesting feature to explore for researchers involved in English as a Second Language (ESL) learning. Table 1 below shows the types of prepositions and their forms. It shows the relationship between a noun or pronoun and other elements in a sentence, but it can never be followed by a verb.

Table 1: Preposition types and their forms

Types	English equivalent Prepositions
Simple	Common to describe time, place or location (e.g., <i>in, to, on, at...</i> etc.)
Double	e.g., 'into', 'onto', 'upon', 'from within' etc.
Complex	e.g., 'in addition to', 'in the middle of' etc.
Participle	End with -ing/ -ed (e.g., 'Considering' 'during') etc.
Phrase	'on time', 'at home' 'before class' etc.

The interference of L1 on L2 learning has been well researched and documented in the literature on ESL learning (James, 1980; Selinker, 1972). Learning prepositions has always been challenging for L1 Arabic ESL students. It has been reported throughout the literature on English as a second language learning contexts (Boquist, 2009; Mahmoodzadeh, 2012; Catalan, 1996). L1 Arabic ESL learners find it difficult to learn, mainly due to the difference in the nature of



prepositions in English and Arabic (Al-Sayed, 1983; Mukattash, 1985; Zughoul, 1979; Thyab, 2019; Serhan et al., 2019; Alahmadi, 2014; Alkhudiry & Al-Ahdal, 2020; Javid & Umer, 2014). Dera (1994) reported difficulties in learning the spatial prepositions, whereas Al-Ahdal & Asmawi (2021) reported issues with the temporal prepositions as well. Below is the comparison of prepositional forms between Arabic and English (Al Marrani, 2009).

**Table 2: Comparison of structural positioning of prepositions in Arabic and English**

Structural patterns of preposition in English & Arabic			
English	Prepositions	Arabic	Prepositions
S+ V+ Prep. Phrase		V + S + Prep. Phrase	/fi/, ?ila /
S+ V + Prep. + Pro.	'at', 'under' and 'to'	V + S + Prep. + Pronoun	/bi / and /?ila /
Prep.+ - ing V (Gerund)	Present	-	-
before, after, since.	Occur as conjunctions	-	-
-	-	Occur as verbs	/?ala: /, /?ada/ and / ha:fa/.
-	-	Occur as nouns	/ ?an/ / ?ala/, /moð / and / monðu /.
Occur at the end of the sentence (expressions: interrogation, emphasis, exclamations, infinitive purpose)	Present	-	-
Description on the types			
English	Description	Arabic	Description
<b>Prepositions of place</b>			
in, at, to, into		/fi:/, /?ila/, /mIn/	
<b>Prepositions of position</b>			
on, at, in		/?ala/	
<b>Preposition of time</b>			
at, in, on, by, for, during, before, after, since, until, till.		/fi:/, / ?ila/, / hatta/, /mIn/	
Since	In Present Perf. & Pre. Perf. Cont.	/ moð /, / monðu /	Present & Past time
<b>Preposition for resemblance</b>			
Like		/?alka:f/	
<b>Preposition for possession</b>			
of, which, without.		*/?alla:m/ 'Of' literally represents 'for' in case of possession	*This house is <u>for</u> Ali.
<b>Preposition for causative</b>			
out of, to, because of.		/mm/, / ?an/, /fi:/, /?alba/, / ?alla:m/, /kar /.	
<b>Preposition for accompaniment</b>			
With, without		/fi:/, /?ila/, /?alba/.	
<b>Preposition for exception</b>			
except		/?ala: /, / ?ada: /, /ha:fa:/	
-		/mm/, /?an/.	For substitution



The patterns of occurrence of prepositions in Arabic and English are very different. On one hand, there are only twenty prepositions in Arabic, and of those, only six are most commonly used (Hasan & Abdullah, 2009), whereas English has been reported to have around one hundred and fifty prepositions (Essberger, 2000). Arabic prepositions are limited, so they don't correspond to all the forms available in English. For instance, the spatial/temporal prepositions like "in," "on," and "at" refer to place/position depending on the context, but for L1 Arabic learners, it is difficult to differentiate the difference in meaning between the following sentences due to the L1 interference.

I am at school or I am in school.

English prepositions have more than one value attached, which makes them ambiguous and difficult to learn. Lengths of time representing prepositions such as 'since/for' distinction are not so easy to learn by the Arabs; varied uses of 'by' also pose difficulty for the learners. Likewise, spatial prepositions are also complex to learn. Locational prepositions like, 'under', 'over', 'between', 'above', 'around', and 'within' also are difficult to learn due to varied connotations, which are context dependent. Even the directional prepositions like 'to', 'toward', 'from', and 'through' are difficult forms in different contexts. Prepositions like to, of, with, and in which are frequently used in the English language, pose greater difficulty for learners as they derive connotations from the contexts they are used in (Appendix 1).

Table 3 below shows the commonly used prepositions in Arabic and their English counterparts. It can be noticed here that the English counterparts are dynamic in nature, and are used differently in various contexts, whereas Arabic prepositions have very limited and restricted usage. Moreover, adverbs in Arabic are used as prepositions in many cases, such as (e.g., *khalfa* (behind), *amam* (in front), *bayna* (between), etc.).

**Table 3: Commonly used prepositions and their English correspondences**

Arabic prepositions	English equivalent Prepositions
min	from
ila	to
an	about
alla	on, over
ba/bi	by, with
la/li	of, for
fi	in, into

The following example illustrates this:

For instance,

We were interested in the film. > “*nahnu istamta'na bilfilm.*” (Meaning: We were interested with the film)



Here, ‘with’ is used instead of ‘in’, because ‘in’ is referred to by ‘fi’ for place/location. In Arabic, /bi-/ as prefix used for such expressions. Prepositions after adjectives are also very difficult to learn. As in English, certain combinations are accepted as chunks, whereas L1 Arabic learners determine the following prepositions after adjectives based on their understanding of context in their L1. Therefore, errors in forms like \**ashamed from*, \**composed from*, \**object on*, \**blame on* commonly occur with L1 Arabic learners.

This leads to the following types of errors committed by L1 Arabic learners (Tahaineh, 2010; Hamdallah, 1984; Scott and Tucker, 1974):

*Omission:*

e.g.

She plays Sunday (Incorrect)

She plays on Sunday (Correct)

*Addition/Insertion:*

e.g.

I will practice on making the food.

I will practice making food.

*Substitution:*

‘on’ is used for ‘over’/’above’/’at’, ‘onto’

for instance,

‘My friend was satisfied from my explanation’\* (Incorrect)

‘My friend was satisfied with my explanation.’ (Correct)

‘My mom was angry from my bad behaviour’\* (Incorrect)

‘My mom was angry at my bad behaviour’ (Correct)

## **Section B: Difficulties related to learning prepositions for Arab ESL learners**

The learners are primarily hampered by the lack of a one-to-one mapping between Arabic and English prepositions. The prepositional usage in English is idiomatic (especially in phrasal verbs and prepositional verbs) and polysemous, making it difficult for learners to follow, and even native English speakers are unsure of the correct usage (Al-khudiry et al., 2020). The conceptual mapping in L1 is very different from the target language, which often leads to L1 interference in prepositional usage. Mahmoodzadeh et al., 2012; Taghavi et al., 2012), but also in positive transfer in many cases. There are similarities in prepositional usage patterns between Arabic and English. Use of ‘from’ (as in ‘I will come from the market’) and ‘with’ (as in ‘She stays with her father’) to indicate the starting point and to indicate the company of someone, respectively. Therefore, direct transfer from the Arabic language can lead to positive transfer, but the cases of negative transfer are more numerous due to the richness of prepositions in the English language.

In standard Arabic, a preposition can have multiple meanings, but due to the knowledge of colloquial Arabic, the learners are able to follow only one English equivalent. It is reported that the learners who are good at standard Arabic reflect more positive transfer than the students who



lack knowledge of the same. In my teaching context, it is very unlikely that the students who join the preparatory year at NBU know standard Arabic very well.

Since the definite equivalent of an English preposition is unavailable in Arabic and vice versa, in terms of usage and meanings we find differences (as the same preposition is used for time and space). Learners mostly face difficulty with ‘*in, on, at*’ as these are frequently used forms and have multiple meanings in various contexts. For instance:

- a. Summer ends **in** the last of September. (on)
- b. **In** the end of the day, we played cricket (at)
- c. **In** my last holiday I enjoyed a lot (during)
- d. The plane is flying **into** the sky (in)

The learners face difficulty in the use of ‘in’, as ‘fi’ is the only Arabic equivalent available to indicate a point and period of time, and in the above instances, negative transfer has caused errors. The following sentence can also be seen to better sense the patterns:

e.g., *Seema enjoyed the match.*

In Arabic the same expression should be formed as,

*Seema enjoyed with the match. or Seema enjoyed from the match.*

Arabic allows a preposition to be inserted to establish a relationship with the noun that has caused enjoyment. Similarly, many prepositions are dropped from expressions, despite the fact that they are required to make meaningful expressions in English. For ‘on’, ‘ala’ is the equivalent term in Arabic, which may represent ‘*above, at, onto, on, over*’. Such cases lead to literal translation from L1, and direct negative transfer to cause errors in use. Learners find it very difficult to remember the context they might have learnt as rules or to assess the context from the sentence, which eventually forces them to resort to transferring similar conceptual mapping from L1 to the target language. Although there are similarities in the form, meaning, and usage patterns between Arabic and English, they differ a lot in terms of usage and the number of equivalent forms (for instance, Arabic has only six locational and directional prepositions whereas English has more than 30 prepositions for the same) as well (Hasan and Abdullah, 2009; Hussain et al, 2019).

### **Sector C: Analysis of the study materials and recommendations**

The new headway plus special edition (elementary & pre-intermediate) enables the learners to be able to achieve A2 and B1 level of language proficiency. Each unit covers a wide range of grammatical areas and addresses all the four skills (reading, writing, listening and speaking) through variety of exercises in 14 units, provides the study materials for 120 hours approximately. The content of each title is very comprehensive and offers range of contexts to prompt the learners to actively participate and unconsciously achieve grammatical accuracy as well. At the elementary level and pre-intermediate levels, texts for reading skills are mostly on universal or timeless topics which are certainly interesting for the learners. However, contemporary topics should also be included to grab students’ attention. In listening section, the book offers a variety of exercises related to pronunciation practice, clear and distorted speech as from the real-life events so that



students can relate more to formal as well as informal situations. Listening exercises are a mix of recording of native and non-native speakers so that learners can relate to wide range of speech patterns and accents; this eventually helps them develop a sense of English speech patterns followed and accepted across the globe. In writing and speaking, the students get exposed to formal and informal registers. With regard to prepositions the following content is distributed across the students' book and the workbook.

**Table 4: Materials related to prepositions at Elementary and Pre-Intermediate levels**

<b>Student Book [Elementary, A2]</b>				
Preposition	Content	Exercises/activities	Unit	Description
	In, after, for, on, from, to, as, about, by	Gap filling	3	'In, on, under, next to' (in A1) (No logical pattern for such choice)
	Of, until	Gap filling	7	No other activities
	Of until	Gap filling	8	No other activities
<b>Workbook [Elementary, A2]</b>				
Preposition	Content	Exercises/activities	Unit	Description
Place	In, on, at,	Gap filling	2	manner, time etc., which are commonly used could be included
Time	In, on, at	Gap filling	7	
Time	In, on, at	Gap filling	10	
	Then, from	Gap filling	11	
<b>Student Book [Pre-Intermediate]</b>				
Preposition	Content	Exercises/activities	Unit	Description
Mix	To, from, at, about, of, on, in, with, for	Gap filling	1	
Words go together	Preposition + noun Adjective + noun Prep. + verb	Error corrections Gap filling Write sentences	12	Exercises (1 -5). Each carry 7 sentences
Words go together	Carry about Married to Good at Info. About On strikes Angry with Different from Look like Belong to	Gap filling	14	
Time	In, on, at, zero preposition	Gap filling	Grammar ref. section	One exercise with 10 sentences
<b>Work Book [Pre-Intermediate]</b>				
Preposition	Content	Exercises/activities	Unit	Description
Words go together	Words go together	Gap filling	5	
	Phrasal verb	Gap filling	11	



It can be noticed from table 4 that the exercises focus mostly on gap filling. In terms of content, ‘in, on, at’ besides ‘in front of, about, after, for, from, like, phrasal verb, have been introduced at the elementary level. However, not all the prepositions introduced in students’ book have been further reinforced in the work-book as well. Moreover, the exercises in work-book focus only on time expressions. As supplementary materials I distributed worksheets not only related to gap-filling, but also to error-corrections, writing drills, preposition identification tasks etc. to reinforce as prepositions to be seen in the context of real-life events. Working out the sentences in isolation does not result in accuracy in the learners’ responses; text on more communicative events should be used so that conceptual clarity could be developed by the learners. In addition to that, locational and directional prepositions are missing, which could be introduced at least in reading texts or else more exercises could be included.

In pre-intermediate books, only one exercise has taken ‘zero preposition’ as a condition in gap-filling activity, which I think is very necessary in all the activities as ‘insertion’ or ‘addition’ of preposition where it is not required is a common error committed by Arab learners due to the L1 interference. ‘omission’ is also reported as error-type, which could be addressed well in the exercises. In this way, the negative transfer cases could be minimised to a greater extent. Content regarding building up collocational knowledge of the students, pre-intermediate study material offers good number of exercises. However, considering ‘substitution’ as an error-type committed by Arab learners due to L1 interference, error corrections, peer-review of the writing tasks with a special focus on prepositions introduced are very helpful. Elaboration and discussion on the same would further make them aware of the patterns of preposition in English. Encouragement for extensive reading is essential to master the dynamic patterns of prepositions.

Textbooks play significant role in developing learners with various skills. It is questionable whether there is enough speaking practice of using which required activities of prepositions. In general, however, the book’s faults are outweighed by its strengths and these can be overcome through adaptation and supplementation of prepositions. At pre-intermediate level, the learners could have been given the more prepositions, apart from prepositions of place to only place, but to manner, time etc., which are common uses at elementary level. Apart from presenting ‘no prepositions’ to be used, the book would have concentrated on behind, besides, (extension of place prepositions). However, the instructor can always supplement with their learning materials to fill the gaps. In my teaching context, spatial and temporal prepositions are effectively taught by Communicative Language Teaching method (Asmawi & Al-Ahdal, 2021), but a considerable discussion on the errors with the students (as in my context the students are freshmen pre-university students) would certainly enhance the learning experience of the students. Worksheets on the variety of contexts using all types of prepositions could help them sense the contexts they are used in. Further exploration on more effective ways to learn preposition would be helpful for the instructors involved in ESL/EFL teaching.

## 2. Conclusion

Students of the English language may struggle with the correct and appropriate usage of prepositions. This is especially true for students whose first language is not English, such as those who speak a Semitic language like Arabic. Findings from the literature, however, show that cognitive linguistics is a successful tool for teaching pupils about complicated English language



aspects like prepositions, in comparison to more conventional methods like rote memorization. It follows from the data that the native language influences which preposition is used. When users' verbal skills are limited, this effect is magnified. In order to raise second-language preposition awareness among EFL and scientific students, the study recommends implementing new programmes. Though the paper discusses the nature of prepositions learning among the Arab ESL learners. It can, however, be seen as a stepping stone toward future, more in-depth studies of prepositional usage. More generalizable results can be expected from a study in which more ESL students of various racial and cultural backgrounds participate which is very much needed to have a comprehensive view of differences in the patterns of prepositions in Arabic and English.

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## Appendix 1

(Source:

[https://www.academia.edu/5277824/Contrastive\\_analysis\\_between\\_English\\_and\\_Arabic\\_prepositions](https://www.academia.edu/5277824/Contrastive_analysis_between_English_and_Arabic_prepositions))

### Arabic Prepositions

Arabic prep. (Forms)	The meaning	Eng. equivalent
/bθ/	The used tool	With
	Exchange	For
	At a place	At
	Condition	With
/m <sup>o</sup> θ/	Company of somebody /something	with
/ʔIθ/	Towards somebody/ something	To
/monðu/	Point of time in the past up to now	Since
/ʔn /	On the subject of	About
Arabic prep. (Forms)	The meaning	Eng. equivalent
/mIn/	Starting point	From
	Partition	Of
	Cause	Of
/la:m/	To be given to	To
	In accordance with	To
	Purpose or benefit	For
/fi/	Indicating state	In
	Into a place	In



# Analyzing the Architectural Characteristics of Tadao Ando's Museum Projects

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**Abstract:** *The museum is one of the building types that lead the development of architecture, transcending physical borders and regionalism and revealing the experimental nature of modern architecture. Japanese architect Tadao Ando is a representative architect of contemporary architecture but also designed the most significant number of museums and sublimated traditional Japanese architecture into a modern interpretation. This paper explores Ando's philosophical background, which seeks to inform the relationship between architecture, humans, and the environment via unique Japanese culture. As a methodology, an existing literature study collected and analyzed various materials necessary to understand Tadao Ando's architectural theory and museum. His workspace's components and details of expression were observed and explored through field visits. Regarding the characteristics of his work, the architectural background and architectural history, and the overall spatial composition and features of the pieces were analyzed with references and drawings. The result showed that Tadao Ando has been constructing architecture using the geometric formative language formed through his experiences in various fields, influenced by Western classical architecture and abstract art. Tadao Ando embodies his attitude towards nature, which is entrenched within him. As a result of a holistic analysis of Tadao Ando's architecture after 1985, It was proven that it is a phenomenon that appears throughout the work, and as the plane of geometry is repeated, the logic of form composition is consistently shown.*

**Keywords:** Tadao Ando, Museum, Dismantling, Simplicity, and Complexity, Borrowing Landscape

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## 1. Introduction

The museum, which has grown explosively since the 1980s, both quantitatively and qualitatively, is one of the types that lead the development of architecture, transcending physical borders and regionalism and revealing the experimental nature of modern architecture (Lee, 2020; Anderson, 2018; Scherling, 2017). On the other hand, the indigenous culture, tradition, regionality, and spiritual climate of a nation that can be lost as it is formed through networked globalization with the advent of computers must be preserved because this is the culture, philosophy, strength, and superiority of that nation (Arar et al., 2021; Stevanović, 2013).

From this perspective, this paper seeks to understand the philosophical background underlying Ando's architecture, which aims to inform the relationship between architecture, humans, and the environment, which is common in museums designed by Tadao Ando, through Japan's unique culture and seeks to create an original architecture (Jung et al., 2021; Buntrock, 2011; Vasilski,



2010). The purpose of this study is to deduce the character of expression that appears in the architectural works of the museum by deriving a traditional method. We shed light on the significance of the museums designed by Tadao Ando in contemporary museum architecture because Tadao Ando is not only a representative architect of modern architecture but also Norman Foster and Frank Gehry, Hans Hollein, Arata Isozaki, and I. M. Pei designed the most significant number of museums and sublimated traditional Japanese architecture into a modern interpretation (Jung et al., 2021; Vasilski, 2013). This study is meaningful because he is an architect who overcame the limitations of Western architecture (Jung et al., 2021, Xue et al., 2009).

## 2. Literature Review

### 2.1. Architectural Background

Under the influence of a culture that has uniquely developed transportation and commerce through rivers and canals in Osaka, the physical environment and natural view of Osaka, such as traditional Japanese architecture, the use of water space, the work of exposed concrete, the composition of space, and the use of light This indicates that it can be understood as a kind of philosophical background reflected (Buggeln, 2012; Baba, 2006; Ando, 2000).

His architectural philosophy, expressed as an architecture of brief and understated details that excludes splendor and decorative elements rather than splendor and decorative elements, aligns with Osaka's pragmatism (Camarero & Garrido, 2011). Also, Osaka's urban planning is a combination of many traditional and modern architectures (Bognar, 2008). Due to Osaka's complex spaces and types of structures, the alleyways connected like a maze and the canals passing through them have always existed in his life (Cole et al., 2020). In this way, the image of Osaka's labyrinth is used as a form of expression in the architecture of Ando (Clark & Pause, 2012). In his work, the plane is simple, but the interior is visually diverse, such as a courtyard, hallway, crevice, flowing stream, dark passage, and an open-top (Dong & Liu, 2016). It has a complex composition that changes rapidly (Ando, 2003).

Ando and her maternal grandmother, a typical Osaka woman with the rational spirit and self-reliance of upper-class people, and her maternal grandmother, run a store and thoroughly learn the rationality and idealism of the two while living together for a long time (Molinari, 2009). The narrow, long, wooden two-story house with three rooms in the front and eight rooms on the side where Ando lived when he was young had many dark places, and no matter how much light came in, there was a shady place somewhere (Meier et al., 2003). Here, Ando always came into contact with the warm and soft light from her wooden and shoji paper (Kirchberg & Tröndle, 2015). So, she was able to turn hard concrete into a smooth finish like shoji paper with light (Ando, 2012).

Ando naturally learned the sense of space possessed by traditional Japanese architecture by visiting Osaka, Kyoto, and Takayama and met Alvar Aalto through architecture through overseas trips to Europe, Moscow, and Finland (Lifu, 2005). And found a clue to Ando's modern interpretation of traditional architecture (Lindsay, 2020). He came to think about the application in Japan through the architectural approach related to the locality of Finland. After that, while traveling to Switzerland, Italy, Spain, and Africa, he was greatly influenced by the creative spirit and charm of the architecture and the construction of geometrical architectural spaces in the works of abstract



artist Albus and was greatly influenced by learning and using the grid technique (Ryan, 2010; Sewing, & Wegerhoff, 2004; Ando, 2002).

## **2.2. Architectural Practice**

He was born in Osaka in 1941. And after graduating from middle school, he tried to become a carpenter at a carpentry shop, but he went on to high school due to severe opposition from his surroundings (Nicholson, 2014). He started his career as an architect, starting his first architectural job in 1969 when a friend introduced him at 18 years old. He studied architecture while working (Yingping, 2010). At 20, he was thirsty for learning, so he looked at Le Corbusier's works and started training from modeling to sketching (MacLeod et al., 2015). From 1965 to 1969, he expanded his knowledge by traveling abroad several times and opened an office in the early spring of 1970 (Schwartz, 2016). After that, he won the Japan Cultural Design Award for numerous house works such as 'Rose Garden' and 'Koshino House,' solidifying his position (Lord et al., 2012). It began to be widely known abroad. He received the French Academy of Architecture Award, the Osaka Art Award from Osaka Prefecture, the Arnold Bruner Memorial Award from the American Institute of Architects, and the Carlsberg Architecture Award in Denmark. Garden of Fine Art', 'Suntory Museum,' 'Naoshima Contemporary Art Museum Annex,' 'Chikatsu-Asuka Historical Museum,' 'Francois Pinault Foundation for Contemporary Art' and so on (Lambrecht, 2018; Hu et al., 2018). He has always been with the construction site due to his extraordinary love and philosophy for architecture, and he is still actively engaged in architecture activities in Japan (McNeill, 2006).

## **2.3. Architectural Language**

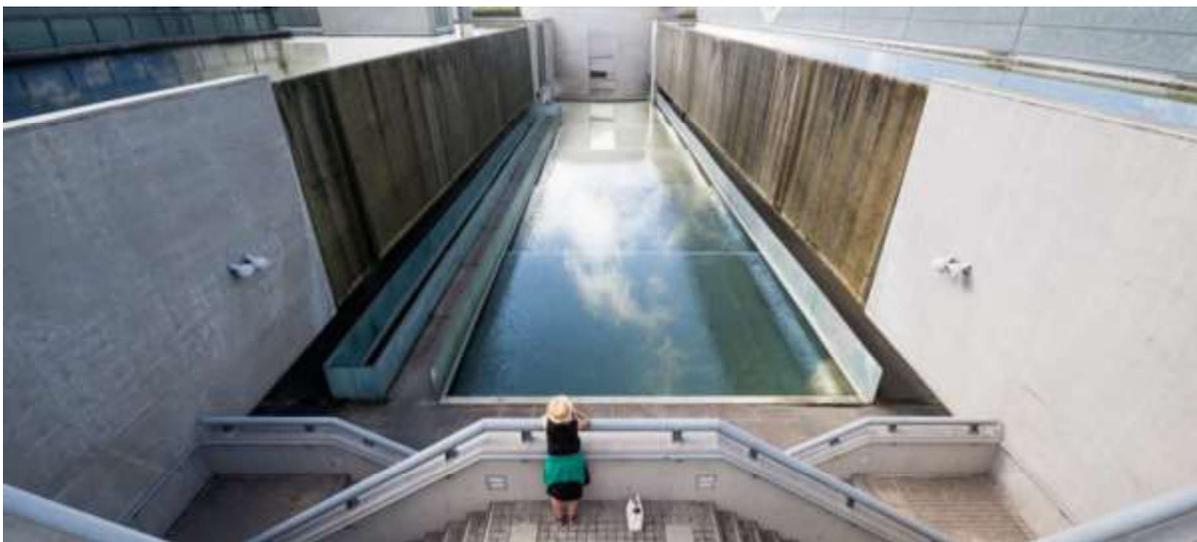
### **2.3.1. Water**

The fact that he was born in Osaka, the city of water, and his experience of being familiar with water from an early age suggests that he is relieved of his love for the water (Macleod et al., 2018). Ando appears as an element of the landscape that looks at water from the inside of a building, as a boundary wall that cannot be crossed, and as an architectural expression of the physical phenomenon of the natural element itself (Keane & Keane, 2005). When water enters from the outside, it moves along with the sound of the water, but when it is stopped, it looks at the water, spills, drops, and locks up to create a stable and quiet landscape (Jodidio, 2007). In other words, it contains the properties of nature that are constantly changing rather than stagnant water (Ivy & Pollock, 2002). He expressed it as 'flowing but not flowing' (Helmets, 2012) (Figure 1). In addition, it watermarks the territory and secures the uniqueness of the building (Shukla, 2000). In other words, water is used as the boundary between nature and architecture or as an image of coexistence (Treib, 2009).



**Figure 1: Water Element in Naoshima Contemporary Art Museum**

In addition, the lightness or floating image of the architecture that can be inferred from the ships and water in Osaka Port through rivers and canals in Osaka does not exist in opposition to the building and its surroundings (Wakefield, 2015) (Figure 2). Ando mainly uses shallow water, embodies quiet flowing water, and is architectural. Before reaching the enemy space, it is also cracked down as part of the process (Schittich, 2013). This creates a phenomenon in which the experiencer sees the remnants of the building reflected in the water and causes a transition with the artificial construction in pruning and sometimes as a natural element (Moriyama et al., 2016).



**Figure 2: Water Element in Sayamaike Historical Museum**

### **2.3.2. Light**

It is light that makes space perceptible (Wong, 2014). This relationship, which leads to the power of space and the ability of light, is projected on the building in Ando and affects the architectural



form and spatial structure to form a depth of expression (Ando, 2003). In addition, dawn always approaches dramatic space production because of its accidental and dynamic mechanism (Crowther & Lancaster, 2012; Erzen, 2004). Ando is also a director of light. Light has various properties and expressions, such as reflection, scattering, diffusion, direct sunlight, and transmission, and the angle and amount of illumination change the face over time (Fenske, 2013). This plays a vital role in underlying his architectural philosophy by enabling the production of various spaces in a building with a simple geometric structure (Helmets, 2012).

Ando lives in a dark house, but darkness coexists with light (MacLeod et al., 2015) (Figure 3).



**Figure 3: Sky Light in Naoshima Contemporary Art Museum**

Light stands out as darkness, and darkness adds depth even with light. It can be thought of as absolute light and absolute darkness in the notion, but both always coexist in architectural space, and Ando uses light to maximize the area through the contrast between dark and light (Nasvik, 2008). Emphasizing the effect of shading expressed by light, light entering the room through a low opening in traditional Japanese architecture is reflected on the floor. It flows in subtle shades to the corners of the room, trying to capture the original characteristics of light it is (Naidoo, 2018).

In the architecture of Ando, light is the most apparent phenomenon of nature. In other words, light shines on the walls of the cold and quiet space created by concrete, intentionally creating a soft and transparent situation that transcends the material itself (Morby, 2006).

### **2.3.3. Courtyard**

For Ando, nature is not the opposite of reason but rather a primitive situation in which humans are related. Rather than making nature friendly with itself, he hopes to change the meaning of nature through architecture (Williams, 2007). This is the work in which architecture abstracts nature. It appears as a blank rather than a natural appearance. To avoid the reduction of his architecture to a consumer image, he works based on experience rather than appearance (Treib, 2009). In Ando's works, a courtyard is found, a metonymy of nature, and introduces vital elements in the outline of wind, rain, snow, and the sky (Shiner, 2007) (Figure 4).



**Figure 4: Natural Courtyard in Naoshima Contemporary Art Museum**

Ando inserts a courtyard in every building (Wineman & Peponis, 2010). The yard is a traditional space and expresses the way of life of Japanese people (Rappolt-Schlichtmann & Daley, 2013). In addition, although planting is rarely used, artificially created landscaping outside the building is excluded, and the courtyard is introduced as a living space (Pallasmaa, 2015). Such a courtyard draws light into the living space and is called a space called light well, and the wall that creates such a garden has a new meaning in Ando architecture. For Ando, the wall is a device that sets boundaries, a tool for catabolism, and serves as a barrier between two objects (Nussaume, 2009). In other words, it creates mineral crystals.

My from architecture in Ando. It was mainly used to show when connecting the outside, and the relationship between public and private spaces that create geometry creates a courtyard, which further developed into a plaza (Farhady & Nam, 2011). As regular units were repeated in the architectural form, a void was inserted and developed into a square. The traditional Japanese view of nature is well expressed (Gill, 2010).

#### **2.3.4. Exposed Concrete**

Since modern times, concrete has been positioned as a universal building material of the incomplete use of structural performance based on physical stability (Hsu et al., 2015). Ando tried to express the tendency of Japanese people to find softness in materials with the sensibility of the Japanese, who had long lived in the architectural culture of wood and paper in Japanese residential spaces with the material concrete (Mainridge, 2006). Ando emphasizes the validity of concrete as a material for realizing an area composed of volume and light, not as a tool for sculptural spatial composition. Since the tactile sense of concrete is considered more important than its structural performance, efforts were made to make concrete with a smooth and soft texture, leading to concerns about whether it can be poured more firmly (McClellan, 2012). Exposed concrete embraces all colors but contains the variability to freely change all architectural languages with penetrating power that does not change their characteristics (Figure 5).



**Figure 5: Exposed Concrete void Space in Hyogo Prefectural Museum of Art**

Ando does not think of the concrete box as merely a physical existence but uses it to pursue a spiritual architecture that re-recognizes the relationship between life and nature (Mehta & MacDonald, 2012). Ando understood the essence of architecture about light. The cold and quiet space created by concrete as an inorganic material flows in and reflects or absorbs sunlight on the wall, making sense of delicacy and tension in the area. And it is said that by finishing the surface as smooth as a mirror, the importance of weight as a structure is eliminated, and a state of weightlessness is created (Nicholson, 2014).

Ando first came to use concrete because he thought that exposed concrete was the material that best expressed the simplicity of traditional Japanese architecture and the attractiveness of creating an ample space with low construction cost (Nute, 2004). Ando believed that rather than revealing himself by the materials forming the architectural space, he accepted nature as it is and that the beauty created by the existence of humans in the colorless area created by nature's materials gives life to the architectural space. Ando exposed concrete is the most suitable building material to form such an architectural space (Sadiki, 2020).

In particular, using concrete as exposure is a trademark of Ando that has elevated the hidden beauty of exposed concrete to a poetic level and is trending worldwide.

### **2.3.5. Color**

Ando tried to revive the material of nature as it is about color. To establish the space, the color of the chassis was kept to a minimum, and the color of the material itself was used, such as the color of concrete, tatami mats, and wood, just like in a Japanese house. In Japanese architecture, only primary colors are unified, and the surrounding trees, plants, light, and wind give color to the space (Self, 2014).

Even though it is the same gray concrete, there are various depths of color in it. Just as multiple colors can be expressed with subtle differences, deep thoughts about living space are described in



multiple colors, which coincides with his philosophical meaning of exposed concrete (Veal, 2002) (Figure 6).



**Figure 6: The Color of the material in the Chikatsu-Asuka Historical Museum**

### **3. Methodology**

Since it aims to analyze museum architecture from a diachronic point of view, the subject of this study is 1985, which is a period of maturity (1969 - 1981) and completion (1981 - present) in Ando's architectural activities. Physically realized architecture as a later work is included in the primary research scope. It was a period when the results of this period more freely realized their formative will under more diverse conditions based on their previous experiences. The characteristics of the external spatial composition are also complex, and the museum's design was most active during this period.

The research method was based on the existing literature study, collecting and analyzing various materials necessary to understand Tadao Ando's architectural theory and museum. His workspace's components and details of expression were observed and explored through an actual field visit. Next, the characteristics of Tadao Ando's work, his career's architectural background and architectural history, and the overall spatial composition and parts of the results were analyzed with references and drawings. The analysis is organized through analysis. Based on the above data, his works' architectural philosophy and characteristics are reviewed.

### **4. Analysis**

#### **4.1. Architectural Philosophy: Dismantling**

The wall is not limited to just enclosing the box; it is disassembled into cotton and handled with care so that it does not feel like a blocked presence at the four corners. It can also be seen in drilling an opening by attaching it to one end. From the effect of volume and the impression of still solidity seen in the masonry, it is the process of making the perimeter of the building immaterial and weightless. . This is the direction towards the concrete architectural space with Japanese lightness.



Ando throws himself into the city of Osaka, which has been struggling with overcrowding from the beginning and rejects the outside to live a healthy life there. With this influence, the architectural space is surrounded by exposed concrete walls (Figure 7).



**Figure 7: Dismantling in Church on the Water**

He, who has devoted all his energy to securing the inner microcosm, kept a material called exposed concrete in his laboratory and gradually digested it as his own. When it came out as a sale site developed in the city's suburbs, it was intended to induce the nature of the outside by disassembling the closed box and setting the cut-out wall in 4 rooms to act as a face. It is between what is surrounded and open (Figure 8).



**Figure 8: Dismantling in Azuma House**



This is because the closed box that made up the building is decomposed into surfaces, and light penetrates onto each wall to illuminate the decomposed surface. As a result, the concrete fence becomes material and rises lightly. As a device that makes it look like a single partition that limits the space, it has taken root in the overall architecture of Ando.

#### 4.2. Architectural Philosophy: Simplicity and Complexity

The plane of relief is simple. Looking at the simple exterior, he is drawn to the front and descends or ascends toward the open space, and his construction begins. However, the interior experience of this architecture is very diverse and complex. It isn't easy to compose such an architectural plan by connecting the partial scenes that develop according to human movement. Enter from the entrance and go left. The exhibition room comes out on the right, goes up the stairs on the second floor, goes around the wall, and comes out to the exhibition room. A continuous gap illuminates the ceiling and bottom of the exhibition room, and the light from the courtyard enters. Moving the stairs from the basement to the second floor will cause you to lose your sense of position or direction (Figure 9).

The impression you experience while walking through the space inside a building is not simple but has complexity like a maze. This is because the water space in the courtyard is opened with a silver horizontal plane and leads to a narrow and long passage made of concrete and glass walls and meets the bright sky wide open at the top.

This is manifested in different attitudes between the two forms in other aspects when recognizing architecture. The purpose is to construct numerous scenes in a simple physical form and inject them into fusion. Using concrete material, the order for entering and leaving the building is made as short as possible while also trying to enrich the order that humans experience while walking.

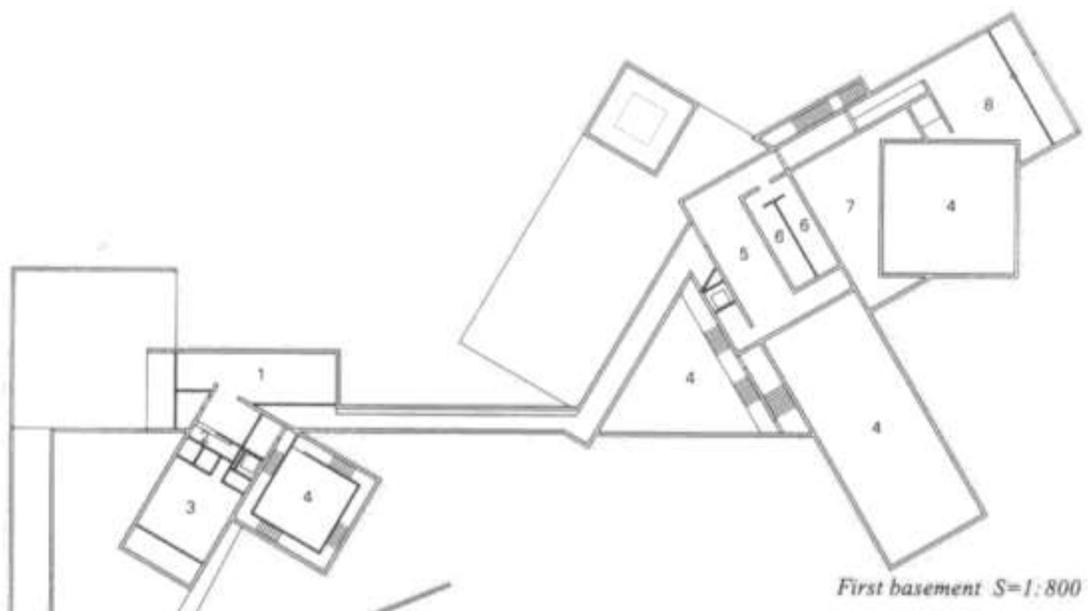


Figure 9: Plan of Chichu Art Museum



#### 4.2. Architectural Philosophy: Proportion and Rhythm

Examining the elemental composition in the form of Ando architecture, it can be seen that rigid geometry and order are controlled. His architecture consists of squares and circles, which are often an essential factor in giving a sense of rhythm as they are composed and repeated on a scale of various sizes in a strict order. As the square faces are repeated, the exact proportions are used for the liver and small spaces on different scales, and the accents of the large and small scales make you feel the rhythm of a distinct space by experiencing the interior (Figure 10).



Figure 10: Proportion of Suntory Museum

Although the complicated manipulation of figures seen in Le Corbusier's architecture is not seen, it can be felt that the total order is created by adding the unit of the completed figure called a square from the beginning of the idea. In addition, by realizing it as a lower-dimensional square of furniture and manipulation, the principle of the free form works in every corner, filling the transparent order. The inherent weight of the material is lost in autonomous figure construction.

#### 4.3. Architectural Philosophy: Traditional View of Nature

The Japanese view of nature tends not to leave nature as it is. I think of nature as rough, disordered, and barren as untouched by human hands. He brings it into the yard and leads it under his control. The most revealing of this Japanese view of nature is the concept of "borrowing landscape." The borrowing landscape in Japan established in the Muromachi period does not simply use the environment but implies active landscaping. The borrowed landscape becomes the host of the garden. In other words, a part of nature cut or cycled by human will is introduced into the garden.

This traditional view of nature greatly influenced Ando. Ando abstracted the unordered nature through walls or frames by confining or cutting it and introduced it into the architecture.



Ando's architecture is permanently embedded with natural elements one by one. The aspects of water on the water wall and the scenery looking at the sea are like that, and this is how the space is created using light. And the natural element shown in various works is expressed in the concept of a courtyard. In particular, this concept is intertwined with the traditional Japanese garden, and water, light, and nature are cleverly harmonized to create the architecture of Ando as a natural artifact (Figure 11).



**Figure 11: Traditional Japanese "Borrow landscape" Technique**

#### **4.5. Architectural Philosophy: The Coherence of the Cube**

It is a design that clearly shows the relationship between nature and the building. In contrast with the surrounding forest and water, the cuboid gives order on the plane. The elemental shape composition consists of six concrete cubes arranged in parallel lines. Each of which is surrounded by a glass exterior and is made by emptying and filling the space. The six rectangular cubes are divided into two elongated communal areas and four short exhibition spaces. This space embraces the surrounding natural environment while accommodating various interior spaces and provides a home for the creative spirit of artists. The concrete cubes surrounded by the glass exterior emphasize the transparency of the glass. In addition, the strong impression that would have been felt if the heavy concrete had been exposed to the external environment was alleviated by the glass, emphasizing the clear cuboid outline in contrast with the surrounding water space. The toughness of concrete protects valuable artworks from the outside climate. The inner concrete cubes provide structural quality, and the outer glass cubes mitigate the direct effect of temperature on the pavilion (Figure 12).



**Figure 12: Modern Art Museum of Fort Worth**

The overall building plan is simple in the form of a 12 m x 52 m system, but various exhibition halls and other natural environment systems add diversity. The interspace surrounded by double-glazed glass and concrete is similar to a Japanese house, which belongs to indoor and outdoor spaces. This space serves as the focal point of the pavilion while embracing the surrounding light, water, and greenery while fostering creativity.

## **5. Conclusion**

The architecture of Ando has been understood and evaluated as a representative architect based on regionalism and overcoming the limitations of Western architecture within the framework of architectural theory made in the West.

This study aims to identify the main philosophical background underlying the architecture of Ando, which seeks to inform the relationship between architecture, humans, and the environment, which are common in these museums designed by Tadao Ando through Japanese culture. The purpose of this study is to derive the architecture and organize the characteristics of expression in the architectural works of the museum.

Based on the existing literature study, various materials necessary to understand Tadao Ando's architectural theory and museum were collected and analyzed. The elements and details of expression appearing in his workspace were observed and explored through the actual exploration. Next, the characteristics of Tadao Ando's work, the architectural background and architectural history of the work, and the overall spatial composition and characteristics were analyzed and explored in reference literature and drawings. Analyze and organize through Based on the above data, the relationship between his architectural philosophy and work was reviewed. The following conclusions can be drawn as a result of the study.



First, Tadao Ando has been constructing architecture using the geometric formative language formed through his experiences in various fields, influenced by Western classical architecture and abstract art. The geometrical order and the square geometric frame that defined classical Western architecture became the plain background to Ando's development of architectural philosophy using geometric shapes such as circles and squares.

Second, as a Japanese, Tadao Ando embodies his attitude toward nature, entrenched within him. The elements of light, water, and the courtyard are used to clarify nature. It can be seen that the opening in the aspect of landscape provision and the wooden structure on the surface was greatly influenced by Osaka, where he grew up. By actively accepting this traditional Japanese view of nature, it becomes an essential theme in the construction of architectural space.

Third, for Tadao Ando, he takes different attitudes between the two forms in various aspects when recognizing architecture. This element aims to make an order as straightforward as possible through the elements of blockages and gaps, simplicity and complexity, proportion and rhythm to construct a building using concrete material while enriching the order that humans walk and experience. is being used as

Fourth, as a result of holistic analysis of Tadao Ando's architecture after 1985, it is a phenomenon that appears throughout the work, and as the plane of geometry is repeated, the logic of form composition is consistently shown. The exact proportions are used for large and small spaces, and the contrast between the large and small areas creates a distinct interior. The overall composition is oriented to experience the external tension effect, the rhythm of the space, and a sense of floating. This is closely related to the program and scale of the building and changes in site conditions.

In this study, we examined the architectural characteristics of Tadao Ando, such as the spatial construction method using geometric means, the inherent dual order, and the introduction of aesthetic sense and traditional elements through geometry. Tadao Ando's work as an architect tries to create a living space with a modern interpretation of traditional Japanese architecture, which is closely related to the local humanities and traditional background while using strict geometry rather than simply using his work as a minimalist and modernist architect.

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## Bibliometric Analysis of Ethics and Online Learning Using VOSviewer Software

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**Abstract:** *The existence of the Covid-19 pandemic crisis has caused a drastic change in the learning process from face-to-face classes to online as a whole. This study aims to get an overview of ethical research and online learning in the past, present, and future. The analysis was carried out in two stages. The first stage is collecting data using publish or perish software. The database used is the Google Scholar Indexed Journal from 2012 to 2022. Using the keywords ethics, online learning, and pandemics, 2,046 article documents were obtained for analysis. The second stage is a bibliometric analysis using VOSviewer software. The quantitative approach of bibliometric analysis is applied to capture the context of ethics and online learning in the existing literature. The results of the analysis show that during the pandemic there was a surge in the number of articles and article citations in 2020. The bibliometric analysis produced network, overlay, and density visualization maps. The results of the analysis of visualization maps, co-occurrence, and link strength obtained information that previous studies put more emphasis on the keywords ethical issue, ethical consideration, approach, or ethical approval. Therefore, for further research, we suggest correlating ethics in online learning with culture, gender, ethical dilemma, disability, awareness, experiential learning, ethical conduct, risk, artificially intelligence, ethical issue, or privacy.*

**Keywords:** Ethics, online learning, publish or perish, bibliometric, VOSviewer.

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### 1. Introduction

The Covid-19 pandemic that is currently engulfing the world, including Indonesia, has had a positive or negative impact on various fields. In addition to the impact on public health and economic and business activities in the era of globalization, the world of education is experiencing unprecedented changes in the digital era. The impact of the Covid-19 pandemic on the world of higher education has radically changed the learning process, namely changing face-to-face or offline learning to distance learning or online. This change in learning methods causes changes in the behavior of the academic community. One of the most important behaviors is related to ethics, especially the ethics of lecturers and students as educators and students.

In terms of lecturers or educators, the five philosophies of educators must continue to be carried out, namely being able to provide knowledge, being able to provide values and ethics, being able to be an inspiration, being able to motivate, and being able to set a good example. [1]. These five things become more difficult for educators to do with the online learning process. From the side



of students or students, the ethics of the learning process becomes more difficult to control. For example, in attending online lectures, students often ignore ethics because of the freedom to control online lectures. The flexibility of online lecture control allows students during lecture hours to carry out other activities that have nothing to do with the ongoing lecture [2]. The ethics of online lectures should be no different from the ethics of offline lectures. In addition to problems in learning ethics, there are also problems in communication ethics between lecturers and students. Some cases that occur are communication ethics at the time of completing the final project or thesis [3].

Previous research gathered ideas and investigations to better understand the relationship between ethics and online learning. The complexity of the topic has led to very mixed results that lack consensus. The diverse nature of the field suggests that although several research methods have been developed, a better understanding of how ethical contexts are in online learning has not been presented [4]. Online learning environments require regulations and policies that balance the differing expectations of learners and educators. In addition, it also considers how students perceive ethics during online learning offered. Ethics that has been integrated as an important dimension of online learning is considered an attempt to understand human behavior and values to answer the question of what humans should do. [5]. The ethical dimension of online learning focuses on issues that aim primarily to address and support online learner learning. Salhab et. al. [6] cites the need to address digital responsibility and digital citizenship responsibility to increase community and stakeholder participation.

The field of ethics in online learning needs to be a further concern for the academic community and society. Many educational organizations, both government and private, from basic education to tertiary education have adapted themselves in carrying out the educational process. This educational process cannot be separated from the application of learning ethics. Some research on ethics in learning, especially online learning has been carried out, for example by Refs [7][8][9][10][11][12][13]. The motivation of this research is to complement the previous review by conducting a cluster-based quantitative review method study to reveal the intellectual structure and research trajectory of online learning ethics. The second objective of this research is to provide an overview of the past, present and future research directions in the field of learning ethics research with bibliometric analysis. This analysis will lead us to find gaps and recommend future research agendas in the area of ethics in online learning.

This research is different from other research by taking an investigative perspective that aims to deepen ethical issues in online learning as a driver to improve the quality of students and graduates so that they can create value for stakeholders. This study seeks to find, summarize, and analyze existing studies on the ethics of online learning to uncover patterns in the field. This study aims to answer research questions (RQ):

RQ1: How is the trend in the number of articles on ethics and online learning before and after the Covid-19 pandemic?

RQ2: What is the trend in the number of citations to articles on ethics and online learning before and after the Covid-19 pandemic?

RQ3: What topics were cited the most during 2012-2022?



RQ4: What terms are researchers paying attention to related to ethics and online learning?

RQ5: How is the relationship between terms or keywords that have been researched during 2012-2022?

The bibliometric analysis carried out in this study is very important in providing a progressive perspective to understand the development of the literature on ethics in online learning. With bibliometric analysis, it is also possible to consider collaboration between researchers and academics from various disciplines who carry out online learning.

Furthermore, we write this article by discussing the research method in the second part, the results and discussion in the third part. Finally, we discuss the conclusions, limitations of the study, and suggestions.

## 2. Research Methods

We use a two-step methodological approach to promote a deep understanding of the context and the relationship between Ethics in learning and online learning. The first stage is to use a publish and perish (PoP) application and the second stage is bibliometric analysis.

### First stage: data collection

We used a qualitative descriptive method to describe the data used in the study. In this study, we retrieved data on August 17, 2022, from the Google Scholar-indexed journal database using the publish or perish (PoP) application. Data collection for journal articles using PoP has been carried out in previous studies [14] and [15]. At that date, we limit our analysis to a period of 10 years, namely 2012-2022. We searched for three keywords: “ethics” OR “ethical” AND “online learning” AND “Pandemic.”

To narrow the focus of our research, we deliberately added "Pandemic" because the pandemic has completely changed the learning method from face-to-face to total online learning. We search in the "Title" or "keywords" section. We only include English-language papers in the format of articles, conference papers, and book chapters. This stage produces 2,046 documents (papers). Figures 1 and 2 show data on the number of documents and citations, while Table 1 shows the 10 most citations during 2012-2022.

### Second stage: bibliometric analysis

The quantitative approach of bibliometric analysis is applied to capture the context of ethics and online learning in the existing literature. Academics from various disciplines have incorporated bibliometric analysis to uncover the structure of specific areas of knowledge and identify the most significant elements [16][17][18][19]. In this analysis, we use the VOSviewer software [19][20] for quantitative analysis and we specifically use bibliographic coupling and keyword co-occurrence analysis [21]. The results of the keyword analysis provided by the bibliometric survey are only based on the quantitative nature of mapping the relationships between variables. Overall statistical patterns become visible, in the form of visualizations of networks, overlays, and density (items and clusters) that help to better understand the nature of the research area.



### 3. Results and Discussion

#### 3.1. Publish or Perish (PoP) Analysis

Figure 1 shows that during 2012-2022 the number of articles writing about ethics and online learning ranged from 50-700 articles. During the first 8 years (2012-2019) articles ranged from 50-100 articles.

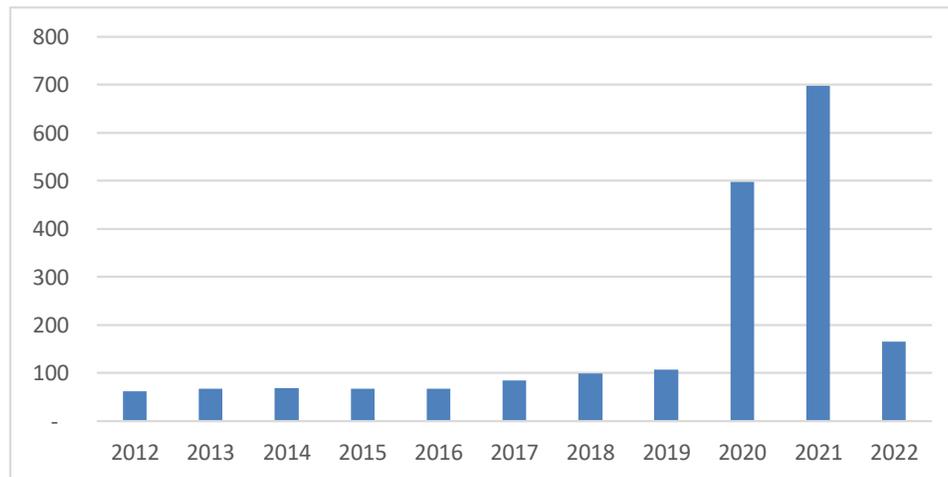


Figure 1: Trends in the Number of Ethics and Online Learning Articles in 2012-2022

In 2020, when the COVID-19 pandemic began, there was a spike in articles on ethics and online learning to 500 articles, and it peaked in 2021 with 700 articles. By August 2022, the number of articles discussing ethics and learning has decreased to around 200 articles. This shows that research on ethics and online learning is of interest to many researchers. When there is a drastic change in learning methods due to the pandemic and the policy of implementing restrictions on community activities (RCC).

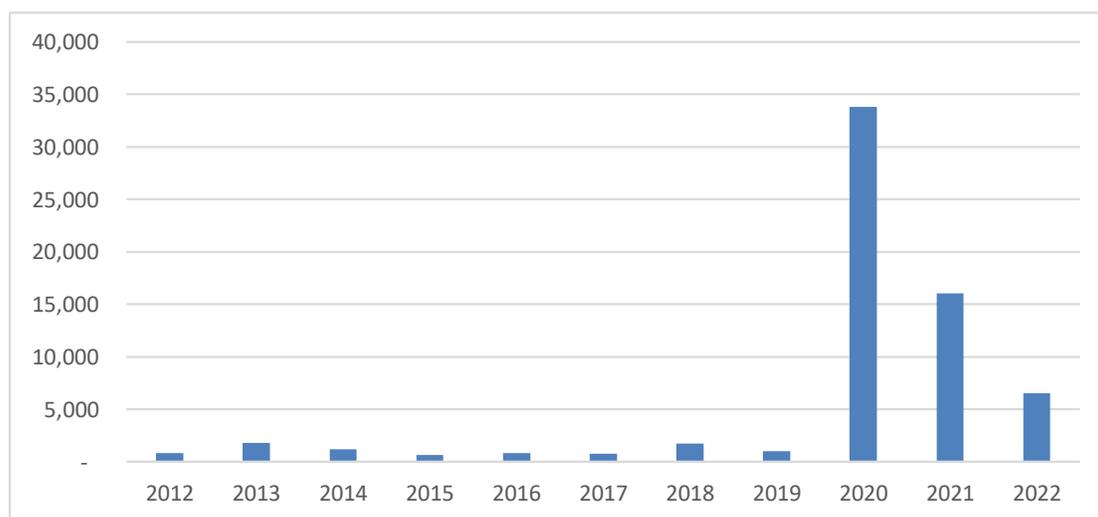


Figure 2: Trends in the Number of Citations of Ethics and Online Learning Articles in 2012-2022



Similarly, the trend in the number of articles, article citations on ethics and online learning experienced a remarkable increase in 2020. Initially during the first 8 years (2012-2019) the number of citations was around 1,000 citations, but in 2020 citations jumped to around 35,000 citations. This shows that the attention of academics and researchers to ethics and online learning is very much a consideration for them both from the point of view of ethics, learning outcomes, practice and graduate abilities. An increase in the number of articles discussing ethics and online learning from 2019 to 2020 by 365%, while citations increased by 3.158%.

Based on the titles of the ten articles that were cited the most in 2012-2022 in Table 1, it shows that the title of ethics is only in articles in 2013 and 2018. From table 1, for the last 10 years there have only been two researchers interested in making titles with the word ethics. article title. Based on the abstracts of the 10 articles, there are 8 articles with the keyword ethics in the abstract. The articles with the most citations (5396 citations) are articles related to school closures and the welfare of students at the elementary school level. From the results of this analysis, it can be concluded that research on learning ethics, especially in online learning, is still very little or not done at all. Therefore, future research can further explore what ethics should be considered and implemented in online learning.

**Table 1: The ten most cited articles on Ethics and Online Learning 2012-2022**  
Source: Publish or Perish Software Results (2022)

No	Year	Number Citation	Publisher	Title
1	2022	5396	Taylor & Francis	Schools closed during the pandemic: revelations about the well-being of 'lower-attaining' primary-school children [22]
2	2020	1433	Elsevier	Online teaching-learning in higher education during lockdown period of COVID-19 pandemic [23]
3	2020	993	mdpi.com	Impacts of the COVID-19 pandemic on life of higher education students: A global perspective [24]
4	2013	842	journals.sagepub.com	Learning analytics: Ethical issues and dilemmas [25]
5	2020	781	ncbi.nlm.nih.gov	Advantages, Limitations and Recommendations for online learning during COVID-19 pandemic era [26]
6	2020	775	asianjde.com	A global outlook to the interruption of education due to COVID-19 pandemic: Navigating in a time of uncertainty and crisis [27]
7	2020	680	jamanetwork.com	A framework for rationing ventilators and critical care beds during the COVID-19 pandemic [28]
8	2021	671	National Acad Sciences	Learning loss due to school closures during the COVID-19 pandemic [29]
9	2018	663	ncbi.nlm.nih.gov	Implementing machine learning in health care—addressing ethical challenges [30]
10	2020	626	Elsevier	Impact of COVID-19 pandemic on information management research and practice: Transforming education, work and life [31]

### 3.2. Bibliometric with VOSviewer Analysis.

We get 4 clusters using bibliometric analysis, namely:

- a) Cluster 1 in red has 57 labels or keywords: ethical approval, perception, transition, online teaching, factor, survey, medical student, shift, satisfaction, attitude, lockdown, relationship, university student, online education, nursing student, remote learning, college, anxiety,



access, ethical committee, ethical review, distance education, ethical clearance, online class, coronavirus disease, barrier, outbreak, accordance, difficulty, influence, students perception, approval, China, cross sectional study, parent, qualitative study, readiness, evidence, motivation, stress, coronavirus, Indonesia, pandemic situation, uncertainty, academic, addition, emergency, emergency remote teaching, regard, virtual learning, covid19, online learning platform, social medium, covid pandemic, online learning experience, Pakistan, and Nepal.

- b) Cluster 2 in green has 48 labels or keywords: approach, context, work, ethical leadership, service, person, community, project, theory, reflection, care, ethical value, service learning, ethical dilemma, question, society, chapter, curriculum, ethical dilemmas, group organization, goal, concept, literature, space, disability, ethical responsibility, section, ethical dimension, ethical problem, ethical reasoning, nature, social, relation, team, attention, business, ethical approach, sustainability, possibility, teacher education, English, ethical reflection, individual, kind, transformative learning. ethical engagement, and ethical obligation.
- c) Cluster 3 in blue has 34 labels or keywords: ethical issue, ethical consideration, ethic, machine learning, data, paper, machine, analytic, ethical challenge, ethical practice, ethical concern, framework, application, ethical, ethical implication, ethical framework, artificial intelligence, benefit, patient, code, risk, medicine, principle, algorithm, ethical use, number, privacy, healthcare, learning analytic, deep learning, mobile learning, range, literature review, and legal issue.
- d) Cluster 4 in yellow has 28 labels or keywords: development, model, article, value, way, ethical learning, behavior, ethical decision making, learner, decision, ethical principle, importance, action, ethical decision, example, awareness, ethical behavior, field, ethical conduct, ethical question, experiential learning, game, ethical perspective, call, advantage, nursing, ethical imperative, and student learning.

### **Keyword Co-occurrence and Map Visualization Analysis**

The purpose of the network analysis for co-occurrence keywords is to determine terms that have been frequently used in various papers in research on ethics and online learning. This type of analysis can assist researchers in understanding the most interesting and most important topics and issues that have come to the attention of academics. VOSviewer generates a map, with the distance between terms taken as an indication of the interrelationships of various keywords. The closer two or more terms are, the smaller the distance between them seems. Co-occurrence in articles was examined to establish linkage of terms [20].

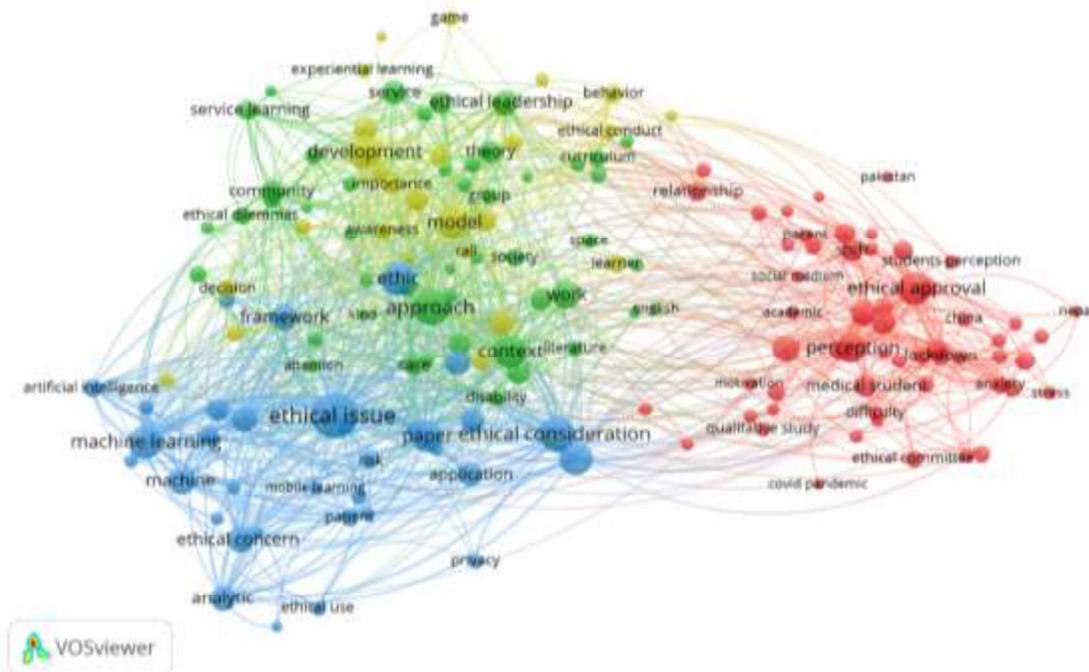
The most frequently used terms indicate that more research has been done in this area (see Table 2). The co-occurrence keyword network map is shown in Fig. 3. The visualization map depicts many keywords that are connected to each other through various lines. The line indicates that these keywords appear together in the data set across multiple papers. The distance between nodes indicates the strength of the connection, meaning that the shorter the distance, the greater the similarity and strength of the connection.



**Table 2: Top Fifteen Terms that most appeared**  
Source: Results analysis with VOSviewer (2022)

Rank	Cluster	Keywords	Occurrence	Link Strength
1	3	ethical issue	157	406
2	3	ethical consideration	102	255
3	2	approach	99	254
4	1	ethical approval	89	181
5	4	development	88	237
6	3	ethic	86	183
7	3	machine learning	86	290
8	2	context	85	240
9	3	data	84	217
10	4	model	83	217
11	1	perception	75	184
12	3	paper	75	227
13	2	work	61	153
14	3	machine	59	188
15	1	transition	58	110

Display in Fig. 3 is created by setting the threshold at 10, which means that the keyword must appear at least 10 times in an article. This analysis revealed that the most dominant keywords used were “ethical issues”, which appeared 157 times, and “ethical considerations”, which appeared 102 times overall (table 2).



**Figure 3: Network Visualization Map**

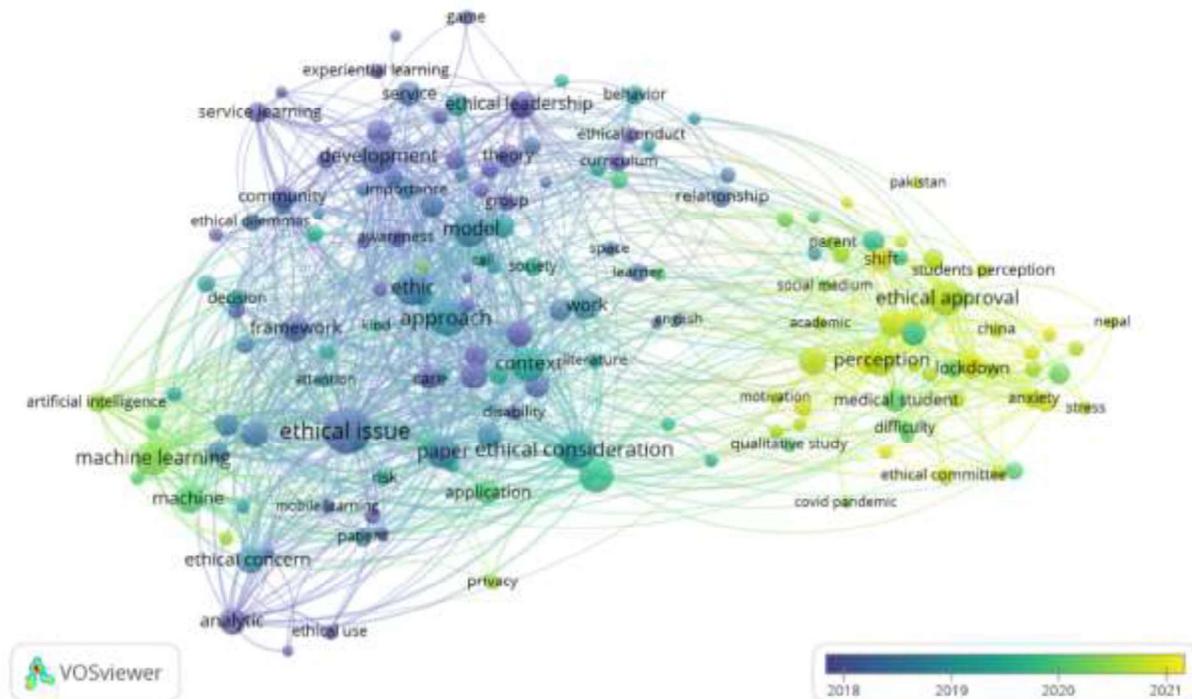


Figure 4: Overlay Visualization

In addition, this visualization shows that the relationship between these two terms is significantly strong, given that keyword co-occurrence measures the most common keywords and those that appear more frequently in the same article [17].

Based on Figure 3, five topics or keywords that have not been studied much are indicated by small circles (assuming the smallest is 10 times appearing in the article) are ethical obligation, ethical engagement, ethical imperative, legal issue, and transformative learning. Thus, future research can link ethics and online learning with these five keywords. Figure 4 on overlay visualization, shows that the blue color (dark color) indicates topics with keywords that have been widely researched. While the yellow color (light color) indicates the topic with the latest keywords and still has the opportunity to be researched related to ethics and online learning.

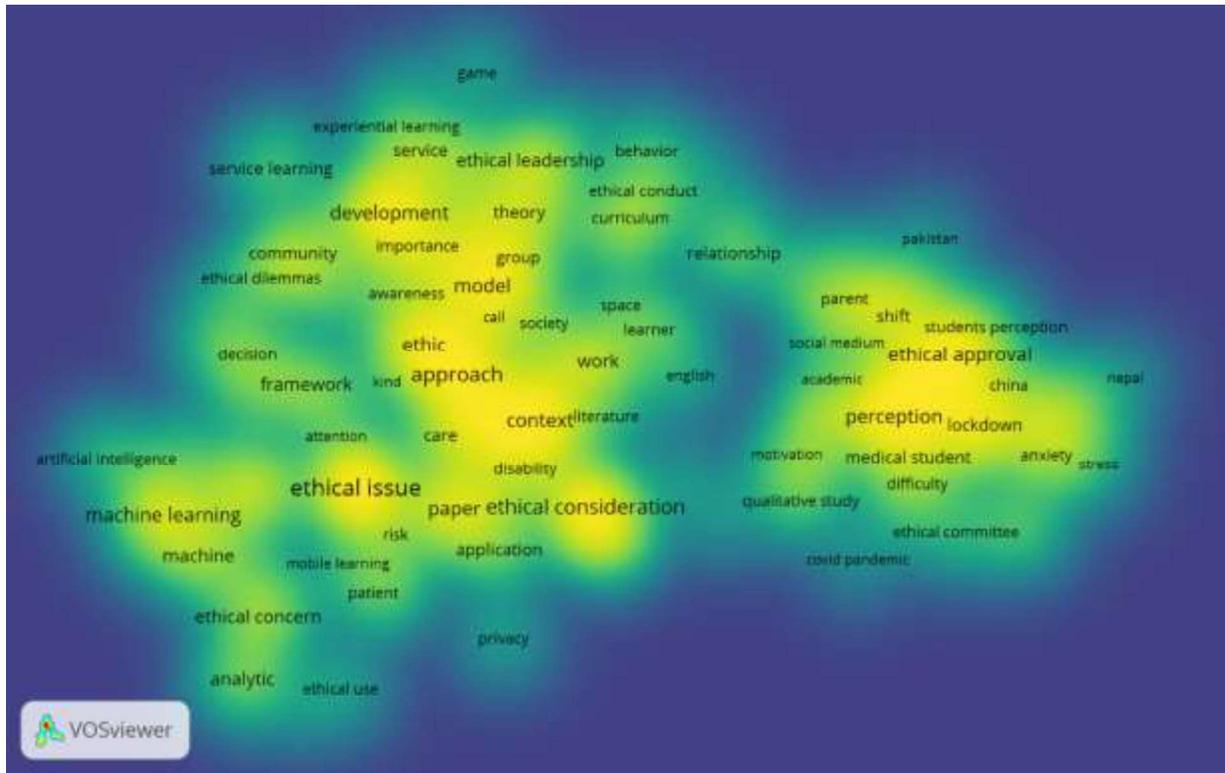


Figure 5: Item – Density Visualization

In contrast to Figure 4, the density visualization in Figure 5 shows that the brighter (yellow becomes red), the more topics with these keywords are studied. Likewise, the blue color (dark color), indicates that the topic is still rarely studied. Therefore, we recommend conducting ethical research and online learning related to artificial intelligence, privacy, games, ethical use, and pandemics.

### Cluster Analysis

Table 4 shows the top five keywords in each cluster. In cluster 1, the top keyword with 89 times occurrence and 181 link strength is ethical approval. In cluster 1 the least researched keywords are social medium, covid-19 and online learning experience. In the top 2 keyword cluster with 99 times occurrence and 254 link strength is approach. In cluster 2, the least researched keywords are transformative learning, ethical engagement, and ethical obligation. The top 3 keyword cluster with 157 occurrences and 406 link strength is an ethical issue. In cluster 3 the least researched keywords are mobile learning, literature review, and legal issues. In the top 4 keyword cluster with 88 times occurrence and 237 link strength is development. In cluster 4, the least studied keywords are ethical imperative and student learning.

The analysis in Figure 6, regarding the red network cluster 1 map, shows that there are still few researchers who correlate ethics and online learning, for example with online learning experiments, ethical committees, and ethical reviews.



**Table 3: Top Five Terms that most occurred often per Cluster**  
Source: Results of analysis with VOSviewer (2022)

Rank	Cluster	Keywords	Occurrence	Link Strength
1	1	ethical approval	89	181
2	1	perception	75	184
3	1	transition	58	110
4	1	online teaching	50	89
5	1	satisfaction	45	95
1	2	approach	99	254
2	2	context	85	240
3	2	work	61	153
4	2	ethical leadership	50	113
5	2	service	45	126
1	3	ethical issue	157	406
2	3	ethical consideration	102	255
3	3	ethic	86	183
4	3	machine learning	86	290
5	3	ethical challenge	84	217
1	4	development	88	237
2	4	model	83	217
3	4	value	45	114
4	4	ethical learning	43	82
5	4	ethical decision making	28	64

The analysis in Figure 7, on the map of network cluster 2 in green, shows that there are still few researchers who connect ethics and online learning, for example with disability, ethical engagement, and curriculum. The analysis in Figure 8, about the blue network cluster 3 map, shows that there are still few researchers who correlate ethics and online learning, for example with artificial intelligence, deep learning, privacy, and legal issues. The analysis in Figure 9, about the yellow 4 network cluster map, shows that there are still few researchers who connect ethics and online learning, for example with ethical imperatives, decisions, and sustainability.









The countries most researched are countries in Asia such as China, Indonesia, Nepal, and Pakistan. There are still many opportunities for research by comparing cultures between countries, because the keyword culture does not appear in the bibliometric analysis. Besides culture, a keyword that is often associated with ethics is gender. Several researchers have proven that ethical behavior and decision making differ between men and women [13][32]. However, the keyword gender did not appear in the bibliometric analysis. Therefore, future research can correlate culture and gender in research on ethics in online learning.

This study analyzes data taken from the Google Scholar indexed source, which still has a weakness, namely that the data has not been organized according to reference tools such as Mendeley or Endnote. Another limitation of this research is that qualitative analysis has not been carried out to understand concepts, theories, and practices in online learning ethics using content analysis methods. Therefore, further research can add data sources based on SCOPUS or Reference tools so that bibliometric analysis can be more accurate. In addition, it is important to add analysis to the content analysis method.

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Learners\_and\_E-Teachers\_in\_Online\_Learning\_Community?enrichId=rgreq-513f561a5c6af43737d196ad62148b69-XXX&enrichSource=Y292ZXJQYWdlOzMyOTg3NjI5MjtBUzo3MDY4MjUzMzA2NDcwNDFAMTU0NTUzMTY5O

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## Building Information Modelling (BIM) in Construction: State of Acceptance

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**Abstract:** *Technology has developed globally at an unprecedented rate involving major economic sectors and human endeavours. The contributions of new technology to economic growth can only be appreciated after it has been thoroughly adopted and implemented. Building Information Modelling (BIM) is one of the tools that has shown potential for ready application in the Architecture, Engineering and Construction (AEC) sector, but as of to date not widely adopted or even adapted in the nation's critical sectors. Since 2007, the Public Work Department (PWD) has recognized the enormous potential of this technology and promoted the use of BIM in Malaysia, and even made it mandatory for certain public projects. This is because BIM does not only facilitate the digital modelling of built objects, but also provides pertinent information with respect to the objects or elements that formed the objects within a single convenient platform for further manipulation and timely decision-making. Furthermore, it can also serve as a reliable avenue to seek redress for multitude of perennial construction problems such as work delay, poor workmanship, cost overrun, and miscommunication among distinct and distant stakeholders. As such, with such obvious benefits at hand, it is mind-boggling why the construction industry in Malaysia is slow or reluctant to undertake and partake in BIM-concerted ventures. It is the aims of this research to gauge the level of BIM acceptance through respondents' competency on the subject matter, its application to facilitate routine task performance within the organizations and the benefits thus gained using the technology. It is further aimed to elucidate the challenges faced by the organizations in implementing BIM and propose pertinent measures to address the problems. Towards these aims, online questionnaires were distributed to construction stakeholders involving the developers, consultants, contractors, authorities, manufacturers, and specialists at around Kuala Lumpur and the adjoining Selangor's districts where much of the major structural and infrastructural projects in the country were being carried out. The data collected was analysed descriptively using IBM SPSS version 23 software. The findings of the research revealed that the acceptance level of BIM in the Malaysian construction industry is still inadequate as primarily attested by low technical competencies, limited use in producing design alternative and optimization process, and inconsiderable beneficial gain in the review of maintenance history. In addition, there were several challenges in implementing BIM namely the lack of skilled worker, the lack of training and awareness, and the issue of hiring workers with the pertinent skills. Several steps can be taken to address these glitches involving establishment of the one-stop state-of-the-art BIM resource centre to facilitate modelling and visualization process, hardware, software and deployment cost subsidization, and establishment of BIM standards and certification.*

**Keywords:** BIM, BIM acceptance, construction industry



## 1. Introduction

Building Information Modelling (BIM) has been defined by Jabatan Kerja Raya (JKR) as a process of preparation and using 3D digital technology that contains information to enhance delivery system throughout the project life cycle, and a digital model that can be shown in 3D. This model provides a variety of information related software including geometry and non-geometry used for analysis purposes. It has gained traction across the world since its inception in 1970s with varying degree of adoption or adaptation to suit local circumstances and constraints. It is not only a software, but also a 3D construction model that organizes and visualizes all building data before the actual construction has even taken place (Memon et al., 2014). BIM is a digital depiction of the physical and useful characteristics of a facility. It is also a shared expertise resource for information about the facility, creating a decent basis decision-making during the life cycle. It is also process of rational model-based design that increases the value along the project life cycle. This will help users to scrutinize the planning, construction, and management building virtually before the start of the construction phase. Construction ambiguity could be reduced, and vital information archived throughout project lifecycle (Memon et al., 2014). Latiffi et al. (2013) stated that BIM enhance communication between construction stakeholders and provide quick design decision. In addition, the intelligent 3D model-based provides Architecture, Engineering and Construction (AEC) industry a clear sense of awareness, clarity or purpose, and direction for effective and efficient planning, construction and management of buildings and the associated infrastructure. BIM allows for virtual simulation of the construction building processes prior to actual implementation, which allow detection of potential problems throughout the work phases (Liu et al., 2015). According to Smith & Tardif (2009), the concept of BIM is to build a building virtually, prior to building it physically, in order to work out problems and stimulate and analyze the potential impact. The heart of BIM is an authoritative building information model. BIM goes beyond this as it can also create a relational database.

There are many BIM tools available in the market nowadays. According to Azhar & Asce (2011), the top three authoring tools are Autodesk Revit, Graphisoft Constructor and Bentley Architecture. The information consisted of a BIM model can be directly extracted for building performance analysis. The appropriate selection of BIM is very important to optimize the modelling and simulation process as well as output performance (Liu et al., 2015). Example of early BIM development is Multipurpose Hall of Universiti Tun Hussein Onn Malaysia (UTHM) in the southern region of Malaysia.

The idea to implement BIM in Malaysian was first mooted by the Director of JKR in 2007 (JKR, 2014). This has reflected the government own policy with respect to BIM to reduce construction cost and avoid design problem in the planning phase (Latiffi et al., 2013). In addition, BIM has been seen as the correct action to improve the construction player participation in the industry involving such entities as the architects, engineer, project manager and contractor (JKR, 2014). JKR committee was set up to define the perfect BIM platform to established interoperability, which developed BIM standard manual documentation relating to BIM as reference for the industry. It also supports BIM training and project consultation in order to promote wider application of the technology in the construction industry.



Even so, its application in Malaysian industry is still regrettably in its infancy. The industry has been slow to pick up the technology and implement BIM throughout the work processes due to various factors. This scenario could be attributed to the notion held by the industry players that BIM is an ‘unruly technology’ that can cause problems to the current well-rehearsed construction process by transforming it into new untested process (Eastman, 2008). Azhar & Asce (2011) has placed it at the industry players, who are reluctant to change the current traditional process. The author further categorized BIM risks into two namely technical and managerial risks. The technical risk can be further classified into three involving the needs for well-defined transactional construction process model to remove software interoperability issues, the requirements that virtual design data to be computable, and the needs for well-developed functional strategies for the purpose exchange and integration of meaningful information among the BIM components (Bernstein & Pittman, 2004). On the other hand, the managerial risk involves the advancement of the national BIM implementation strategy that would define national priorities and provide guidance to the entire industry. It is significant to institutionalize the process of BIM and publish the guideline for BIM implementation. The lack of a national standard for collaboration among stakeholders is one of the challenges in implementing BIM in the construction industry. Enthusiasm to share data among stakeholders can be crucial. This is to show that BIM needs to consider the capability of a system to transfer data and reuse the information in the graphical mode (Liu et al., 2015).

Real awareness on the benefits of BIM could motivate stakeholders to undertake the venture regardless of the challenges and commitments entailed.

## **2. Methodology**

### **Sample**

The sample consisted of 58 respondents involving the developers (4), contractors (26), consultants (16), authorities (4), manufacturers (2) and specialists (6) with the following gender aggregation: 63.8% male and 36.2% female. 22.4% of the sample had alighted from organization of age not exceeding 3 years, 24.1% of age not exceeding 6 years, 10.3% of age not exceeding 9 years and the remaining 43.1% of age beyond 9 years. The respondents’ working experience also varied from not exceeding 3 years at 58.6%, not exceeding 6 years at 24.1%, not exceeding 9 years at 3.4% and beyond 9 years for the rest at 13.8%. These variations had delivered balanced view and fresh perspective into the subject matter.

### **Survey**

An online survey technique in a form of questionnaire was used to gather data about the perspective of property managers on sustainability issues. The questionnaire was divided into five sections namely Section A to E. Section A solicited demographic information of the respondents’ organizations while Section B of the respondents themselves. The gist of this research commenced from Section C with the level of BIM competency among staffs in the organization, the level of BIM application in the organization and the benefits gained since implementing BIM in the organization. This concludes with Section D, which queried on the challenges in implementing BIM in the construction industry and the recommendations to encourage BIM usage in the construction industry. To gauge the wide-ranging perspectives of the last three section, a 5-point Likert scale had been employed with the following classifications: 1-strongly disagree, 2-disagree,



3-moderately agree or neutral, 4-agree and 5-strongly agree. The distribution of the questionnaire was carried out online and targeted at prospective respondents in Kuala Lumpur and the adjoining Selangor's districts due to research-access proximity at the time and highly developed urban settings. A pilot test of the survey was first administered to prospective respondents to scrutinize its content and coverage expediencies. Appropriate revisions were made based on their comments and suggestions. This was followed with the real exploratory survey in the manner prescribed before.

### **Analysis**

The data obtained through the online survey were first subjected to the reliability, normality and linearity tests to ensure the goodness of measure. In all cases, compliance to required thresholds were observed. Then, further analysis was carried out using SPSS version 23 software for descriptive statistical parameter. Demographic data were expressed by frequency of captured responses and were stated either in numbers or percentages. On the other hand, perspective data were treated for means of captured responses and ranked in descending order of magnitude.

## **3. Analysis and Discussion**

### **Level of BIM Acceptance**

In order to gauge the level of BIM acceptance by the organizations, three separate measures were established. These included the level of BIM competency within an organization, the level of BIM application within the same, and the benefits thus gained from the initiative. The first measure relates to individual and collective capacity with the right knowledge and experience to engage BIM technology effectively and efficiently in realizing organizational objectives. The second measure relates to organizational work processes that may have been supplanted or supplemented with the presence of BIM. Lastly, the third measure relates to the benefits gained by the organization by fully or partially adopting BIM in the work processes.

Table 1 shows the level of competency among staffs within an organization involved in the construction sector. In general, the findings indicate minimal competency level of the workforce in all areas concerned as evinced from the low mean values. Some trend can however be observed. Lack of technical competency tops the list, followed by the core competency, managerial competency, operation competency, supportive competency, functional competency, administration competency, implementation competency, and research and development competency. The lack of exposure and training of the workforce in the intricacies of the BIM could have contributed towards this scenario. Notwithstanding, such deficiencies could not but keep the level of BIM acceptance to a minimal or non-existent.

**Table 1: Descriptive Statistics for Level of BIM Competency among Staffs within an Organization**

<b>Rank</b>	<b>Description</b>	<b>Mean</b>	<b>Std. Deviation</b>
1	Technical competency	1.33	1.322
2	Core competency	1.33	1.373
3	Managerial competency	1.27	1.311
4	Operation competency	1.27	1.258



5	Supportive competency	1.23	1.278
6	Functional competency	1.20	1.270
7	Administration competency	1.20	1.270
8	Implementation competency	1.20	1.243
9	Research and development competency	1.20	1.297

Table 2 shows the level of BIM application within an organization involved in the construction sector. Similarly, the mean values are strikingly low indicating minimal level of BIM application in all manner of organizational work processes concerned. The use, if any, is restricted to design alternatives selection and optimization, and even less in the crucial construction phases of cost management, automated building design review, construction planning and management, supply chain management, commissioning, and quality management. Furthermore, quality management, operation and maintenance, sustainable design and analysis, procurement, safety design and management, information integration, management, and visualization and fabrication are other crucial areas that are equally disregarded with respect to BIM integration. This is understandable given the prescribed low level of competency among the workforce, that restricted any meaningful application, thus leading low BIM acceptance level.

**Table 2: Descriptive Statistics for Level of BIM Application within an Organization**

Rank	Description	Mean	Std. Deviation
1	Design alternatives selection and optimization	1.87	1.889
2	Cost management	1.83	1.931
3	Automated building design review	1.77	1.832
4	Construction planning and management	1.73	1.741
5	Supply chain management	1.67	1.807
6	Commissioning	1.63	1.771
7	Quality management	1.63	1.712
8	Operation and maintenance	1.60	1.653
9	Sustainable design and analysis	1.57	1.612
10	Procurement	1.57	1.755
11	Safety design and management	1.53	1.676
12	Information integration, management, and visualization	1.50	1.656
13	Fabrication	1.43	1.633

Table 3 shows the benefits gained since implementing BIM within an organization involved in the construction sector. Most respondents were at least in theory aware of some of the benefits of BIM when implemented within organizational context. This included review of maintenance history, scheduled maintenance, and clash detection and clash analysis. To a lesser extent, benefits were somewhat known in visualisation improvement, productivity improvement due to ease of information retrieval, accuracy enhancement of existing conditions documentation, better



communication, schedule sequencing or phasing issues, profitability enhancement, better tracking of cost control and cash flow, coordination of construction, tracking of work in real time, proactive facility management, demonstration of construction process, design effectiveness, delivery speed enhancement, reduction in costs of utility demand and demolition, cost efficiencies, and tracking of build asset. However, awareness of the benefits would not result in favourable BIM acceptance level given low workforce competency and work process application as prescribed above.

**Table 3: Descriptive Statistics for Benefits Gained since Implementing BIM within an Organization**

Rank	Description	Mean	Std. Deviation
1	Provides review of maintenance history	3.17	1.543
2	Enable scheduled maintenance	3.17	1.581
3	Perform clash detection and clash analysis	2.13	2.161
4	Improve visualisation	2.10	2.213
5	Improve productivity due to ease of information retrieval	2.07	2.164
6	Enhance accuracy of existing conditions documentation	2.03	2.076
7	Facilitate better communication	2.03	2.059
8	Identify schedule sequencing or phasing issues	2.03	2.059
9	Enhance profitability	2.03	2.076
10	Provide better tracking of cost control and cash flow	2.00	2.101
11	Enhance coordination of construction	2.00	2.068
12	Enable tracking of work in real time	1.97	2.059
13	Manage facilities proactively	1.97	2.008
14	Enable demonstration of construction process	1.97	2.076
15	Increase design effectiveness	1.97	2.025
16	Enhance delivery speed	1.97	2.025
17	Decrease costs of utility demand and demolition	1.93	2.033
18	Cost efficiencies	1.90	2.006
19	Keep track of build asset	1.83	1.949

### **Challenges in Implementing BIM in the Construction Industry**

Table 4 shows the ranking for the challenges faced by the stakeholders in implementing BIM during the performance of the construction projects. As expected, high on the list of challenges revolves around the lack of skilled workers, and lack of training and awareness to realize the true potential of the technology within the respective organizational environment. Most of the workforce may already be accustomed to and performing well under conventional processes, and consequently reluctant to submit to the hassle and toil of acquiring new skills without worthy incentives from the management. The management in turn may not want to incur additional recruitment cost to undertake such ventures with little immediate economic boost. Additionally, it may initially lose the competitive edge and miss productivity targets during the transition period as the existing staffs build competency and proficiency with the technology. Hiring workers



already skilled in BIM might be prohibitive in terms of availability of candidates and remuneration demands.

Other challenges may also be faced by pioneer organizations that wish to implement BIM, but to a lesser extent according to the findings. These include lack of leadership or management support, high hardware cost, licensing problems, high initial cost, and lack of guidelines or standard. Furthermore, the scale of the project, lack of client demand, believe in the exceedance of the traditional method, and irrelevancy of BIM to the project may also contributed towards establishing BIM primacy within the organizational workflow. It is interesting to note from the responses that these issues were essentially subordinated to that of the preceding manpower concerns. This gives the impression of paramount importance placed to workforce in ensuring successful implementation of BIM within organizational context.

**Table 4: Descriptive Statistics for Challenges in Implementing BIM in the Construction Industry**

<b>Rank</b>	<b>Description</b>	<b>Mean</b>	<b>Std. Deviation</b>
1	Lack of skilled workers	3.27	1.507
2	Lack of training and awareness	3.17	1.416
3	Hire skilled worker	3.07	1.413
4	Lack of leadership or management support	3.07	1.437
5	High hardware cost	3.07	1.363
6	Licensing problems	3.00	1.576
7	High initial cost	3.00	1.365
8	Lack of guidelines or standard	2.97	1.426
9	Project works on are too small	2.97	1.326
10	No client demand	2.90	1.296
11	Believe that traditional method is better	2.63	1.299
12	BIM is not relevant to the project work on	2.53	1.383

### **Recommendations to Promote BIM Use in the Construction Industry**

Table 5 indicates the outcome of the questionnaire survey on the recommendations to promote BIM use in the construction industry. Most respondents have advocated for the establishment of the one-stop state-of-the-art resource centre that can provide consultation and ready assistance to facilitate modelling and visualization process. No doubt this is attributed to the general novelty of the technology among the current construction practitioners who are well-versed in the conventional processes, but do not wish to lose their competitive edge by not subscribing to the technology. Such centre could also provide training and development on all matter related to BIM. Next involves monetary instrument through the need for additional investment in hardware, software, and deployment needs. Such potentially significant investment could frustrate many pioneering companies from deliberately acquiring the technology at least in the foreseeable future. Subsidy initiatives from the government in the form of monetary grants or tax relieves could go a long in addressing this concern and motivate usage of the technology. The third ranking involves the establishment of local BIM standards and certification. At present, many BIM products are



seemingly haphazard since the resulting form were left to individual proponent devices with few structural standardizations. This can impede dissemination of information and communication among varied and wider audiences from the project stakeholders to the governmental agencies. Through the production and imposition of guidelines, models and the associated information can be rationalized in a way to allow for viewing, manipulation, retention, and maintenance across the board. Furthermore, certification regime could be established based on the adherence to these guiding principles, which inadvertently promote qualified and quality work outputs.

The fourth item on the rank involves intensification of BIM awareness and promotional drives across the industry. The technology edges over conventional practices and benefits could be expounded to those unaccustomed to such realization. In the same measure, solutions can be proposed to mitigate potential obstacles and challenges in course towards BIM adoption or adaptation and thus persuade detractors to follow suit. Another subsidization measure involving BIM training and practice towards capacity-building with respect to the technology was ranked fifth the recommendation list. Having the BIM infrastructure would not suffice unless there are equally technically enabled and empowered workforce to make sense and utilize the technology to its fullest potential. These can revolve around the six levels of BIM maturity involving 2D/3D modelling, partial/full collaboration, and scheduling/cost/sustainability integration, which of course should be tailored to the specific niche of a particular organization in the market. Finally, the least preferred measure among the stakeholders involves the enforcement of BIM usage through legislative and regulatory procedures. The compulsive and uncompromising nature of this step has always entailed negative connotations involving restrictive and punitive threats, which is highly unlikely to garner mass support considering claims of overregulation of the industry. This route should be thread cautiously in light of the sentiment of the stakeholders as manifested in the ranking.

**Table 5: Descriptive Statistics for Recommendations to Promote BIM Use in the Construction Industry**

Rank	Description	Mean	Std. Deviation
1	Establish one-stop state-of-the-art BIM resource centre to facilitate modelling and visualization process	4.43	7.596
2	Subsidize hardware, software, and deployment costs	3.43	1.501
3	Establish local BIM standards and certification	3.30	1.368
4	Intensify BIM awareness and promotional drives across the industry	3.27	1.437
5	Subsidize professional training	3.27	1.413
6	Enforce BIM usage through legislative and regulatory procedures	3.23	1.524

#### 4. Conclusion

BIM technology is an integral part of the Industrial Revolution 3.0 of automated production and even more so as we are aspired towards attainment of Industrial Revolution 4.0 goals of cyber-physical systems. It has become an irreversible phenomenon across the world and in all sectors of human activities including that of the construction industry. The fact that the acceptance and adoption levels in the county are still far from desirable would entail that the industry is potentially



lagging technically and structurally, and fast becoming uncompetitive in the wider market. Challenges to the implementation of BIM must be expeditiously addressed through prioritization and implementation of the right solutions to ensure that BIM would have a firm grip on the industry as a whole.

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## Business Zakat Payment Compliance among Small Business Owners in Kedah, Malaysia: Mediation Effects of Awareness and Attitude

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**Abstract:** *Due to the low amount of business zakat collection in Kedah, this study was conducted to determine whether attitude, subjective norms, behavioural control, and awareness affect small business owners' intentions to comply with business zakat payment. One hundred ninety-one small business owners in Kedah participated in this survey. The data was analysed using the Partial Least Squares (PLS) by utilising the SmartPLS 3 software. The study results show a significant association between attitude, subjective norms, behavioural control, and the intent to comply with business zakat payment. However, awareness does not affect a business owner's intention to comply with Islamic law and pay business zakat. It has been discovered that awareness is a mediator between subjective norms and attitudes towards the intention of paying business zakat. Additionally, the attitude was discovered to mediate between awareness and intention for zakat payment compliance. The State of Kedah Zakat Board can use the study's findings to develop new strategies and strengthen current strategies to encourage small business owners to pay business zakat.*

**Keywords:** business zakat, awareness, subjective norms, attitude, perceived behavioural control, Partial Least Squares

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### 1. Introduction

Zakat, which refers to a payment that must be made by a Muslim under specific circumstances and dispersed to particular people, plays a vital role in the life of Muslims. Zakat is the fourth pillar of Islam and is part of the worship Allah SWT has determined in the lives of Muslims. Muslims are responsible for providing a certain amount of their property to the entitled asnaf (the group of people worthy of receiving a Muslim tithe) as listed in the Quran. However, the wisdom of the Shari'ah to issue zakat does not only mean to purify the property and soul of Muslims but also goes far beyond just helping the asnaf eligible to receive zakat distribution. It has a significant role in the economic and social aspects. Zakat represents the primary financial income in growing a more balanced social situation while bringing Muslims prosperity and security (Teh, Aza, & Noraini, 2016). Therefore, the effectiveness of the zakat system does not only become dependent on an individual but also a business entity. Business entities can pay high business zakat compared to individuals following the purpose of establishing a business entity is to generate profit. Therefore, the involvement of business entities through this zakat system can build an advanced society with a solid economic base. Businesses are typically involved in property zakat that originates from various sources such as business, income, livestock, savings, stocks, gold, and rice. Of these types



of property zakat, business zakat is one of the essential zakat, as it has contributed RM49.6 million to the State of Kedah in 2021 (<https://www.zakatkedah.com.my/statistik-kutipan-2/>, 2021). To generate a profit, selling and purchasing are often required before a business owner pays his business zakat. If these requirements are satisfied, he must pay his zakat, equal to 2.5% of the profit from his business's goods that have received enough nisab and haul (Shafie & Amir, 2018). The order to issue zakat demonstrates the significance of business zakat, particularly for the advancement of society and the nation. Therefore, to ensure that business zakat can fulfill its obligation as prescribed by Islam, business zakat management in a society should be done in an orderly and regulated manner. There are 14 zakat institutions, each responsible for managing the zakat collection in Malaysia. States in Malaysia have completely activated their zakat management organisations to raise Muslim awareness and understanding of zakat and collect all forms of zakat, including business zakat (Azman, Tajuddin & Shamsuddin, 2015).

Business zakat is the second largest contributor to Malaysia's total zakat collection (Saad, Sawandi, & Mohammad, 2016). Compared to other types of zakat, it is suggested that the business zakat market segment also has a relatively high return value. In the State of Kedah, the involvement of Muslims in small businesses is a positive development. (Wahab & Borhan (2014), even though the number of small business owners increases from time to time, many of them continue to avoid paying their zakat through the channels made available by the Kedah State Zakat Board (LZNK). LZNK has developed several efforts to motivate zakat payers to make zakat payments, such as payment through online banking, post offices, mobile counters, and cash at zakat office counters. However, prior research indicates that zakat collection is still insufficient. It is due to Malaysia's Muslim population's low compliance behavior (Azman & Bidin, 2015). The majority of the Muslim population only knows that fitrah zakat, paid during the month of Ramadan, is compulsory to pay rather than business zakat (Wahid, Mohd Noor, & Ahmad, 2005). Even though business zakat is an act of worship that Allah SWT requires of Muslims, the performance of the collection does not demonstrate that small business owners in the state of Kedah are fully adhering to this responsibility.

Records from LZNK reveal that despite an annual growth in small business owners in Kedah, many still do not pay business zakat. In the state of Kedah, business zakat collection is still not promising (Saad, 2018). The amount of business zakat collection is still tiny compared to the amount of income zakat collection in the same year. Ghazali, Saad, & Abdul Wahab (2016) revealed that the business zakat collection is around 10-20% of the actual potential amount of those who should pay Zakat. It shows that the current collection (the year 2021) of business zakat of more than RM49.6 million is still far compared to the potential collection, which is more than  $(49.6/0.2 \times 1) = \text{RM}248$  million per year. Baba, Jusoh, Muda & Rahman (2010) discovered that 41% of respondents paid both zakat and tax, while 24% paid taxes and only 15% paid zakat. The remaining 20% of respondents do not pay any zakat. It means that many respondents still put a higher value on paying taxes higher than paying zakat. Therefore, Malaysia's zakat institutions must continue to make efforts to raise business zakat collection (Halizah, Kasumalinda, & Agoos Munalis, 2011). Therefore, this study intends to investigate factors that influence small business owners in the state of Kedah on their compliance with business zakat payment. Their zakat payment compliance pattern is crucial in maximizing the potential for zakat collection. By



concentrating on small business owners, this study will uncover factors that can boost the potential for business zakat collections.

## **2. Literature Review and Hypotheses Development**

### **Theory of Planned Behaviour**

The Theory of Planned Behaviour (TPB) developed by (Ajzen, 1985) explains that a behaviour's conduct depends on the individual's intention. According to Ajzen (1991), TPB also explains that three determinants determine behavioral intention: attitude towards behavior, subjective norm, and perceived behavioral control. Even though past studies (i.e., Kamil, 2002; Saad, 2010) have used the TPB to identify or discuss the factors that contribute to zakat payment compliance, these studies are still unable to explain the situation entirely. Behavioral studies are considered complex studies with differences in behavior regarding attitude, selection, desire, and decision in action. In this study, TPB was used to assess the awareness of small business owners towards a particular behavior, attitude, subjective norms, and perceived behavioral control to determine the small business owners' intention to comply with business zakat payment. In addition, this study also investigated the mediation effect of awareness on the relationships between attitude and intention to comply with zakat payment and between subject norms and intention to comply with zakat payment.

### **Intention to Comply with Business Zakat Payment**

According to Ajzen (2005), intention refers to a person's level of cognition concerning their willingness to engage in a particular behaviour. Consumers' intentions show their willingness to try something new and how much work they are prepared to put into a particular habit (Golnaz Rezai, 2012). In general, intention refers to an individual's motivation, preparedness, or desire to engage in behaviour; the higher an individual's intention to engage in an activity, the more likely that individual is to do so (Said & Saad, 2016). According to Bidin, Idris, & Shamsudin (2009), the intention to pay zakat refers to a Muslim individual's willingness to pay zakat to the zakat institution. Muslim individuals are more likely to comply with paying zakat to zakat institutions if they have a strong desire to do so, and vice versa (Muhammad, Mahri, & Nurasyiah, 2018).

### **Awareness and Intention to Comply with Business Zakat Payment**

Awareness refers to the state or capacity to observe, feel, or be cognizant of events, objects, or sensory patterns (Gafoor, 2012). As defined by (<https://www.oxfordlearnersdictionaries.com/>, 2022), awareness refers to "knowing that something exists and is important." Awareness and intention toward paying zakat compliance were found to have a significant and positive relationship in Indonesia (Kartika, 2020) and the context of halal certificates (Sharif & Ariffin, 2018). A study by Setiawan, Chairy & Syahrivar (2019) found that awareness has a significant positive relationship with attitude toward purchasing halal food in Indonesia. Therefore, it is hypothesized that:

H1: Awareness positively influences the intention to comply with zakat payment.

### **Attitude and Intention to Comply with Business Zakat Payment**

Attitude is a psychological tendency shown in an individual's assessment of a particularly favorable or unfavorable entity (Othman, Alwi, Yusuff, & Saufi, 2017). Attitude is a positive or



negative evaluation of a product, environment, or service (Mokhtar, Mahomed, & Hashim, 2018). People's attitudes influence their actions (Lee, 2009). Human conduct is primarily determined by attitude, which is very difficult to alter (Ayuba, 2014). Previous studies by Farah, Othman, & Omar (2017); Mukhan, Noor, & Wahid (2018); Othman et al. (2017); Wahyudin, Wulandari, & Pradisti (2018) found a positive and significant relationship between attitude and intention to comply with zakat payment. Therefore, it is hypothesized that:

H2: Attitude positively influences intention to comply with zakat payment.

### **Subjective Norms and Intention to Comply with Business Zakat Payment**

Othman et al. (2017) found a significant positive and significant relationship between subjective norm and intention to comply with income zakat payment. Subjective norms refer to a response to someone acting in response to peer pressure or beliefs about how others perceive them as they engage in particular behaviors (James, Hu, & Leonce, 2019; Sareye & Othman, 2017). Previous studies (i.e., Dandago, Muhammad, & Abba, 2016; Najwa, Nur Shairah, & Pg Mohd Faezual Fikri, 2019) found that subjective norm has a significant relationship with the intention to comply with paying income zakat. A study by Nor, Tajuddin, Azman, & Jamaluddin (2018) in the context of plant zakat also shows that subjective norms positively and significantly affect the intention of compliance behavior. Therefore, it is hypothesized that:

H3: Subjective norm positively influences intention to comply with zakat payment.

### **Perceived Behavioral Control and Intention to Comply with Business Zakat Payment**

According to Mattison & Norris (2007), behavioral control measures a person's perception of their ability to perform the desired behavior. Perceived behavioral control and intention were found to have a significant and positive relationship in the context of savings (Satsios & Hadjidakis, 2018), purchase of halal products (Sharif & Ariffin, 2018), hibah (Said, Zainal, Din, Zainuddin, & Abdullah, 2020), and zakat payment (Najwa et al., 2019); (Saad, Bidin, Idris & Hussain, 2010). If an individual believes it is simple to pay zakat, compliance with zakat payment will also increase (Najwa et al., 2019). Therefore, it is hypothesized that:

H4: Perceived behavioral control positively influences intention to comply with zakat payment

### **Awareness and Attitude toward Intention to Comply with Business Zakat Payment**

According to Mohd Sofi & Shamsurritawati (2018), a consumer's awareness is acquired through experience or learning. The process of awareness involves customers getting familiarized with certain products through marketing communications and learning how the products differ from their competitors (Alfin & Saad, 2019). According to Ayuba (2014), a need to aggressively increase the awareness levels among consumers of Takaful in Nigeria to change their negative attitude towards purchasing that services. Adeyemi, Ismail, & Hassan (2016) further suggested that increasing Malaysian Muslims' awareness of cash Waqf would increase their acceptance of cash Waqf. In addition, these authors further suggested that when people are aware and familiar with a phenomenon, their understanding of it increases, which could lead to further action. Therefore, it is hypothesized that:



H5: Awareness positively influences attitude toward intention to comply with business zakat payment.

#### **Subjective Norm and Awareness toward Intention to Comply with Business Zakat Payment**

Subjective norms or social influence play an essential role in influencing awareness which has a significant and positive relationship in various research contexts such as zakat and taxes (Zaid, Mat Rejab & Zul Fahmi, 2015), cash waqf (Adeyemi et al., 2016), and Islamic micro financial programs (Kouk, Sin, and Siew, 2013). Subjective norms are constructed through interactions with others and assumptions made by individuals to convince them to adopt specific behavior (Badina & Fakhrudin, 2021). Individuals are more likely to accept the thoughts or beliefs of religiously affiliated reference groups. It is essential because specific reference groups' influences may increase the individual's awareness towards compliance to zakat payment as the individuals respect these reference groups. Therefore, it is hypothesized that:

H6: Subjective norm positively influences awareness toward intentions to comply with business zakat payment.

#### **Awareness as a Mediator in the Relationship between Subjective Norm and Intention to Comply with Business Zakat Payment**

A study by Badina & Fakhrudin (2021) found that knowledge positively related to awareness (Bodibe, Chiliya, & Chikandiwa, 2016) has a positive and significant influence on the intention to use e-money. A previous Kartika (2020) study found awareness of zakat as a full mediator between income and interest in paying zakat. It means awareness positively influences the intention to pay zakat. Therefore, it is hypothesized that:

H7: Awareness mediates the relationship between subjective norms and the intention to comply with zakat payment

#### **Attitude as a Mediator in the Relationship between Awareness and Intention to Comply with Business Zakat Payment**

Bodibe et al. (2016) found that awareness positively and significantly influences attitude towards Islamic banking. A previous study by Chu (2018) has examined the mediating effect of attitude towards organic food in the relationship between environmental awareness and purchase intention among Chinese consumers. Similarly, a study by Oladapo, Omar, Muda & Abdurraheem (2019) found that attitude has a positive effect as a mediator of the relationship between awareness and customer behavioral intentions. A study by Xi (2018) found a significant mediating effect of attitude on the relationship between awareness and intention to use counseling services. Therefore, it is hypothesized that:

H8: Attitude mediates the relationship between awareness and intention to comply with zakat payment.

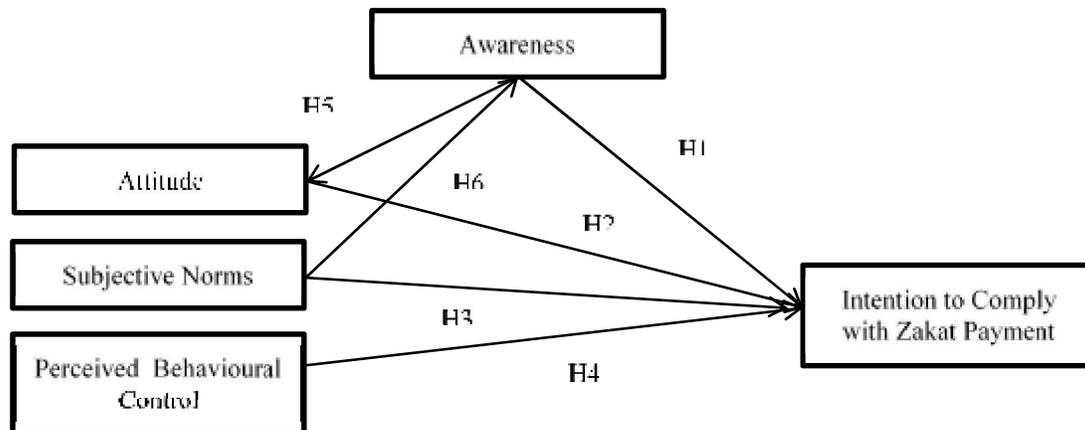


Figure 1: Research Framework

### 3. Research Methodology

This study uses a quantitative methodology. A pretest was conducted with two academicians and two small business owners to assess the content and face validity of the items. Feedback from the pretest was used to enhance the quality of the questionnaire. Thirty respondents were selected to participate in the pilot test. Cronbach's alpha for the constructs exceeded the threshold value of 0.70 (Nunnally & Bernstein, 1994), confirming construct reliability. The respondents in this study were Muslim small business owners in the State of Kedah. The questionnaires comprise two sections: demographics and questions related to the variables. The items were measured using a five-point Likert scale ranging from "1" as strongly disagree to "5" as strongly agree was used for this study. A four-item scale to measure intention to comply with zakat payment was adapted from Saad, Bidin, Idris & Hussain (2010). Awareness was measured using a five-item scale adapted from (Mohd Ghadafi bin Shari, 2019). Attitude and subjective norms were measured using five-item and four-item scales adapted from Saad, Bidin, Idris & Hussain (2010). Lastly, perceived behavioral control was measured using five items adapted from (Bidin & Idris, 2009). A total of 191 usable questionnaires were analysed using Statistical Package on Social Science (SPSS) and Partial Least Squares using SmartPLS 3.0. The research framework is shown in Figure 1.

### 4. Results

#### Demographic Profile

The demographic profile of respondents is based on 191 cases. The majority of respondents who participated in this questionnaire were women (66.5%). One hundred thirty-nine respondents (72.7%) were married, 25.1% were single, and the rest (2.1%) were divorced. A large number of respondents aged from 26 to 33 years (29.5%), followed by over 41 years (27.4%), 18 to 25 years (22.1%), and 34 to 41 years (21.1%). Most respondents (56.8%) have just run a business within five years. Most businesses are sole proprietorships (83.2%) and focus more on food and beverage businesses (53.4%). The majority of respondents (78.1%) earned between RM1,000 and RM9,999. Only 36.1% of respondents hold a bachelor's degree, 52.4% have formal education up to Form Five, and only one respondent has never attended school (0.5%).



### Measurement Model Assessment

Before structural modeling assessment, the constructs' measurement model was assessed to examine their dimensionality, reliability, and validity by conducting a confirmatory factor analysis (CFA). The measurement model determines the individual item's reliability, internal consistency, convergent validity, and discriminant validity (Hair, Joe, Hult, Ringle, & Sarstedt, 2016; Wong, 2013). Table 1 shows the results of the measurement model of the constructs.

**Table 1: Measurement Models Assessment**

Variables	Items	Loadings	Cronbach Alpha	CR	AVE
Attitude	ATT1	0.896	0.906	0.93	0.728
	ATT2	0.901			
	ATT3	0.853			
	ATT4	0.774			
	ATT5	0.834			
Awareness	AW1	0.918	0.939	0.956	0.844
	AW2	0.932			
	AW3	0.905			
	AW4	0.92			
Intention	BI1	0.885	0.823	0.883	0.658
	BI2	0.913			
	BI3	0.659			
	BI4	0.76			
Perceived Behavioural Control	PBC1	0.895	0.892	0.921	0.702
	PBC2	0.919			
	PBC3	0.719			
	PBC4	0.801			
	PBC5	0.841			
Subjective Norms	SN1	0.897	0.945	0.961	0.860
	SN2	0.963			
	SN3	0.939			
	SN4	0.909			

Convergent validity of the measurement model can be ascertained by examining the factor loadings, average variance extracted (AVE), and composite reliability (CR) (Duarte, Alves & Raposo, 2010; Hair, Joe et al., 2016). Following the rule of thumb for items with loadings between 0.40 and 0.70 (Hair, Sarstedt, Hopkins, & Kuppelwieser, 2014), it was discovered that all 22 items were retained with loadings between 0.659 and 0.963. Internal consistency was confirmed by assessing the value of CR. According to (Hair, William, Black, Babin, & Anderson, 2010), CR values exceeding 0.7 explain the degree of construct indicator representing latent construct. The convergent validity was also confirmed through the values of AVE exceeding 0.50 (Fornell & Larcker, 1981a).



**Table 2: Discriminant Validity**

	Attitude	Awareness	Intention to Pay Business Zakat	Perceived Behavioural Control	Subjective norm
Attitude	<b>0.853</b>				
Awareness	0.844	<b>0.906</b>			
Intention to Pay Business Zakat	0.635	0.613	<b>0.811</b>		
Perceived Behavioural Control	0.455	0.568	0.558	<b>0.838</b>	
Subjective norm	0.703	0.707	0.663	0.649	<b>0.927</b>

Discriminate validity is the degree to which items are differentiated among construct and measures distinct concepts (Fornell & Larcker, 1981b). The discriminant validity was also assessed by examining the correlation between the measures of the potential overlapping construct (Fornell & Larcker, 1981b). According to (Compeau, Higgins, & Sid, 1999), the average variance shared between each construct and its measure should be greater than the variance shared between the construct and other constructs.

### Structural Model Assessment

The PLS-SEM algorithm was run to test the  $\beta$ -value of the path coefficient. The further analysis employed was a bootstrap re-sampling procedure (191 cases, 500 sub-samples, no sign change option) to generate the standard error and t-value. Five out of the six hypotheses were significant ( $p < 0.05$ ). After assessing the measurement model, the next step is to evaluate the structural model using the bootstrapping procedure. The results from the structural model in Table 3 indicated that awareness does not exhibit any significant influence on intention to pay business zakat ( $\beta = 0.014$ , t-value = 0.128,  $p > 0.05$ ). In contrast, attitude positive and significantly influenced intention to pay zakat ( $\beta = 0.322$  t-value = 2.511,  $p < 0.05$ ). Subjective norms also significantly influenced intention to pay zakat with  $\beta = 0.285$ , t-value=3.281 at  $p < 0.05$ . Additionally, perceived behavioural control positive and significantly influenced intention to pay zakat ( $\beta = 0.221$ , t-value = 2.805 at  $p < 0.05$ ). Awareness exhibited a strong positive influence on attitude ( $\beta = 0.838$ , t-value=20.334,  $p < 0.05$ ). Finally, subjective norms positively and significantly influence awareness ( $\beta = 0.700$ , t-value=11.997,  $p < 0.05$ ). Except for hypothesis H1, all other hypotheses (i.e., H2, H3.H4, H5, H6) were supported.

**Table 3: Structural Model Assessment**

Hypothesis	Relationship	$\beta$	t-value	p value	Decision
H1	Awareness -> Intention	0.014	0.128	0.898	Not Supported
H2	Attitude -> Intention	0.322	2.511	0.012*	Supported
H3	Subjective norm -> Intention	0.285	3.281	0.001*	Supported
H4	Perceived Behavioural Control -> Intention	0.221	2.805	0.005*	Supported
H5	Awareness -> Attitude	0.838	20.334	0.000*	Supported
H6	Subjective norm -> Awareness	0.700	11.997	0.000*	Supported

\* $p < 0.05$



### Testing for Mediating Effect of Attitude on the Relationship between Awareness and Intention to Comply with Business Zakat Payment

Findings from testing H7 (see Table 4) show that the indirect effect of attitude in the relationship between awareness and intention towards compliance with paying zakat is significant ( $t=2.465$ ,  $p<0.05$ ). In contrast, the two variables' direct effect is insignificant ( $t=0.476$ ,  $p>0.05$ ). Therefore, hypothesis 7 was supported, where the attitude of the small business owner is a full mediator between the level of awareness and intention towards the compliance of paying business zakat. It implies that the owners' levels of awareness will influence their attitude before they intend to comply with paying business zakat.

### Testing For Mediating Effect Of Awareness On The Relationship Between Subjective Norm And Intention To Comply With Business Zakat Payment

Findings from testing H8 (see Table 4) show that the indirect effect between subjective norms and intention on the compliance of paying zakat is significant ( $t=3.871$ ,  $p<0.05$ ). At the same time, the direct effect between the two variables is also significant ( $t = 2.987$ ,  $p<0.05$ ). The study's findings also show that Hypothesis 8 was supported, where the level of awareness of small business owners is a partial mediator between subjective norms and the intention to comply with paying business. It means that the trust gained by business owners through the reference group will influence the level of awareness of those business owners to have the intention to pay business zakat. Parents, friends, and relatives can significantly influence business owners to pay the business zakat.

**Table 4: Assessment of the Mediating Effect**

Hypothesis	Relationship	Direct Effect	95% Confidence Interval Direct Effect	t-value	Significant? ( $p<0.05$ )?	Indirect Effect	95% Confidence Interval Indirect Effect	t-value	Significant? ( $p<0.05$ )?
H7	Awareness -> Attitude -> Intention to Comply with Zakat Payment	0.059	0.302	0.476	NO	0.247	0.46	2.465	YES
H8	Subjective Norms -> Awareness -> Intention to Comply with Zakat Payment	0.277	0.452	2.987	YES	0.134	0.214	3.871	YES

## 5. Discussions And Implications

The results of this study show that, except for awareness, all other variables (attitude, subjective norms, perceived behavioral control) have significant positive relationships with the intention to pay business zakat. The results of this study are relevant to previous research conducted by Dandago, Muhammad, & Abba (2016); Huda, Rini, Mardoni & Putra (2012); Nor, Tajuddin, Azman & Jamaluddin (2018); Shafie, & Amir (2018). Awareness resulted in no significant



influence on intention to comply with zakat payment among small business owners in Kedah. This finding is consistent with a study by Khairi, Laili, & Kamarubahrin (2020). Due to the lack of education and exposure about business zakat among small business owners, they do not know much about business zakat, which causes them to have no awareness and subsequently do not intend to pay business zakat. However, the positive attitude of business owners towards the payment of business zakat can increase the intention of compliance towards the payment of zakat. The higher the owner's trust in the support and motivation provided by the reference group to pay zakat, the stronger the owner's intention to pay business zakat. Behavioral control is a motivational factor that drives a person's intention to pay zakat. The easier it is for small business owners to implement business zakat payments, the more positive their intentions are towards the compliance of paying business zakat.

A previous study by Xi (2018) found a significant mediating effect of attitude on the relationship between awareness and intention to use counseling services. The attitude was a mediator between the level of awareness and intention towards the compliance of paying business zakat in Kedah. This finding is similar to a study by Oladapo, Omar, Muda & Abdurraheem (2019) found that attitude has a positive effect as a mediator of the relationship between awareness and customer behavioral intentions. Accordingly, it is essential to emphasize factors that can increase the awareness of paying zakat (such as the level of faith, trust in zakat institutions, and subjective norms) so that the resulting awareness will change the attitude of small business owners to have the intention of paying business zakat.

Awareness of paying zakat mediates the relationship between subjective norms and intention to pay zakat. This finding is consistent with previous studies made by Hernandez, Luthanen, Ramsel & Osatuke (2015); Ibarrola-Garcia, Iriarte & Aznarez-Sanado (2017); Kalam & Hossain (2020). The important thing that needs to be emphasized by LZNK is to create a good relationship between LZNK and small business owners in the State of Kedah. The concept known as relationship marketing is essential in cultivating a good relationship that continues between the two parties. LZNK can develop a database of small business owners who have received zakat assistance for reference and monitoring purposes. LZNK needs periodic monitoring to see the condition of the small business owners who have been supported so they do not feel left out. In this way, business owners can establish good relationships with LZNK, increasing their awareness to pay business zakat. The Kedah State Zakat Board needs to go to the field to provide training to strengthen knowledge and educate small business owners on recording their earnings. It is because there is a possibility that there are business owners who are not knowledgeable about the record-keeping of their business results. This tutorial can benefit small business owners because recording business results can be done more accurately.

In conclusion, the findings of this study show that Theory of Planned Behaviour (TPB) can be applied in various fields to explain compliance behavior. From the theoretical view, the intention to pay business zakat will only exist when the current level of awareness can change the attitude of small business owners to pay business zakat. From a practical point of view, the findings of this study can be used by zakat institutions to focus more on increasing the level of awareness through an emphasis on subjective norms (social pressure) received by small business owners through the respective reference groups.



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## Demand on Malay Traditional Dessert during Wedding Festival

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**Abstract:** *The purpose of the article is to disclose the demand of Malay traditional kuih with differing levels of acceptance among consumer in Peninsular Malaysia. Malaysia is well-known for being a diverse society with a wide variety of culinary characteristics. The Malay kuih became the traditional dessert in Malaysian cuisine due to a variety of historical influences. This study examined the quality, taste, and demand of traditional Malay kuih, particularly during festive occasions especially during wedding festivals. In needed to respond the research's objectives and complete the study, three independent variables were investigated. In addition, this study's methodology is consistent with the survey research design. This study used questionnaires to collect information from participants across Malaysia. 250 sets of the study's questionnaires were given out, and the analysis was performed using the window version of IBM's Statistical Package for the Social Science (SSPS) 27.0 programme. The results showed a positive association between the traditional dessert of Malaysia and the criteria of quality, taste, and demand. Besides, this article is hoped to contribute to further refining the traditional Malay food knowledge specifically in its kuih acceptance among the Malaysian society.*

**Keywords:** Traditional Malay kuih, Kuih, Demand, Traditional food & Malaysia's heritage food

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### 1. Introduction

The key components of approaching any research problem are covered in this paper. This chapter's introduction began with the study's timeline to clarify the rationality of the problem statement before enabling the development of the research question and objective. The conceptual framework of the investigation, a substantial research scope, and a synopsis of the overall objective of the research were then included in this chapter.

Traditional food has diverse connotations depending on the locale and the individual's perspective on it. Traditional Malaysian cuisine was appreciated by all races and cultures. Malay traditional cuisine includes a wide variety of dishes and desserts. West Malaysia and East Malaysia are the two separate regions from which traditional Malay desserts are developed (Mohd Nazri et al, 2017). Variance is the defining characteristic of Malay traditional cuisine, and this is seen in all varieties of kuih, sometimes referred to as cakes and pastries. Traditional kuih have a specific cultural character and are transformed by certain qualitative features such as discovering something hidden. It provides insight into the culture, history, and daily life of Malaysian citizens. Typically, various kuih are served during special occasions or festivals. Nonetheless, through the modernization, Malay kuih can be consumed at anytime and anywhere as teatime, dessert, or a



small brunch. The two types of Malay kuih are sweet and savoury. Sweet kuih is made with sugar, coconut milk, brown sugar, and gula melaka (palm sugar), among other basic ingredients. Kuih bahulu, tapai, dodol, kuih tepung talam, kuih seri muka, kuih tepung pelita, and onde-onde are few examples of traditional sweet kuih (Raji et al. 2017).

Allegedly, Malay traditional kuih is well favoured among the citizen is Malaysia. There is still a high demand on traditional kuih even though there are variety of modern and western dessert. The major concern here are about the lacking research and information of traditional kuih to be explored. This research focus to determine the preferences desserts of people in Malaysia and to determine the demand on Malay traditional desserts during wedding festivals. The researcher also wants to find out whether or nor there is a relevant relationship between quality, taste, demand, and Malay traditional dessert.

For this research of study, more variety of Malay traditional desserts will be produced for the consumers. The taste of the Malay traditional desserts also will be improved to keep the demand and maintain the special identity of Malay traditional desserts. This study's range is constrained to the demand on Malay traditional desserts during the wedding festivals in Malaysia. Additionally, this study will explore into the elements that affect the taste, quality, and demand of traditional Malay delicacies; therefore, the involvement of other findings from prior studies may result in additional enlightenment of this topic.

## **2. Literature Review**

This chapter examines earlier study that was conducted by several researchers to identify the demand for traditional Malay desserts at wedding celebrations in Malaysia. The dependent variable and independent variables cited to protect and support this study are the focus of this chapter's literature review. Traditional evidence that verifies the findings is helpful.

### **Malay Wedding Festivals**

The practise of marriage is essential to social culture and religion in practically every country on earth. Marriage is a legal connection between two male and female individuals that takes place on certain occasions. Rozekhi et al (2016) stated that the wedding festival cannot be at the top without the the presence of food. Food is one of the key components of a wedding and has been customary for most races and ethnicities around the world. (Mohamed, 2008; Abdullah, 2009). Wedding banquets in Malaysia are either made by commercial caterers or rewang which is volunteering food preparation by the local community where the wedding is held. Food preparation differs between the two categories. Food preparation for catering is normally done inside and within the business premises using commercial equipment and utensils. Food preparation for rewang is frequently done outside under temporary tents where villagers come and go while the meals are being prepared.

### **Demand of Malay Kuih during Wedding Festival**

Traditional Malay desserts have typically been associated with joyful occasions like Hari Raya Aidilfitri, Hari Raya Aidiladha, wedding ceremony, akikah ceremony and berkhatan ceremony (Ismail et. al, 2021). Food quality, unique tastes and high demand are the factors that make traditional Malay desserts on highlight in the community all over Malaysia. Humairah Hamzah et



al. (2015) stated that the uniqueness of traditional Malay cuisine is reflected in the many kuih, or sweet and snacks, that are transmitted from one generation toward the next. It is a representation of Malaysian culture, history, and way of life. It is also about the local foods, procedures, tools, and utensils that are employed which are heavenly reliant on the knowledge and abilities of the local people.

### **Malay Traditional Dessert**

There are additional small delights from the traditional Malay kitchen that merit more attention in Malay cuisine. They are the kuih, which are well-liked foods often referred to as having Malaysian flavours. Traditional Malay kuih is a broad term that refers to a variety of small-sized treats with sweet or savoury flavours, ranging from mouth-watering pastries or bakeries to steamed and grilled delicacies. The diversity of Malay traditional desserts displays the Malay cultures and cuisine heritage's richness. A classic Malay cake or dessert are just a few of the traditional foods that Malaysians honour the Malay ethnic group with. (Norsyahidah Ismail et al, 2021).

### **The Diversity and Potentials of Traditional Malay Kuih**

In the sense of revitalization, traditional Malay kuih may need to undergo innovations as a step to levitating its pride. Having said that, the traditional quality of such heritage materials is by no chance should be disregarded. A well-innovated product should hold true to its origin but better in certain ways that could enhance its value. Different aspects of innovation should be looked into like packaging or serving presentations, processing system, or even the sensitive careful selection of ingredients. Kühne et al. contends that there is a controversial argument on innovating traditional foods, and it is however the intention of sustaining its relevance should uphold innovation as important as to be competitive in the market among other trendy products

### **3. Methodology**

This article is conducted with the aims to evaluate the demand of Malay traditional kuih during wedding festival among the whole citizen across Malaysia. Based on the non-probability sampling, this study undergoes the convenience sampling method and 250 respondents had been selected samples. Every state has different cultures and heritages, and everyone must have been to a Malay wedding ceremony at least once in their life. The combination of archival and narrative data was analysed with a view to identifying the ways in which information come to be embedded within various forms from samples and too peeled out the demand during the wedding festival.

Most of it have attended Malay wedding festival across whole Malaysia. Malay festivals are very popular for the traditional cottage industries compared to other wedding festival such as Chinese and Indian wedding festival. This is since Malaysia is known to be the cradle of Malay culture, food choices, and commitment to the preservation of their customs, traditions, and craft skills over time. The market and supply during the festival also the factor why most of the samples believed to examine and as well to be primarily significant.

### **4. Results and Findings**

The focus of the research conductor is majority between 18 to 24 years old, and majority are Malay and Muslims. In addition, most of it is single and female. In this scenario, all the participants are familiar and experienced in attending at least one wedding festival. It can be stated that the demand



of traditional dessert is commonly easily be found and fit the demand compared to Chinese and Indian wedding. The Socio demographic profiles are summarized in Table I below.

**Table I: Demographic Profile Of Respondents (N = 250)**

Characteristic	Frequency	Percentage (%)	
<i>Age</i>	18 – 24	109	44
	25 – 29	102	41
	30 – 34	35	13
	35 – 39	4	2
	40 and above	0	0
<i>Gender</i>	Female	178	71
	Male	72	29
<i>Race</i>	Malay	233	89
	Chinese	17	7
	Indian	8	3
	Bumiputera	2	1
	Others	0	0
<i>Marital status</i>	Single	193	77
	Married	50	20
	Divorced	7	3
<i>Religion</i>	Islam	225	90
	Christianity	19	8
	Hinduism	6	2
	Other	0	0

The finding of this study shows that quality has influence on the demand of Malay traditional dessert in Malaysia. This is because the data gathered indicated that majority of the respondents agreed that quality in Malay traditional dessert is a must especially when serve in festivals such as wedding ceremony and Hari Raya festivals. Next, the results of the study also explained that the taste of the Malay traditional dessert is one of the factors of the demand on the dessert. Overall, it is accepted that there is positive relationship between the quality, taste, and demand with Malay traditional dessert in Malaysia.

## 5. Conclusion

In conclusion, this research has accomplished the objectives in investigating the factors effecting the demand on Malay traditional dessert during wedding festivals in Malaysia. The results gained from this study had been achieved.

Nevertheless, the challenge in helping the millennials to acknowledge traditional Malay kuih will require multifaceted and community-wide efforts. Thus, Malay food experts and professionals



especially during preparing authentic Malay kuih. They should play as a role model to influence youth` behaviours to consume, to learn how to make traditional kuih through community outreach, advocacy work, and building partnership s with the food and restaurant industry, media groups, government programs and agencies, school and community organizations, policy makers, and youth groups. Likewise, the Malay traditional kuih brought to these Malaysian` flavours` appear strongly

As a conclusion, although the themes are reachable, this study faces some limitations that are inherent in the research method. One of the primary limitations of this study results from the lack of secondary data from similar studies in literature. Another limitation pertains to the sampling method itself. Owing to budget constraints information had to be collected only from online survey during the pandemic is rather collecting face-to-face or interview session. Therefore, findings had to be confined and interpreted within the characteristics of the themes. Hence, this present study highlights the need for further investigation and exploration on this topic in broader scope and different method for further research.

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# Design of Ergonomic Table and Chair to Reduce Musculoskeletal Complaints with Anthropometric Approaches and Reverse Engineering in the Gatot Kaca MSME

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**Abstract:** *MSME Gatot Kaca is an MSME that is processing fish into crackers. In this cracker packaging activity, workers experience pain because of bad work posture. The purpose of this study is to design an ergonomic packaging table and chairs to reduce musculoskeletal disorders (MSD's). NBM questionnaire used to find out which parts of the body are felt pain by workers. Comparing the risk value of work postures using the QEC and RULA method. The results showed the operators felt pain in the left and back body. From QEC work posture, the exposure value of 70.3% was obtained and from RULA a value of 7. That means the work posture is very risky and requires investigation and change as soon as possible. To overcome this, ergonomic table and chair are designed whose size has been adjusted to the dimensions of the worker and user needs using Anthropometry and Reverse Engineering Method.*

**Keywords:** Anthropometry, Nordic Body Map, RULA, Reverse Engineering, QEC

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## 1. Introduction

Indonesia's economic growth rate is currently on a positive trend and shows an increase from year to year. Economic growth must involve all levels of society from the grassroots to the stakeholders as representatives of the people. According to S. Sofyan, the role of the community in economic growth and development in Indonesia is through Micro, Small, and Medium Enterprises or it can be called an MSME (Sofyan, 2017). The number of Micro, Small, and Medium Enterprises in 2014, there were around 57.8 million SMEs in Indonesia. In 2017 and the next few years it is estimated that the number of SMEs will continue to grow (Kementerian Koperasi dan UMKM, 2004). The growth of MSMEs is not comparable to the implementation of the Occupational Safety and Health Management System (OHS) in the MSMEs. This is indicated by the high number of work accidents that occur. Based on news published by Warta Berita in Indonesia, every seven seconds there is one case of work accident (Ekonomi, 2006).

One of the causes of work accidents that often occur is work posture or poor work attitude in working continuously. Work posture is a determining point in analyzing the effectiveness of a job. If the work posture carried out by the operator is good and ergonomic then the results obtained by the operator will be good. However, if the operator's work posture is not ergonomic then the operator will be easily exhausted. If the operator easily experiences fatigue, the results of the work carried out by the operator will also decrease and not as expected (Sulaiman & Sari, 2018). At work, if we do a work posture that is not ergonomic then it can cause Musculoskeletal disorders



(MSD's). The next stage as a result of poor work posture is that it can lead to CTD's. CTD's (Cumulative Trauma Disorders) are injuries to the muscular skeletal system that gradually increase as a result of continuous small trauma caused by poor design (Tayyari & Smith, 1997).

One of the MSME that has work posture problems is the MSME Gatot Kaca. The MSME Gatot Kaca is one of the MSMEs in Indonesia. Based on the results of direct observations that have been made, in the fish cracker production process in MSMEs they still use traditional tools and facilities and in their production process activities still do not pay attention to and ignore work health and safety. Gatot Kaca MSME has several weaknesses from the work system which can be improved so that the work system in the MSME is much better. One of the problems in this MSME is the cracker packaging process. Crackers that have been fried are put into a temporary storage sack, then the crackers that are inside the sack are put into a plastic bag for later sale in the market. Based on the assessment of researchers, in the process of packaging crackers into plastic work postures from workers at the MSME Gatot Kaca are not ergonomic because the two workers sit on the floor with their legs crossed, their backs bent, movements reaching too far and need more than 7 hours to finish the process. Because of this, it is necessary to have a measurement of work posture at the packaging station at MSME Gatot Kaca. That has been done by R. Brown and G. Li and a survey was used to determine the pain and discomfort felt by buyers and employees of grocery stores. Researchers use anthropometric methods to design table and chair by concerning about dimensions for user convenience (Brown & Li, 2003).

Based on these problems, designed tools in the form of a table with packaging equipment and an ergonomic chair to reduce the risk of musculoskeletal disorders workers in packing crackers using the anthropometric approach and the Reverse Engineering method.

## **2. Research Methods**

### **A. Subject and Object**

In the MSME Gatot Kaca, two workers are the subjects of this study. Anthropometric respondent samples are male and female with range 18-47 years with a total of 30 data, 28 from In the MSME Gatot Kaca, two workers are the subjects of this study. Anthropometric respondent samples are male and female with range 18-47 years with a total of 30 data, 28 from the Indonesian Anthropometry Data Bank and 2 others from workers at the MSME. The object of this research is the risk level of work posture and anthropometric data dimensions. This research uses assistive tools such as the Nordic Body Map questionnaire, RULA and QEC observation sheet, ErgoFellow software, CorelDraw software, measuring instruments, and SolidWorks software.

### **B. Research Flow**

The first thing to do is starting, which means that set the things needed to conduct preliminary research. After that, do the preliminary research in the form of conduct interviews with MSME Gatot Kaca workers and direct observation of the situation of MSMEs. The third step, do the literature study to find out which theory references are relevant to the problem and after that identification the problems that exist in the MSME. The next step is data collection. In this study, there are two types of data collection, which is work posture data collection and anthropometry data collection. When all the data has been collected, the data will be processed by the calculation method used in the NBM questionnaire, QEC and RULA methods. After the data processing and



analysis has been finished, then the data can be used as a reference to design the ergonomic table and chair, and when the table and chair has been designed then, the study can be done.

There are five main steps for designing and developing the table and chair. First, the identification of worker complaints using the Nordic Body Map (NBM) questionnaire. The NBM (Nordic Body Map) questionnaire is one of the subjective measurement tools in the form of a questionnaire that is used to find out the parts of the muscles that are experiencing complaints ranging from discomfort (mild pain) to extreme pain (Corlett, 1992).

Second, identify the score of work posture with the QEC method. This method assesses risk disorders that occur on the back of the back, shoulders / arms, wrists, and neck based on the viewpoint of researchers and workers. QEC helps to prevent the occurrence of MSDs such as repetitive motion, compressive force, incorrect posture, and duration of action (Tawraka, 2004). The classification of QEC results can be seen in the following table:

**Table 1: QEC Classification**

<b>Exposure Check</b>	<b>Action</b>
≤40%	Acceptable
41-50%	Investigate Further
51-70%	Investigate Further and Change Soon
>70%	Investigate and Change Immediately

Third, identify the score of work posture with the RULA method. Rapid Upper Limb Assessment (RULA) is a quick method of assessment of upper body posture. The input of this method is the posture (palms, upper arms, forearms, back and neck), the burden lifted, the energy used (static/dynamic), the amount of work (Budiman et al., 2012). The classification of RULA results can be seen in the following table:

**Table 2: RULA Classification**

<b>RULA Score</b>	<b>Level of Risk and Action</b>
1-2	Risk ignored, no handling required
3-4	Low risk, change needed
5-6	Medium risk, further treatment, needs immediate change
6+	Very risky, make changes now

Fourth, design the ergonomic table and chair using the Reverse Engineering method. According to [20] Reverse Engineering (RE) is a method for analyzing the subject system to identify the components used today and the existing deficiencies so that it can extract and know the system and information about the design of a product (Chikofsky & Cross, 1990).

And the last one, retrieval of anthropometric dimensions data so that the tool designed can be adjusted and adapted to the human body or the user's body so that it is safe and comfortable in its



use. Anthropometry plays an important role in the fields of industrial design, clothing design, ergonomics, and architecture (Kristanto & Saputra, 2011).

### 3. Result and Discussion

#### A. Identification of Workers Work Posture

Work posture is the position of the worker's body when doing work activities that are usually associated with the design of work areas and task recruitment (Pulat, 1992). There are some researchers who have been identifying the level of work posture risk. Like research form B. M. Pulat (Pulat, 1998), the research aims to obtain an ergonomic workstation through the design of table and chair equipment at a cracker company in Medan. Some things that will be used as the basis for designing equipment are anthropometry and percentiles as a basis for design, RULA (Rapid Upper Limb Assessment) method as a basis for analyzing operator work postures, cycle times for determining standard time and standard outputs, simulations for comparing actual work postures with an ergonomic work posture. Work posture research results obtained mostly at level 1 with the safe category. The conclusion of the study is that there is an ergonomic design of tables and chairs.

In this research, the work posture study was begun by identifying the workers body map using the NBM Questionnaire for the two workers in the MSME Gatot Kaca, as shown below:

Table 3: NBM Questionnaire Result

No	Location	Level of Complaints			
		A	B	C	D
0	Upper neck	-	50%	-	50%
1	Lower neck	-	-	50%	50%
2	Left shoulder	-	-	100%	-
3	Right shoulder	-	100%	-	-
4	Left upper arm	-	-	100%	-
5	Back	-	-	-	-
6	Right upper arm	-	100%	-	-
7	Waist	-	-	-	100%
8	Buttock	-	-	-	100%
9	Bottom	-	-	-	100%
10	Left elbow	100%	-	-	-
11	Right elbow	100%	-	-	-
12	Left lower arm	50%	50%	-	-
13	Right lower arm	-	100%	-	-
14	Left wrist	-	-	100%	-
15	Right wrist/	-	100%	-	-
16	Left hand	-	50%	50%	-



No	Location	Level of Complaints			
		A	B	C	D
17	Right hand	-	100%	-	-
18	Left thigh	-	-	50%	50%
19	Right thigh	-	-	50%	50%
20	Left knee	-	-	50%	50%
21	Right knee	-	-	50%	50%
22	Left calf	-	50%	50%	-
23	Right calf	-	50%	-	-
24	Left ankle	100%	-	-	-
25	Right ankle	100%	-	-	-
26	Left foot	50%	50%	-	-
27	Right foot	50%	50%	-	-

Based on the results of the Nordic Body Map (NBM) questionnaire from operators 1 and operator 2 it is known that the part of the body that feels painful or very painful for both operators is the left side body and the back body.

After finishing with NBM Questionnaire, the next step is identification of the level of work posture risk using QEC and RULA Method using ErgoFellow software. Based on the result for both operators, the calculation of exposure check values for both operators as follows:

$$\begin{aligned}x &= 30 + 34 + 16 = 114 \\x \text{ max} &= 162 \text{ (static activity)} \\E (\%) &= \frac{x}{x_{\text{max}}} \times 100\% \\&= \frac{114}{162} \times 100\% \\&= 70.3\%\end{aligned}$$

Based on the calculation of the work posture value using the Quick Exposure Check method, the exposure check value of the two operators is 70.3%, where the exposure check value is 70.3%, including the >70% category, which means an investigation is needed on the work done by the operator and as soon as possible changes to the posture operator work to reduce the value of risk received by the operator while working.

The thing that caused the high exposure value of the two operators according to the researchers was that when working the back of the operator was greatly bent, the same thing also happened to the operator's wrist, coupled with repetitive movements on the operator's wrist that could be more than 20 times per minute. From the researchers' observations, the operator also made too many movements of the shoulders and neck at work. Operators themselves sometimes have difficulty doing their work and sometimes feel stressed at work. After measuring with the QEC method, continued with the mix using the RULA method. The operator's working posture is documented in the form of photos using an iPhone 7+ camera. After the photo is obtained, in this study using



CorelDraw software to make the angle of the work posture that has been determined. The following is the result of the RULA work posture angle of the two operators:



**Figure 1: Operator 1**



**Figure 2: Operator 2**

The angular value data for the two operators was then processed using ErgoFellow software and the results of the Rapid Upper Limb Assessment work posture risk value of 7. Where a value of 7 is included in the action level 4 and the work posture value of RULA 7 means the work posture carried out by operator 1 and operator 2 is so risky that investigation is needed and immediate changes are needed to improve the work postures of both operators.

The work posture done by the two operators can lead to a musculoskeletal disorder (MSDs). MSD's) are musculoskeletal disorders that are characterized by the occurrence of an injury to muscles, tendons, ligaments, nerves, joints, cartilages, bones or blood vessels in the hands, feet, head, neck, or back. MSDs can be caused or worsened by work, work environment and work performance (Eko, 2003). The next stage of MSD's is CTD's.



Cumulative Trauma Disorders (CTDs) are groups of disorders, injuries, or disorders of the musculoskeletal system in the form of injuries to nerves, muscles, tendons, ligaments, bones and joints at extreme points, upper body (hands, wrists, elbows) and shoulders), lower body (legs, knees and hips) and spine (back and neck) (Savitri, 2010).

### B. Product Size Adjustment with Anthropometry Approach

The term anthropometry comes from the word "anthro" which means human and "metri" which means size. Definitely anthropometry is a study related to the measurement of the dimensions of the human body. Anthropometry plays an important role in the fields of industrial design, clothing design, ergonomics, and architecture. Changes in daily lifestyle, nutrition, and ethnic composition of the community can make changes in body size distribution (for example in the form of an obesity epidemic), and make the need for periodic adjustments from anthropometric data collection (Kristanto & Saputra, 2011).

Anthropometric data used to redesign the carrying basket was taken from the body dimensions of 30 respondents with an age range of 18 - 47 years. The anthropometric data used was tested with a normality test using a 95% confidence level. From the Kolmogorov-Smirnov significance value table, it is known that the significance value of the anthropometric dimensions is used as follows: Sitting Shoulder Height (TBD) = 0.200, Sitting Elbow Height (TSD) = 0.161; Popliteal buttocks (PPO) = 0.056; Popliteal Height (TPO) = 0.164; Shoulder Width (LB) = 0.138; Hip Width (LP) = 0.200; Thigh Thickness (TP) = 0.200; Hand Reach (JT) = 0.153; Metacarpal Palm Width (LTM) = 0.200; Range of Hands (RT) = 0.200; of the value it can be seen that it is greater than 0.05, which means the data are normally distributed.

Table 1: Chair Size Calculation Result

Product Dimension	Dimension	Size Calculation			Result
		Percentile	Percentile value (cm)	All	
Backrest height	TBD	P50	59.19	-	59.19
The length of the cushion	PPO	P5	36.29	-	36.29
The height of the cushion	TPO	P50	41.87	-	41.87
Backrest width	LB	P95	48.43	-	48.43
Seat width	LP	P95	44.72	-	44.72

The size of the chair element in this study, the anthropometric dimension used as a reference for the height of the backrest is the Sitting Shoulder Height (TBD) using the 50% percentile (P50). P50 is used so that the average person can lean comfortably in a chair. For the length of the seat cushion using Popliteal Butt anthropometry dimensions (PPO) using 5% percentile (P5). The use of P5 is intended so that people with smaller PPO dimensions can sit with uninterrupted legs and with larger PPO dimensions can also sit comfortably. The size of the seat height uses the Popliteal Height dimension (TPO) using the 50% percentile (P50). The use of P50 is used so that people who are larger or smaller in size can sit comfortably. 95% percentile use (P95) is used in the Shoulder Width (LB) dimension as a reference for the width of the backrest and Hip Width (LP)



as a reference for the width of the seat base. The purpose of using the 95% percentile is for people who have shoulder and hip size to be able to sit and lean on the chair. The size of the table elements in this study, the anthropometric dimension used as a reference for the width of the table is the Hand Coverage (JT) using 5% percentile (P5). The use of P5 is so that people with smaller hands can still reach the table from the other side and people with greater arms can comfortably use the table.

**Table 8: Table Size Calculation Result**

Product Dimension	Dimension	Size Calculation			Result
		Percentile	Percentile value (cm)	All	
Table width	JT	P5	55.03	-	55.03
Table length	RT	P5	154.67	-	154.67
Upper surface height	TSD	P50	23.99	-	65.86
Backrest width	TPO	P50	41.87	-	48.43
Lower surface height	TP	P95	15.10	-	56.97
Drawer handle	LTM	P50	8.13	-	8.13

Measuring the length of the table using anthropometric dimensions Range of Hand (RT) using 5% percentile (P5). Use P5 so that people who have smaller arms can still reach the right or left side of the table and those with larger arms can comfortably reach the table. Table top height refers to the number of dimensions of the Sitting Elbow Height (TSD) and Popliteal Height (TPO) using the 50% percentile (P50). Use P50 so that the average person can comfortably use a desk. For the height of the surface under the table using the number of dimensions of Thigh Thickness (TP) with P95 and TPO dimensions (TPO) with P50, the height of the surface under the table is set with this size so that when sitting on average the thighs until the stiff sole of the person can still get into under the desk. For the drawer handle use P50 and refer to the dimension of the Metacarpal Palm Width (LTM) so that the largest or the smallest metacarpal palm width can hold the drawer handle.

### **C. Product Design with a Reverse Engineering Method**

The design of tools in this study uses the reverse engineering method. This has been done by which aims to design a tailor chair using ergonomic aspects and anthropometric aspects using the Reverse Engineering method. The results of the study resulted in anthropometric calculations to determine the size of the new tailor chair design (Khoirini, 2019). After calculating the operator's work posture it is known that the operator's work posture is very risky. Therefore, we need a tool that can reduce the risk of operator work posture. The following are some of the previous tools that can be used.



**Figure 4: Previous Product**

Based on interviews conducted, the operator stated that the design of tools for packaging crackers was needed and the operator. The following is a list of product attributes in the design of cracker packaging tools:

**Table 4: Conversion of User Needs**

User Needs	Product Attributes
Reducing pain in the waist	Ergonomic
It's easy when reaching crackers and packaging materials	The size fits
Can be used for a long period	Durable

After determining the product attributes of the packaging device development it is necessary to proceed with making functional predictions in the form of technical characteristics of the required design solutions. The following are functional predictions:

**Table 2: Functuonal Prediction**

User Needs	Product Attributes
Ergonomic	Procedure for packing crackers with good and correct work postures
The size fits	The size of the product elements is adjusted according to anthropometric measurements
Durable	Raw materials and elements of tools that have quality
Effective and efficient	The mechanism of use of the tool can be used appropriately and can increase productivity

Weaknesses from the previous product, namely the size is still not suitable, the chair does not have a cushion, and the packaging press that has a short usage period So the innovations given to the product in this study, namely the size of the tool that is adapted to anthropometric measurements, the giving of a base on the cushion, the use of packaging presses that are easier to use, there is a drawer to place the crackers that have been fried so that the operator or the person using the tool can be safer and more comfortable at work. The following are specifications of the tools in the research times:



**Table 6: Product Specification**

User Needs	Product Attributes
Size	Appropriate measurement of anthropometric dimensions
Material	Aluminum, polymers, fabrics
RULA Value	<4 (maximum RULA score for moderate risk work)
Packaging press mechanism	Using the principles of movement economics

The following are the results of design in the form of tables, chairs, and packaging press to improve operator work posture and reduce ergonomic complaints musculoskeletal:



**Figure 5: Ergonomic Table and Chair**

On the table there is a drawer 2 that functions as a place to put the crackers to be packaged, the purpose of making drawers as much as 2 levels is so that when the crackers have started to pack a lot, the operator only needs to replace the top drawer with the bottom drawer. In the cracker packaging device, when it will glue the packaging do not use hands manually but use the feet automatically. So, the operator only needs to press the footrest under the table and then the packaging press will increase the packaging by itself. The seats are made to be able to rotate 360° to make it easier for operators to reach something. The product is designed so that the operator's working posture no longer bends and reduces the risk of musculoskeletal.

In the design of this research table, the basic material used is aluminum table. The use of aluminum is so that the table is more toughness and durable. Fabric and foam are used on the seat cushion and back of the chair so that the operator feels comfortable and painless when working. Polymers are used on the back of the backrest, backrest hinges, the bottom of the seat cushion. In the



packaging press section uses a polymer base material and the part to glue the packaging is made of aluminum.

#### 4. Conclusion

Based on the Nordic Body Map (NBM) questionnaire, it is known that the parts of the body that are painful or very painful for both operators are the left side and the back. From the QEC method it was found that the exposure check value was 70.3% and from the RULA method a score of 7 which indicated the risky working posture level. Therefore, a solution is provided in the form of an ergonomic packaging table and chair that is designed taking into account the needs and desires of the operator and adjusted to the operator's anthropometric size so that it will be safe and comfortable when used.

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# Factors affecting Purchase Intention of Electric Vehicles in Thailand

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**Abstract:** *Recently, Thailand has seen the rise in awareness and popularity of electric vehicles (EV). One reason is because of the increasing price of gasoline for the regular automobiles. The sales of both hybrid and pure-electric vehicles have increased rapidly. The Thai government has seen the importance of being less dependent on the gasoline at the macro level as an important issue. As a result, in 2021, the Thai government issued the regulations to reduce the levies on components of electric vehicles and other measures to support the production and manufacturing of electronic vehicles in Thailand. The initiatives by the Thai government have propelled the demand for electronic vehicles in Thailand significantly. This research utilizes the Technology Acceptance Model (TAM) (Davis, 1989) with some adaptation to make it suitable for the context of the study. The variables, government financial incentives, perceived risk, and price, are added to the conceptual framework because the high increase in demand for electric vehicles in Thailand is largely impacted by the government financial incentives. In conclusion, this research has shown that the Thai government's initiative to push the electric vehicles into the Thai market has succeeded. The research has found that several factors, including perceived usefulness, ease of use, and the government initiatives have positive impacts on the Thai people's intention to use the electric vehicles.*

**Keywords:** electric vehicles, Thailand, government policies

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## 1. Introduction

Recently, Thailand has seen the rise in awareness and popularity of electric vehicles (EV). One reason is because of the increasing price of gasoline for the regular automobiles. The sales of both hybrid and pure-electric vehicles have increased rapidly. The Thai government has seen the importance of being less dependent on the gasoline at the macro level as an important issue. As a result, in 2021, the Thai government issued the regulations to reduce the levies on components of electric vehicles and other measures to support the production and manufacturing of electronic vehicles in Thailand. The initiatives by the Thai government have propelled the demand for electronic vehicles in Thailand significantly. The sales of the electric vehicles have increased so much that all manufacturers of electric vehicles had to stop selling the bookings and promoting the electric vehicles because they could not manufacture and meet up with the high demand to be in time for delivery. The delivery date is now queued up to the end of 2022 without stable promises of delivery.



The government initiatives have driven down the price of electric vehicles to about 800,000 Thai baht, which is comparable to the eco-car using gasolines that most Thai could afford. The bookings of the electric vehicles have gone up 232% year on year.

## 2. Research Framework

This research utilizes the Technology Acceptance Model (TAM) (Davis, 1989) with some adaptation to make it suitable for the context of the study. The variables, government financial incentives, perceived risk, and price, are added to the conceptual framework because the high increase in demand for electric vehicles in Thailand is largely impacted by the government financial incentives.

The Thai government's initiatives on reducing the levies on electric vehicle parts have enabled the electric vehicle manufacturers in Thailand to reduce the price so much that, for some brands, the price of the electric vehicles is equal to the economy size gasoline cars. The reduced price of the electric vehicles has been down to only 800,000 Thai baht. This price range is considered to be affordable by the working group of Thai people.

The TAM model components are measured as follow:

- i. Perceived usefulness is measured by the perception of the consumers in the usefulness of electric vehicles and the driving range of the electric cars,
- ii. Ease of use is measured by the perception of the consumers regarding the ease of use of the electric cars,
- iii. Perceived risk is measured by the perception of the consumers on the security features of the electric vehicles,
- iv. Intention to use is measured by the intention of the consumers to purchase the electric vehicles in the future.

The TAM model is also accompanied by two more variables as mentioned earlier.

The adapted TAM model with two additional variables results in the following research conceptual framework.

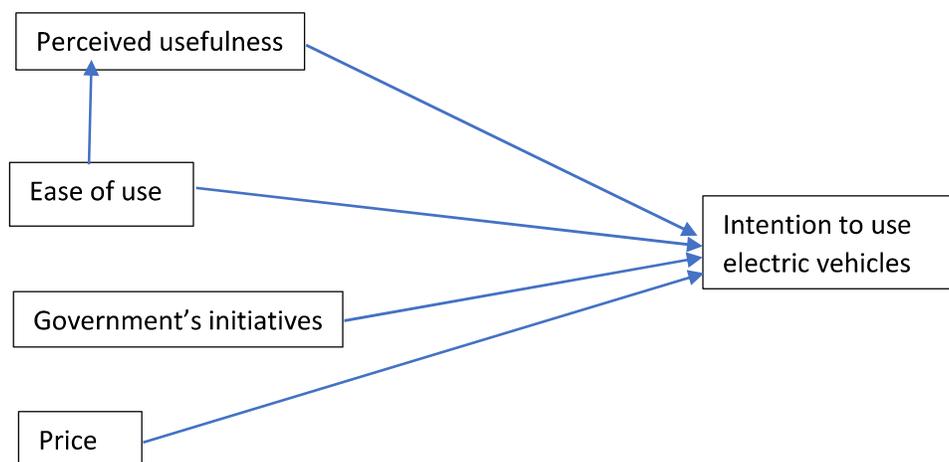


Figure 1: Research Conceptual Framework



The research conceptual framework is then elaborated into the following hypothesis.

H1: Perceived usefulness has statistically significant impacts on intention to use.

H2: Ease of use has statistically significant impacts on intention to use.

H3: Perceived risk has statistically significant impacts on intention to use.

H4: Ease of use has statistically significant impacts on perceived usefulness.

H5: Government financial incentives have statistically significant impacts on intention to use.

H6: Price of electric vehicles has statistically significant impacts on intention to use.

### 3. Research Methodology

This research utilizes both the qualitative and quantitative approach. The survey of 400 respondents, which statistically could be the representative of population in Bangkok Metropolitan Areas, was conducted. The samples were selected randomly from different districts of Bangkok. As a matter of fact, more than 400 people agreed to do the self-administered survey but the researcher selected only the qualified 400 respondents that can be used in the statistical analysis. The questions in the questionnaire were adapted from previous literature related to the theoretical background. In addition, questions on demographics were added in order to get all variables into the statistical analysis.

The statistical analysis used in this study are the t-test and linear regression using SPSS statistical package. The hypothesis are considered to be statistically significant at the 95% confidence level. This research also conducted random after-survey interviews. The interviews were semi-structured and brief in nature. The data from the interview were then collected and analyzed by encoding the repetitive and important keywords that are related to the research framework.

### 4. Results

The demographic analysis of the respondents shows that there are more males than females among the respondents. The average income is between 15,000 – 45,000 Thai baht. The educational backgrounds of the respondents mostly fall between high school and graduate levels. The descriptive analysis shows that the average level of interest in using electric vehicles among respondents are about 3.67 out of 5 scale. More than 95% of the respondents have heard about the coming of electric vehicles. However, less than 50% of the respondents have studied further about the electric vehicles.

The statistical analysis showed the following results:

H1: Perceived usefulness has statistically significant impacts on intention to use.

This hypothesis is supported in a positive way at the 95% confidence level. This means the more people see the usefulness of the electric vehicles, the more they will have intention to use it. The perceived usefulness includes two factors, the perceived usefulness and the driving range of the electric vehicles. Both of these variables are statistically significant to the intention to use.

H2: Ease of use has statistically significant impacts on intention to use.

This hypothesis is also supported in the positive way. That is, the ease of use of the electric vehicles positively affects the intention of the users to use electric vehicles.

H3: Perceived risk has statistically significant impacts on intention to use.



This hypothesis is supported but in the negative direction. This means the lower the perceived risk of electric vehicles, the higher the intention of the users to use electric vehicles. The perceived risk was asked in the questionnaire as the safety features of the vehicles including the worries about using electric vehicles during the rainy season or in other environmental conditions.

H4: Ease of use has statistically significant impacts on perceived usefulness.

This hypothesis is supported in the positive direction. The easier it is in using the electric vehicles, the higher the level of perceived usefulness of the electric vehicles.

H5: Government financial incentives have statistically significant impacts on intention to use.

This hypothesis is also supported in the positive direction. The fact that the Thai government provides tax incentives which resulted in the price reduction of the electric vehicles attracts higher intention to use electric vehicles.

H6: Price of electric vehicles has statistically significant impacts on intention to use.

This hypothesis, in contrast with other hypothesis, is not supported by the statistical analysis and descriptive analysis. This means that the prices of electric vehicles have no statistical impacts on the intention to use of the electric vehicles. If the buyers have the intention to use the electric vehicles, they would buy it with little attention on the prices of the electric vehicles.

## 5. Discussion

The descriptive analysis of the questionnaire shows that more than 80% of the users agreed that the perceived usefulness of the electric vehicles (measured on the scale of one to five, with five being the most useful) is very useful to them. Some of them mentioned that they can see the high usefulness of electric vehicles but they would rather wait until more people use them or until the electric vehicles are accepted more widely.

Another descriptive analysis shows that the respondents agreed that the electric vehicles are easy to use (on the scale of one to five, with five being the easiest) with the average score of 4.53. Since most of the respondents are familiar with the introduction of electric vehicles in the news and advertisement.

Most of the respondents also think that the use of electric vehicles is quite safe in different environmental conditions, including raining or light floods. They are not afraid of the electric shock or similar issues citing that they trust that the manufacturers must have tested the electric vehicles to a certain level that is secure enough before they release the vehicles to the market.

Subsequently, the researcher then input all the responses into the SPSS program and run linear regression analysis. The results show that all hypothesis, except the last one, are statistically supported at the 95% confidence level. The R-squared is at 0.379.

The first hypothesis shows that perceived usefulness has statistically significant impacts on intention to use. This means that the respondents can relate the perceived usefulness of electric vehicles to the intention to use the electric vehicles. In addition, in the interview following the questionnaire filling, the respondents mentioned that the advertisement showing the efficiency of



energy usage of the electric vehicles is actually one attribute of the usefulness that they perceived. This hypothesis is significant at the 99% confidence level.

The second hypothesis shows that ease of use has statistically significant impacts on intention to use. This hypothesis is also significant in the positive way. When asked about the ease of use, the respondents agreed that they think the electric vehicles are easy to use because there are no mechanical components, except for the electric motors that drive the vehicles. So, they do not expect many problems with using the electric vehicles. Therefore, they have high intention to use the electric vehicles.

The third hypothesis shows that perceived risk has statistically significant impacts on intention to use. This hypothesis is supported but in the negative direction. This means, the lower the perceived risk of electric vehicles, the higher the intention to use the electric vehicles. As mentioned earlier, this dimension of the questionnaire is mainly concerned with the safety of the electric vehicles. The fourth hypothesis, ease of use has statistically significant impacts on perceived usefulness, is also supported in the positive direction. This hypothesis is quite obvious to the researcher because once the respondents have seen the advertisement and found that the electric vehicles are easy to use, as mentioned in the second hypothesis, it is quite easy for them to see the usefulness of the electric vehicles.

The fifth hypothesis, the Thai government financial incentives have statistically significant impacts on intention to use, is supported in the positive direction. As the Thai government is trying to be less dependent on importing gasoline from neighboring countries, it has issued many initiatives to support the use of hybrid and pure electric vehicles, including the reduction in the tax levied on the components of such vehicles and other measures. It cannot be denied that the reduction in price of the electric vehicles, coupled with wide advertisement and promotion campaigns from the manufacturers of the electric vehicles, can increase the intention to use the electric vehicles of Thai people.

The last hypothesis, price of electric vehicles has statistically significant impacts on intention to use, is the only hypothesis that is not statistically supported in this research. It is found that, at the 95% confidence level, the price of the electric vehicles does not have impacts on the respondents' intention to use the electric vehicles. This implies that most respondents perceived that the prices of electric vehicles are reasonable compared to their performance and efficiency. This, too, could be the result of wide advertisement which can inform the audience of such benefits.

The researcher also conducted the t-test to test the difference in demographics on the intention to use the electric vehicles. It was found that neither age, gender, education level, nor income levels have different effects on the intention to use the application. It seems like everyone is comfortable using it no matter what their demographic backgrounds are. This phenomenon is not uncommon. It is found when the application or the technology is simple enough and is widely accepted.

## **6. Conclusion**

In conclusion, this research has shown that the Thai government's initiative to push the electric vehicles into the Thai market has succeeded. The research has found that several factors, including



perceived usefulness, ease of use, and the government initiatives have positive impacts on the Thai people's intention to use the electric vehicles.

The statistical analysis has shown that the adapted TAM framework, which includes government initiatives and price of the electric vehicles, could support the results described earlier.

Nonetheless, this study still has some limitations that could be resolved by further research. The first limitation is that this study focuses only in the Bangkok Metropolitan areas and not in the provincial areas. Had the research been conducted in other areas, the results may have differed. Another limitation is that it cannot be said that without the government initiatives and wide advertisement from the manufacturers of the electric vehicles, the initiatives alone would have been this successful or not. This is because the initiatives and other factors support each other.

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## Factors Influencing Consumer Preference of Suboptimal Food towards Purchase Decision in Selangor

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**Abstract:** *Suboptimal food products also known as 'ugly foods' are those that may still be consumed but appear to differ from the optimal or normal in some aspects in the eyes of the consumer. Assuming consumer do not buy and consume suboptimal food, hence international trade regulation and also retailers have established product requirements which resulting goods that do not fulfil such criteria to be discarded. Various studies have published statistics on the quantity of food wasted along the food supply chain and in consumer households. Hence, to address the concern of this issue, this study was conducted the factors that influence the consumer preferences to consume suboptimal food and also tested the consumer purchase decision. The questionnaire has been conducted with the quantitative method to achieve the objectives of this research. The target population for this study was the people who live in Selangor, Malaysia. A purposive sample was used in this study and the researcher has targeted a specific characteristic to do this study. At the end of this study, hypothesis one and hypothesis two were supported. The result of Pearson correlation showed that it was important whether acceptance of product associated with the suboptimal condition (attitude) and perceived quality and safety of food. The results of the study indicated that consumer purchase decisions toward the suboptimal foods are significantly related by the acceptance of products associated with suboptimal in appearance condition, date labelling, and its packaging, as well as by the consumer perspective towards the quality and safety of food perceived. However, hypothesis three was not supported, whereas this study concluded that the personality measure of consumers towards environmental concern did not directly affect the consumer purchase decision.*

**Keywords:** Suboptimal food, Perceived Quality, Environmental Concern, Purchase Decision, Behaviour

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### 1. Introduction

Suboptimal food products are also known as 'ugly foods' are those that may still be consumed but appear to differ from normal in some aspects in the eyes of the consumer which include the appearance standards, their date labeling, and packaging (Aschemann-Witzel et al., 2020; de Hooge et al., 2017). International trade regulations and retailers have set product criteria (de Hooge et al., 2017; Mookerjee et al., 2021), and supply chains will discard goods that do not meet these product criteria, assuming that consumers do not want to buy and consume such suboptimal items (Aschemann-Witzel et al., 2020; T.Hartmann et al., 2021). Hence, this issue leads to food waste.



The issue of food waste has arisen and received a lot of attention over the last few years (de Hooge et al. 2017). Various studies have published statistics on the quantity of food wasted along the food supply chain and in consumer households, which show that about one of the third to one half of all produced food is wasted (Aschemann-Witzel et al., 2018; Makhal et al., 2020; Yang and Chen 2022). Among the wastes in Malaysia, food is the highest waste thrown at 44.5% (Graze Market, 2015). Food waste is directly linked to the unwillingness to sell purchase and consume suboptimal food or imperfect product appears to be a substantial cause of food waste at retailers and in households (Wong et al., 2018; Aschemann-Witzel et al., 2018). The aesthetic standards employed while buying from wholesalers are influenced by the consumer's choice behavior and perception of what is acceptable for them to consume (Aschemann-Witzel et al., 2018).

Thus, it is of importance to research consumer perception and choice of foods that might be wasted due to being perceived as 'suboptimal', to devise strategies to reduce consumer-related food waste (Aschemann-Witzel et al., 2018). Based on Wong et al., (2018), stated in limitation that the research was queried regarding consumer preference towards suboptimal food products in general. Hence through this argument, further studies carried on consumer preference towards suboptimal food products in specific categories. To address the concern of this issue, this study will explore consumer preference dimension and tested towards purchase decision.

## **2. Literature Review**

### **2.1 Suboptimal Food Product**

Suboptimal food product is product that deviate from normal or optimal product and also known as 'ugly foods' are those that may still be consumed but appear to differ from the optimal or normal in some aspects in the eyes of the consumer (Aschemann-Witzel et al., 2020; Aschemann-Witzel et al., 2019). Suboptimal food is defined into three different categories in terms of the characteristics of food (Stangherlin et al., 2019). The first category is based on the appearance standard of the food. These include the weight, shape, or size of the food products (de Hooge et al., 2017). The second category is based on their date labeling. This is related to the date labeling being close to or beyond the best-before date (de Hooge et al., 2017). The third category is based on their packaging. The packaging that related to visual images such as dented can or torn wrappers (de Hooge et al., 2017). However, all of the three category food characteristics do not represent the safety risk of the food and consumer consumption (de Hooge et al., 2017).

### **2.2 Consumer Preference of Product Associate with Suboptimal Condition**

The visual food characteristics that represent the suboptimal food product create the first impression on the consumer, hence, acting as the main determinant of food products choice and willingness to purchase them (Yuan et al., 2019). This is because consumers found that the optimal and perfect appearance when purchasing the food products is related to the quality of the food product (Aschemann-Witzel et al., 2018). Also, the fact is supported by Stangherlin et al., (2019) that consumers believe that they are losing some aspects if they purchase suboptimal food products.

The distinction between optimality and sub-optimality is established by criteria of the consumer which are related not only to subjective factors but also objective factors such as food safety concerns (Aschemann-Witzel et al., 2018). According to de Hooge et al., (2017), which stated that



majority of consumer (62%) that they purchase food product that has the longest remaining shelf life, which implies that consumer avoids purchasing food product that is close to their best-before date. Food loss research in supermarkets provides additional indirect evidence that consumers are less enthusiastic towards food products in which visual packaging damage or food that close their best-before date (de Hooge et al., 2017). Hence, this study proposes that consumers' purchase decision was influenced by the product that associated with suboptimal condition. Based on the remarks above, the following hypothesis is developed:

H1 There is positive relationship between the consumer preference of product associate with suboptimal food product in the supermarket and purchase decision.

### **2.3 Perceived Quality and Food Safety of Suboptimal Food Product**

Consumers believe that the safety and quality of food products depend on the image of the product (Aschemann-Witzel et al., 2020). Safety and quality might be expected as a result of responsible and irresponsible by the company or workers' attitude during the process of handling (Aschemann-Witzel et al., 2020). Moreover, consumers believe that the quality can be reflected in brand reputation (Aschemann-Witzel et al., 2020).

There are a variety of contexts of the term quality. According to Grunert, 2005, there is broad agreement that quality has an objective and subjective dimension. The physical characteristics incorporated into the product are referred to as objective quality. Meanwhile, subjective quality is the perception of consumers towards the product quality (Grunert, 2005). Sensory and health-related aspects, as well as convenience and process quality, are elements of quality dimensions (Grunert, 2005).

The suboptimal food product may simply seem less appealing and thus harm its value perception (Aschemann-Witzel et al., 2020). Aschemann-Witzel et al., 2020, added that the ratio between the resources that need to spend and the benefit must achieve, to get the benefit of the product. However, there is an unfavorable ratio between the benefit and the resources when it comes to suboptimal food products (Aschemann-Witzel et al., 2020). When compared to the effort in terms of money or time, suboptimal food is worthless in terms of perceived value and certain quality attributes (Aschemann-Witzel et al., 2020).

This is related to the convenience and sensory characteristics of the food product. Suboptimal food might be viewed as inconvenient to cope with in terms of transportation, storage, and preparation in which consumers need to give extra care while handling suboptimal food such as brownish bananas (Aschemann-Witzel et al., 2020). Moreover, when a product is no longer fresh, it is anticipated to lose nutritious qualities or no longer taste as nice as it should (Aschemann-Witzel et al., 2018).

Stangherlin et al., 2019, added that safety concerns are also an important factor of consumer preference toward suboptimal food products. Food safety, in a broad sense, can be viewed as nutritional qualities of food as well as more general concerns about the characteristics of unfamiliar foods (Grunert, 2005). Consumers tend to reject food products with a shorter expiration date or close to the best-before date due to safety and risk concerns (Stangherlin et al., 2019). Furthermore,



damaged packaging in supermarkets can be a source of perceived potential contamination as well as thought health and safety hazards (de Hooge et al., 2017). This belief also plays a significant role in the consumption of food products in which there is a study where consumers are less likely to consume suboptimal packaging of food products (de Hooge et al., 2017). Hence, based on these arguments, the following hypothesis is developed:

H2 There is positive relationship between perceived quality and safety of food and consumer purchase decision.

#### **2.4 Personality Measure of Consumers**

According to Aschemann-Witzel et al., 2018; de Hooge et al., 2017, suboptimal food acceptance by consumers is also influenced by personality measure aspects towards the environment. The fact is supported by several studies that the consumer level of environmental concern might play a role (Aschemann-Witzel et al., 2020). The term environmental concern refers to 'the degree to which people are aware of problems regarding the environment and support efforts to solve them or indicate the willingness to contribute personally to their solution' (Wong et al., 2018). According to Stangerlin et al., 2019, it was shown that when people are more concerned about the environment, they are more susceptible to cosmetic imperfections. In the study by de Hooge et al., 2017, consumers are more likely to act environmentally friendly when they are personally engaged in environmental sustainability and have confidence in their abilities to help the environment. Hence, the following hypothesis is developed:

H3 There is positive relationship between consumers' personality measures towards environment concern and consumer purchase decision.

### **3. Methodology**

In this study, there are three factors of consumer preferences which are products associated with the suboptimal condition, quality, and safety of suboptimal food, and personality measures of consumers toward the environment. The target population for this study was the people who live in Selangor, Malaysia. In Selangor, Malaysia, have 6.56 million citizens (Department of Statistic Malaysia, 2021). To do the research need respondents and need a specific amount of them. This study used Krejcie and Morgan Table (Krejcie & Morgan, 1970) to find the amount of sample size. Based on Krejcie and Morgan, 1970, as the population is more than 1,000,000, a total of 384 residents are required to conduct this research

The questionnaire has been conducted with the quantitative method to achieve the objectives of this research. Likert's scale of 6-points is ideal for research with several variables since it reduces the number of questions in the test as a whole, making it less burdensome for responders while maintaining adequate reliability according to psychological test standards (Chomeya, 2010). In this research design, the non-probability sampling technique that will be used is purposive sampling. Purposive sampling is a method in which specific places, people, or events are purposefully chosen to give important information that cannot be gained through other approaches (Taherdoost, 2020).



To capture the information regarding product associated with suboptimal condition, perceived quality and safety of food, and personality measure towards environment concern and consumer purchase decision, a questionnaire was design into seven main sections. The first section involved a screening question is demographic to ensure that the respondent is within the survey area and follow the requirements of survey. The second section of questionnaire was designed to capture the acceptance of consumer towards food product that associated with suboptimal condition. The third, fourth and fifth part of questionnaire include question of perceived quality and safety of food product regarding to its suboptimal condition which are based on appearance, packaging and date labelling. As for the sixth section of questionnaire, the question was designed to capture the information of personality measure of consumer towards environment concern. Last section which is seventh part of questionnaire was designed to assess respondents' decision whether to buy the suboptimal food or not.

The total data of 399 respondents was collected and used for data analysis. Statistical analysis and hypothesis were tested using The Pearson Correlation Coefficient,  $r$ , to determine the relationship between independent variable and independent variable (Cohen, 1988). The data obtain analyzed using statistical software, Statistical Package for the Social Science (SPSS) version 21 (IBM,2012). The reliability test for the pilot test has been conducted from the results of the questionnaire which represent 39 respondents. The Cronbach's Alpha is the reliability test used in this research to determine the reliability.

## 4. Results and Analyses

### 4.1 Socio-demographic profile respondent

Table 4.1: frequency of respondent profile

Demographics	Frequency	Percent (%)
<b>Age</b>		
18-20	8	2.0
21-35	146	36.6
36-50	124	31.1
More than 50	121	30.3
<b>Gender</b>		
Female	241	60.4
Male	158	39.6
<b>Residential area</b>		
Sabak Bernam	39	9.8
Kuala Selangor	36	9.0
Hulu Selangor	12	3.0
Gombak	63	15.8
Petaling	76	19.0
Klang	50	12.5



Kuala Langat	17	4.3
Hulu Langat	38	9.5
Selangor	68	17.0
<b>Household Composition</b>		
No children under 18 years old	189	47.4
Have children under 18 years old	210	52.6
<b>Education Level</b>		
SPM	51	12.8
Diploma	137	34.3
Bachelor degree	176	44.1
Master degree	31	7.8
PHD	4	1.0
<b>Occupation</b>		
Fulltime employed	237	59.4
Part-time employed	8	2.0
Not employed	14	3.5
Retired	78	19.5
Student	54	13.5
Not specific	8	2.0
<b>Household Income</b>		
B40, Household income is below RM4,850 per month	124	31.1
M40, RM4,851 per to RM10,970 per month	200	50.1
T20, exceeds RM10,971 a month	53	13.3
-	22	5.5

Based on table (4.1), displays the respondents' demographic background. Respondents' age is divided into 4 categories. The highest respondents within the age of 21-35, which represents 36.6% of the total respondents. As for the gender, from the 399 respondents, 241 of them were female which represents 60.4% number of respondents. The rest of 39.6% of respondents were male that representing 158 of respondents. Next, from the data, the highest participation for residential area is from Petaling which is 19% from 399 respondents.

Of the 399 respondents, 189 of them have 'no children under 18 years old' which represents 47.4% number of respondents. The rest of 52.6% of respondents 'have children under 18 years old' that represents 210 of the respondents. As for the education level, the highest percentage is Bachelor's degree level which is 44.1%. Moreover, the highest range for occupation of respondents are fulltime employed that represent 59.4%. Lastly, as for the respondents' household income, M40, RM4,851 per to RM10,970 per month stated the highest from the respondents.



## 4.2 Reliability test

The reliability test for the pilot test has been conducted from the results of the questionnaire which represent 39 respondents. The Cronbach's Alpha is the reliability test used in this research to determine the reliability. Reliabilities less than 0.60 are considered poor, those in the 0.70 range acceptable, and those greater than 0.80 good (Sekaran & Bougie 2016). Table (4.2) below shows the result corresponding with the pilot test that has been conducted.

**Table 4.2: shows reliability statistics of the question**

RELIABILITY STATISTICS		
Variable	Cronbach's Alpha	N of item
Product associated with suboptimal condition.	0.600	3
Perceived quality and food safety of suboptimal product. (Appearance)	0.930	6
Perceived quality and food safety of suboptimal product. (Packaging)	0.933	6
Perceived quality and food safety of suboptimal product. (Date labelling)	0.938	6
Personality Measure of Consumer	0.788	4
Consumer Purchase Decision	0.958	4

$r = .10$ to $.29$ or $r = -.10$ to $-.29$	Small correlation
$r = .30$ to $.49$ or $r = -.30$ to $-.4.9$	Medium correlation
$r = .50$ to $1.0$ or $r = -.50$ to $-1.0$	Large correlation

**Table 4.4: shows the correlation between product associated with suboptimal condition, perceived quality and safety, personality measure and purchase decision**

		Product Associated with Suboptimal Condition	Perceived Quality	Personality Measure	Purchase Decision
Purchase Decision	Pearson Correlation	<b>.373**</b>	<b>.339**</b>	<b>.035</b>	1
	Sig. (2-tailed)	.000	.000	.487	
	N	399	399	399	399

\*\* . Correlation is significant at the 0.01 level (2-tailed).

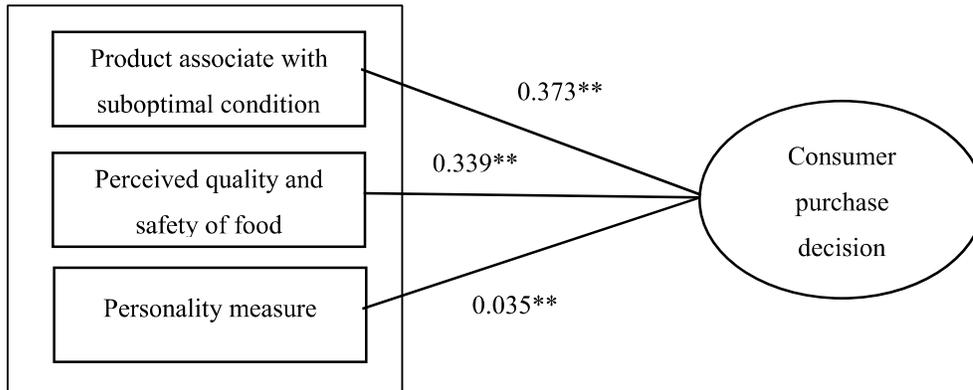
Based on the result from table (4.2), the result of the Pearson correlation between product associated with the suboptimal condition and purchase decision shows that the value  $r = 0.373$  with the  $p$ -value  $< 0.05$ . Thus, these two variables show that there is a medium positive correlation. As for the second independent variable which is perceived quality, the Pearson correlation between perceived quality and purchase decision shows the  $r = 0.339$  with the  $p$ -value  $< 0.05$ . The  $r$ -value shows that there is a medium positive correlation between the two variables. Lastly, the Pearson



correlation between personality measure and purchase decision shows that the  $r = 0.035$  with the  $p\text{-value} > 0.05$ . Hence, the  $r$ -value shows that there is no relationship between these two variables.

## 5. Discussion

Factors influence consumer preference



**Figure 5.1: shows the result of Pearson correlation**

A summary of the verification of the hypothesis made in this study is shown in figure 5.1. In this study, the clear identification of determining factors influencing the consumer's preference of choice on the suboptimal food products towards purchase decision was the main objective. To this end, theory planned behavior (TPB) was utilized as the theoretical framework for the study. H1 and H2 were supported. The result of Pearson correlation showed that it was important whether acceptance of product associated with the suboptimal condition (attitude) and perceived quality and safety of food. The results of the study indicated that consumer purchase decisions toward the suboptimal foods are significantly related by the acceptance of products associated with suboptimal in appearance condition, date labeling, and its packaging, as well as by the consumer perspective towards the quality and safety of food perceived, which is similar to conclusion conclude by de Hooge et al., (2017) and Aschemann-Witzel et al., (2018). On the other hand, H3 was not supported, whereas this study concluded that the personality measure of consumers towards environmental concern did not directly affect the consumer purchase decision.

**Table 5.2 shows the result of Pearson correlation between product associate of suboptimal condition and purchase decision.**

		Acceptance of suboptimal appearance	Acceptance of suboptimal package damage	Acceptance of suboptimal due to date
	Pearson Correlation	.384**	.221**	.307**
Purchase Decision	Sig. (2-tailed)	.000	.000	.000
	N	399	399	399

\*\* . Correlation is significant at the 0.01 level (2-tailed).



More specifically, the results indicated that, among the factors that influence the consumer's purchase decision, acceptance of product associated with the suboptimal condition is the factor most responsible for determining consumer purchase decision. According to de Hooge et al., 2017, there are three categories of suboptimal food which are, based on their appearance, date labeling, and packaging. Hence, the result of the study showed that suboptimal condition of appearance is the most responsible factor in determining the purchase decision of the consumer, followed by date labeling and packaging.

The research hypothesis for perceived quality and safety of food (H2) states that the more consumers feel they achieved the standard of quality and safety of food, the more likely they are to buy suboptimal food. According to several previous studies, the quality and safety of food consist of the attractiveness (de Hooge et al., 2017; Yuan et al., 2019), taste (Stangherlin et al., 2019; de Hooge et al., 2017; Yuan et al., 2019; Grunert, 2005), freshness (Aschemann-Witzel et al. 2020; Aschemann-Witzel et al., 2018), the safety of food (de Hooge et al., 2019), the convenience of food (Aschemann-Witzel et al., 2018; Aschemann-Witzel et al., 2020) and overall quality (Aschemann-Witzel et al., 2018; Grunert, 2005) influence the consumer purchase decision in which increase their risk perception towards the food product.

Environmental concern is an additional construct incorporated in the TPB model. However, personality measure consumer towards environmental concern (H3) was not supported. The results indicated that personality measure consumer towards environmental concern had no significant relationship on the consumer purchase decision. The results of this study are not consistent with research by Stangherlin et al., (2019) and de Hooge et al., (2017). According to Dahalan et al., (2020) that there is a high level of concern in society towards environmental sustainability especially due to the enforcement of MCO because of the Covid-19 pandemic. However, Neo Sau Mei et al., (2016) stated that a strong environmental awareness level does not indicate greater environmental behavior. Environmental awareness alone is insufficient to predict behavior performance in terms of environmental preservation (Neo Sau Mei et al., 2016). Hence, even though Malaysians are concerned about the environment, they might be not motivated to practice and behave in an environmental-friendly way.

## 6. Conclusion

Findings show the extent to which suboptimal food preferences are impacted by various factors. For the first finding, the results showed that products associated with the suboptimal condition in terms of appearance, date labelling, and packaging of the food highlight significant effects on the consumer purchase decision. This can conclude that finding H1 is consistent with the previous researcher. For the second finding, the results showed that there is a relationship between the perceived quality and safety of food. The findings allowed us to conclude that low expectations towards certain aspects of the food products are the respective reasons to determine consumer preferences to purchase the particular product which proves that the hypothesis consistent with the various research. Furthermore, the study allowed to conclude that personality measure of consumer towards environmentally friendly is not affected the consumer purchase decision. H3 is not consistently proves that personality measure of consumer towards purchase decision significantly related with the purchase decision.



It should be noted that, although the results of the current study shed light on several important issues, some limitation need to be considerate in future research. In this study, three dimension was used to explore the factors influencing consumer preference of suboptimal food towards purchase decision. However, other factors that are important such as price-reduced are not offered in this study. Further studies may need to include price reduction in the study.

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## Idioms: Malay's Viewpoint About The Royal Institution In Classical Texts

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**Abstract:** *The royal institution is the highest in an administrative hierarchy of a country. This institution should be glorified as it is considered sacred and sovereign. From the Malay community's point of view, the monarchy's image was depicted with idioms, which can be found in the forms of an adage, proverbs, parables and so on. In addition, this study will focus on the way of life and customs of the royal family based on the Za'ba framework. Using qualitative methods, the chosen classical text data were analysed and worked on to show the greatness of the royalties. The selection of the story text was based on the narrative that included the social structure of society and is sometimes paralogical to give the readers an idea of the greatness of each character. Thus, the beauty of idioms in the classical Malay tale showcases the viewpoint of the people towards the monarchy. It embeds them with the elements of heroism, strength, power, superiority and privilege while trying to demonstrate the wisdom of the Malays.*

**Keywords:** Idioms; Malay's viewpoint; Royal institutions; Classical text

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### 1. Introduction

The system of government practised in Malaysia is a system of tradition that has been used for centuries. This system maintains the King as the central pillar and institution of the people combined to ensure a smooth state administration. But behind the coexistence of people's lives, there are differences in ways of life and customs involving the King's institutions. This comparison shows the Malay community, especially the symbols of power and sovereignty of royal institutions.

The Malay community's point of view on this institution is an institution that is full of protocol systems. The existing king system is now seen as more meaningful and friendly to the people. This cosiness makes the people more loving and respectful of the King's institution. The custom of Raja Raja Melayu (p. 60) reveals that a king needs to be skilled in four things; first, 'old heart is right' means consideration or discretion. Second, sweet-faced; third, fluent tongue; and fourth, helping hands. If a king carries out the law, it also involves four things; first, justice; second, pity; third, violently violating the law; and fourth, courage (Zainal Abidin Borhan, 2017).

However, respect and sovereignty of this institution are still practised because the height of the hierarchical position of the social structure of the King's institution about the King's way of life and customs is not for public viewing. This involves administrative, security, sovereignty and state institutions. According to Madiawati Mustaffa et al. (2020), the people view kings or leaders in



traditional societies highly. In the context of the people's view of the royal institution, the people recognise the state government through the mass media and understand the sovereignty and respect of the people for the royal institution. Other administrative-related affairs are unknown unless the excitement is conveyed through the mass media (Ramlah Adam, 2014). However, the existing technology now provides space and opportunities for people to interact with the government in cyberspace compared to previously protected personalities (Rohayu Ab Majid et al., 2021). This description of kings and royal institutions is widely told in Malay with processing, which expresses language's beauty and subtlety, especially the expression of idioms.

The beauty of the idioms in the language used in presenting matters related to the King's institution intensely examines the element of subtlety. Therefore, this study will focus on the King's procedures, guidelines and customs in selected biography texts. The biography contains many expressions embedded in beautiful language and tells about the King's heroism, power, power and customs through three biography texts. Hence, this study was conducted aiming to identify:

- i. The royal component by using idioms in the language of classical text.
- ii. the customs of the royal group by using idioms in the language of classical text.

## 2. Idioms

Idioms refer to oral expressions that are verbally handed down without the origin of the creator being known and the co-owner's property. This expression carries the message of teaching, rebuke, advice and satire to teach society the meaning of life. The beauty of language in conveying a message signifies that the Malay community uses common sense so that individuals who receive the message are not discouraged and accept it with an open heart.

At the same time, studies related to expression through the Malay language are documented by researchers to preserve the sovereignty and heritage of the Malay people. According to Muhammad Husain (1957), idioms can be defined as those which are said to be the idioms of the language in Malay language and literature, namely, a knot of language, metaphorical language, language fairy, bidalan, parable, proverb, parable, poets and others, each one has high quality and value in literature. Among the works that include idioms are folklore texts with royal procedures and rules, linguistic customs, marriage customs, and so on.

The elevation of values through this verbal expression is paraded through inheritance. Muhammad Bukhari Lubis (1994) describes idioms as a combination of several words that present a distinctive meaning, meaning that the meaning of the semantic unit will not be the same as the meaning of the translation of the catechesis." Therefore, the summary of the meaning of these language flowers through the thought of Zaba shows the use of language through expressions born from the tongue of the nation that animates mining on the other side.

## 3. Research Methodology

This study uses literature by examining and analysing three Malay hikayat books. The selection of three biographical texts aims to look at various materials that tell the story of the King. The material from this folklore book is worked out using reading, selection, and data division. The division of the data obtained will be categorised according to the basic concepts in Malay expression. Among



the texts being used are Hikayat Raja Muda, Hikayat Anggun Che' Tunggal and Hikayat Terung Pipit.

The text of Hikayat Raja Muda was authored by Pawang Ana (1998). The text highlights the Viceroy's prowess as a hero and main character. In addition, the second literary text is Hikayat Anggun Che'Tunggal which was translated by Pawang Ana and Raja Haji Yahya. The text was initially written by R.O. Winstedt (1964). The third text is Hikayat Terung Pipit; this text was authored by Commander Ali Mudin (1998), who brought heroic character by highlighting the main character's strength. In addition, the selection of this biography text is related to the use of idioms which are most widely used in biography text writing.

Based on the framework of Za'ba, the Malay language spoken in the nation builds the national and cultural spirit inherited from ancient ancestors. This language is also a tool to bring out the mind, and there is a philosophy behind the spoken expression. Correct language use can also determine the purpose of a matter being conveyed. In a cultural context, language can provide understanding related to the use of idioms which consists of proverbs, parables, parables, knots of language, tamsil, lidah pelita and metaphor. Zaba's thought in shaping the identity of the Malay people can be seen in Figure 1.1 as follows:

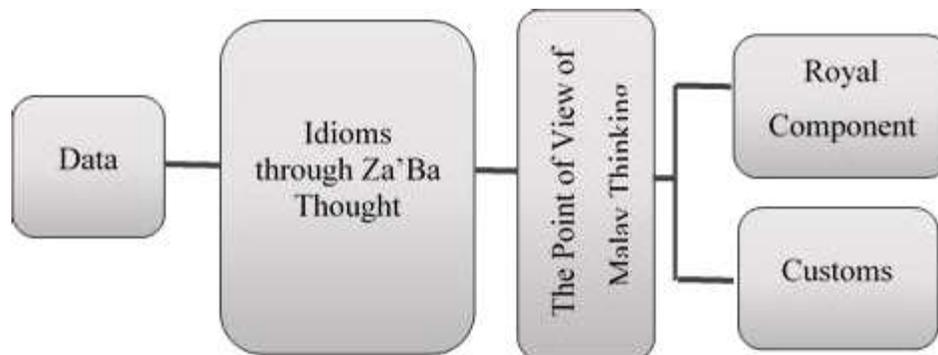


Figure 1.1: The Theoretical Framework of Za'ba Thought

#### 4. The Point Of View Of Malay Thinking

Malay people are thinkers who build the concept of life through wisdom by combining elements of nature. This community thought will answer questions about why and how the community created and made the idioms a source of advice, rebuke and teaching.

This study focuses on royal institutions in terms of customs and the daily life of the King through cases related to this group. To ensure storytelling through highlighted characters, the use of idioms, especially hyperbolic, needs to be well described in the form of writing. This form of storytelling gives the reader an idea of the life of the King's institution, which is full of systematic procedures and customs. For example, the King's institution is not a public place to be pilgrimed or visited; only the palace workers can see and experience it while serving in the palace. Therefore, the idioms in the hikayat text can provide images and parables related to royal customs and equipment that surround the everyday life of the King's institution.



## 5. Royal Component

The royal life concept must be full of rules and guidelines to show that all work can be carried out systematically. The guidance for the royal institution involves all the palace factions ranging from the Sultan to the palace workers, to understand, know and make the guidance so that the tasks and responsibilities assigned can be carried out perfectly. Furthermore, to illustrate the sovereignty and majesty of this institution, the point of view of royal life includes the material components owned by the royal institution, such as the mahligai, seating, and dressing until the aspect of royal food.

### **Mahligai**

Mahligai refers to the palace or residence of the King. It is inhabited by kings, queens and sons of kings and officers in the King. The palace officers subjected to this official residence displayed the emblem of the sovereignty and majesty of the King's institution. This can be seen in Hikayat Terung Pipit (HTP):

"After a while, Wan Cik sat down to do the work, and the Mahligai was already too beautiful to do; arrived at the meaning of the Javanese King"(Panglima Ali Mudin, 1998, p. 4)

The construction of mahligai or palaces cannot be compared to the construction of houses that ordinary people build. The palace has a large size and built-up manner. Three components allow all government affairs to be well administered in it. The formal, Royal and administrative components are built into a national palace. Other components built in the palace include the construction of a seating place. The seat in the palace language refers specifically to the seat. Storytelling is related to the beauty and greatness of the constructed place. This can be seen in the text of Che'Tunggal Anggun Hikayat (HACT):

"So it was seen that the Raja Tunggal junjongan had a man too large in length, the chalice of the base of his arm, and the chalice of his chest was in the middle of the golden geta, with the ratna manikam tassels and pearl tassels and also interspersed with nilam, the poalam pusparagam was too beautiful, his actions glittering in the look of the light of all the gems, awaited by perwara." (Pawang Ana,1964)

The narrative related to the King's place of occupation uses many aspects of hyperbole to tell the greatness of the construction of the place of occupation. For example, Geta refers to the place of the King's bed. In addition, Ratna manikam carries the meaning of various gems, nilam is a blue gemstone, pualam carries the meaning of marble, pusparagam is various colours, and perwara is referred to as the girl who accompanies the King (queen).

### **Wearing of clothing**

Furthermore, the dress code for the royalty also has meaning and mining according to the customs carried out, including marriage, ascension, coronation and so on. Therefore, the wearing of this garment differs according to the customs carried out. For example, wedding customs dresses differ from coronation customs dresses. Likewise, wearing clothes for the commoners is given the prescribed wearing procedures if the people receive the grant of a degree of greatness in the palace.



In the context of arranging the affairs and procedures for royalty use, the Prime Minister will ensure the procedures and perfection of the use according to the ceremony held. The neat research by the Prime Minister is stated in the text through the concept of *seberhana pakaian*. *Seberhana* refers to the provision of a complete clothing set that includes jewellery and clothing equipment according to the ceremony attended by the Sultan or royalty. Equipment sets include clothes, skulls, trousers and jewellery that must be adapted to the ceremony. The *Hikayat Raja Muda (HRM)* text tells these duties and responsibilities.

"... the prime minister also appeared to decorate and supply the royal apparatus *seberhana pakaian*, as the custom of the great king, clothing encrusted with manikam and nila pualam pusparagam..." (Pawang Ana, 1998, p.55)

The selection of garments for royalty also requires careful attention. Starting with the selection of manufacturing materials, the type of fabric until the style of use worn by the imperial class needs to be worshipped and agreed upon by the Sultan or the government. Each garment selected has meaning and mining and provides beauty for the wearer. Wearing and dressmaking guidelines also need to be heavily pinned by palace officials. To get a picture related to the selection of this garment is told in the text *Hikayat Anggun Che Tunggal*:

"Also worn is a *saf sakhlat ainul banat* shirt with gems sown by Betara Kala adored with devotion; worn is a ten cm long male *chindai* cloth with a waistband tied to the waist; then a *Sembilawari keris* is inserted; also, a gold thread is woven with metal on the shoulder" (Pawang Ana, 1964, p. 118)

In addition, the King's or Sultan's ascension is a regrettable event for all state or country palaces. The ascension of the palace encompasses the Sultan, the Empress, and the prince and princess of the Raka will follow the customs as stipulated with greatness. As for the ascension of the ruling Sultan, the period for mourning will be joined by the people of the whole country by raising a flag on half a pole as a tribute and mourning. Likewise, the way to attend the Sultan's ascension ceremony is by wrapping a white cloth *songkok* for men and wearing a black or white shirt. The customs of the ascendants of this palace can be seen in the quote of *Hikayat Raja Muda (HRM)* as follows:

"After a short time of watering, it was lifted into the middle of the palace, then it was worn like a corpse and put in a coffin" (Pawang Ana, 1998, p.7)

The ascension of the Sultan during his reign also allowed the commoners to pay their last respects. This study related to the ascension of the Sultan is described by Jelani Harun (2011) describing the customs of the ascension of the Sultan of Perak in the Malay Mass Text, namely the procedure before the funeral and the things that must be obeyed, including the commoners as a sign of respect. For example, the period of mourning according to the last coronation is 100 days for the Sultan, 40 days for the Raja Muda, 14 days for the Raja Bendahara, and seven days for the Raja Dihilir and five days for the other King. In the meantime, the commoners also paid tribute by holding *tahlil* and reciting the Quran to pray for the deceased's good.



### **Tengkolok/ Destar**

A tengkolok or destar refers to the equipment of a man's clothing and is located on the head of the wearer. This garment has a distinctive symbolic character. Each of these ties of clothing differs according to custom. This garment also gives a picture of a person's greatness and strength. This can be seen in the following passage in Hikayat Anggun Che' Tunggal (HACT):

"The black tengkolok was worn with a crown of nilam pualam pusparagam, titled with diamonds, and a bracelet on the right hand." (Pawang Ana, 1964, p.118)."

A tengkolok is a kind of male headgear. The custom is that the tengkolok is used in the customs of the kings. This tengkolok also has an implied meaning. The Malay community believes this part of clothing should be respected by placing it in a relatively high place to avoid it being stepped on.

In the martial arts (silat) game, the tengkolok portrays courage and calmness. This cloth will be worn throughout the game, and the martial artist needs to ensure that the tengkolok does not fall off the head. The Malay people believe that the tengkolok/destar that falls to earth is the same as scratched dignity.

Today, the tengkolok is only worn by men at weddings and official ceremonies. This is because the boundary and the conspicuous object have different ways of bonding, giving meaning and mining. Similarly to the King's institution, the tengkolok is only imposed for official national occasions and is not to be used casually.

### **Royal Dinner**

Royal food preparation guidelines and rules must also follow established guidelines to show courtesy and order. A celebratory ceremony conducted to welcome guests will be welcomed with a festive atmosphere and glorious atmosphere. The selection of dining equipment should also be refined to avoid any negligence that could degrade the guest's dignity and the ruling Sultan during the ceremony.

A token of respect, an enthusiastic welcome and serving guests with a welcome can strengthen ties between two or more countries. Good relations between the government and the country can create political, economic, and marital relations. For example, in the HACT text:

the King, ministers, knights, and all the people of the army with Bujang Selamat ate at the same level, and the prime minister was given a meal; halwa was a delicious meal. The chalice with roses and tassels was circulated before the assembly. the King of Pertogal and the King of Junjongan drank grape sorbet. "(Pawang Ana, 1964, p.124)

In addition to storytelling in the form of royal meal preparation procedures, the writing of hikayat texts also touches on the element of humour. This element of food-related storytelling is also used as humour in bringing the character to life in storytelling. This can be seen in the following text of Hikayat Terung Pipit (HTP):



"Then Jerun asked the king's maid, what did he say, who was round like this rifle bullet?" The King's maid replied, "this man is crazy, has never eaten Melaka fruit." (Commander Ali Mudin, 1998, p. 68)

The description in the passage above of the concept of humour is based on the parable of the nature of the food being formed. In those days, rifle bullets were also circular to give an idea of the name of the food that was unknown and wanted an answer; this was very practical.

### **Customs**

The concept of customs is a rule set to show the perfection and systematisation of procedures in ceremonies or ceremonies attended by the Sultan or the government. Customs can generally be expressed as a rule or an arrangement of concepts involving cultural life. However, the concept of custom is nowadays devoted to customs that refer to something more protocolled. According to Jelani Harun (2011), this custom was founded by Sultan Muhammad Shah at the time of the reign of Malacca. Other Sultan sultans inherited it until Malacca fell into Portuguese hands. According to a study by Mohd Shazwan Mokhtar et al. (2019), the Portuguese attack on Melaka did not destabilise the King's institution in the Malay land. The Malacca Sultanate moved to Johor and formed the Johor Riau Sultanate, and a prince from the Malacca Sultanate, King Muzaffar, was invited to be held in Perak. In addition, a systematic protocol included the arrangement of each dignitary according to the priorities in the Sultan's presence hall.

### **Honour**

The rules in speaking and controlling customs in each ceremony are books to be used as a guide for anyone to know the rules in the palace. The order of the Sultan's presence begins with the order of the dignitaries according to their position. The procedures and guidelines for speaking in the language of the palace also need to be studied stage by stage so that the ceremony can be carried out perfectly. These procedures and guidelines can be seen in the text of Hikayat Raja Muda (HRM):

'In order to be heard by all the kings and great men who will obey his majesty's decree, each of them replied, 'Daulat, my lord, increase the sovereignty, as the decree was addressed to the head of my mind' (Pawang Ana, 1998, p.104)

The rules and procedures of the King and the dignitaries at the front hall if the Sultan or the government decides will be taken by the dignitaries, and every word of the King's decree will be welcomed with words from the dignitaries. The dignitaries' response to the Sultan's conversation through the words "Daulat Tuanku" means justifying all the King's orders.

### **Celebration**

During the reign of the Sultanate of Malacca, the Malay Islands became an archipelago frequented by foreign countries for trade, politics, cooperation and marriage purposes. Therefore, the arrival of the Royal entourage will be welcomed by the ruling Sultan and the chief dignitaries with full customs. A celebration full of customs can be seen in the text of Hikayat Anggun Che'Tunggal (HACT):



"The kings and great men prepared for the visit, consisting of umbrellas held by sixteen servants on the right and sixteen servants on the left which invested in a beautiful type of jewellery as well as the sound from gongs, drums, serunai, napiri, herebab, kechapi, dandi, muri, bangsi, kopok, and cheracap. The King and the great men proceeded with the host to the forbidden bridge." (Pawang Ana, 1964, p. 116)

This designation and percentage are booked to be a reference to make the celebration ceremony systematically carried out. The rules and practices of reception are also written in the matter of celebration on the manuscript of the First Order of the Customary Board of the Malay People in the Perak Darul Ridzuan State from the Ancient Age. In the text of the HACT document, the way of greeting with the jellyfish-like umbrella is a sign of greatness.

Likewise, other sound tools are brought together to complete the celebration. In the royal marriage customs, there is a touching related to the marriage custom. Symbolic transmission to the request to marry the son of the King by giving betel nut, which means honour or honour to someone. The related matter of betel nut, in this case, can be seen in the text of Hikayat Terung Pipit (HTP):

"The betel nut of the King of Java was received by the King of the protection of the month of old Kedah. After a few days, the raja of Lindung Bulan, Kedah Tua, married his son, Princess Rakna Juita, to the King of Oldung, as was the custom of marriage. So, the old king of Java remained in Raja Lindung Bulan Kedah Tua"(Panglima Ali Mudin, 1998, p. 3)

In addition to the custom of marriage, there are rules and procedures through the custom of the word argument, which is how to express the word in any situation. Commander Ali Mudin (1998), in the text of Hikayat Raja Muda, wrote about the linguistic aspect by giving a meeting on the condition of flowers.

"After hearing from his majesty Seri Maharaja Imbangan Jajar, he was very angry by his embarrassment, as if he wanted to die simultaneously. the red face was extinguished like a radiant pale morning flower" (p.89)

Likewise, in the text of Hikayat Terung Pipit, there is a discussion about the parable of flowers to discuss nature by giving the parable of the diamond, which means beautiful gems. The beauty and subtlety of using the word can be seen as follows:

"Then the flowers of the rakna mala are seven petals and seven stacks, and seven races smell and colours, the colour is like the colour of gold, silver, bronze and copper and incomparable diamonds." (Commander Ali Mudin, 1998, p.177)

Hence, related to these features, many similarities are given by making parables about surrounding objects for listeners or readers to think about the meaning behind each expression.

### **Sound Settings**

The concept of sound arrangement refers to the tools that are played based on the type of ceremony or custom held. Each tool has its function and meaning. The community was already synonymous



with the sound of tools intended to convey information, religion, war, etc. This is due to the absence of technological facilities to deliver information quickly.

This sound arrangement is a compelling message to convey information according to circumstances and occasions. This can be seen in the narrative of Hikayat Raja Muda:

'The words of his majesty Seri Sultan Raja Muda, after the knight of Maharaja Imbangan Jajar had returned, he ordered his Prime Minister to prepare all warfare tools. The minister bowed and struck a forbidden drum, a roaring gong, and a canang pemangil. All the people of the land, from the great kings, the ministers, the captains, the commander-in-chief, the superheroes, the heroes, each came to meet his majesty, crowded in the front hall.' (Pawang Ana, 1998, p. 90)

The ranking for the imperial tool group is also ranked by priority. For example, the position of the palace music player begins with the higher noblemen sitting on the left side of the nobat drum and the lower noblemen sitting on the right side of the nobat. Betel nobat was given according to the rules of rank, which he supported starting from the Prime Minister until the King desired (Yusoff Iskandar, 1977, p. 662).

In addition, the concept of the idioms of the imperial sound can be seen in Hikayat Terung Pipit as follows:

"Bongsu Emas came out straight to the door, took a golden jug with bronze handle, and rinse his face. The water at the door dropped with sounds like kopok, ceracap, Javanese drums." (Commander Ali Mudin, 1998, p. 23)

The sound instrument's parable describes the rinsing played in the palace with one's physical strength. A hyperbolic element accompanies the parable to show the highlighted character's greatness.

## 6. Conclusion

The rule of the King or Sultan is based on the support and guidance of the appointed officials or dignitaries to ensure that all state administration is carried out systematically. The rules and guidelines established in government are inherited in blood relations. This legacy will bring customs and guidance and be extended to others to be learned and refined through printed guidance. This study shows the linguistic aspects presented in Malay life texts to discuss royal institutions and the point of view of Malay as a sovereign institution.

Storytelling using idioms has implications for the linguistic aspect, namely certifying Malay identity and identity. We need to believe that spoken language is full of manners and order. This order can be seen based on the procedure by placing the ruler as a role model in using acceptable language when ordering something. The concept of controlling speech and behaviour can be seen in the text of hikayat through manners and order that can be taken as a lesson by the reader.

Therefore, the point of view of the royal institution is full of manners and order, making the Malays full of customs and order from the ruling Sultan to preserve behaviour and speech. Hopefully, this



study can open the people's point of view on the monarchical institution based on sovereignty, struggle and uplifting Malay identity.

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# Interactive Learning Environment Through Visualization To Promote Creative Thinking Among Non-Major Undergraduate Computer Science Students Learning Computer Programming Subject

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**Abstract:** *This study aimed to investigate whether the experience of learning using a visual interactive learning environment through visualization impacts performance and dimensions of creative potential in terms of creative thinking. Sixteen (16) non-random non-major undergraduate computer science students learning computer programming subjects were exposed to a visual interactive learning environment through visualization in a pre-experimental single group pre-posttest research design. Before and after participants learn using visual interactive learning environment through visualization for six (6) weeks, they must complete three Visual tests and two verbal tasks of the Torrance Tests of Creative Thinking (TTCT). Both descriptive and inferential statistics were used to analyze the data. The study showed significant evidence that the performance and creative level of the students are better after learning using a visual interactive learning environment except for Verbal Fluency and Verbal Flexibility dimensions of Creative thinking. Implications of these findings for future research are discussed.*

**Keywords:** List three to five keywords, each separated by semicolons (;)

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## 1. Introduction

The ability to think creatively is crucial and in high demand today. However, many researchers—especially those studying the curriculum—might have missed this ability. Students cannot apply their thinking abilities to an organization since the information on creative thinking is not presented correctly. Due to a lack of creative thinking, graduates in Malaysia were found to have trouble meeting industry expectations (Wong, 2017). According to Sternberg & Sternberg (2010), creativity can be produced in various ways, ranging from minor thought redirections to major reproductions. According to a similar stance, creativity can be fostered and monitored by offering theoretical and practical methods (Lucas, Claxton, & Spencer, 2013). We require a curriculum structure for the course to creatively present the content to foster creative thinking among the students. Visualization may help educators enhance creative teaching skills. According to Abegglen et al., (2018), learners taught by teachers using visualization positively impact fear and academic performance and enhance learners' creativity and highly independence. In addition, Ong et al. (2000) claim interactive web-based instructional modules can enhance learning experiences through multisensory methods and visualization. The impact of the learning environment, particularly the creative learning environment, on students' creativity has been acknowledged by academics and educators (Fan & Chai, 2022).



## 2. Objectives

So, this research aims to develop an interactive learning environment through visualization and apply the Torrance incubation model strategy for pre-service teachers learning computer subjects. We wish to :

- i. Identify the performance differences among non-major undergraduate computer science students learning computer programming subjects before and after learning using visual interactive learning environment through visualization.
- ii. Identify the creative thinking differences among non-major undergraduate computer science students learning computer programming subjects before and after learning using visual interactive learning environment through visualization.

### Visual interactive learning environment through visualization

The online learning environment was developed based on Torrance Incubation Models of Teaching (Murdock & Keller-Mathers, 2008; Smith, 2012). Torrance Incubation model describes a technique based on creativity research designed to enhance creative thinking, demonstrating continues learning for deeper and leaving the lesson with questions an ideas (Murdock & Keller-Mathers, 2008). The Incubation Model consists of three stages which have been mapped with a lesson plan for learning Programming Language Course among non-major computer science students. The Programming language course will introduce students to the concept of Mobile Apps development using block programming. Table 1 shows the Mapping of Torrance Incubation Models of Teaching stages with the course lesson plan and the suitable Visual Tools as follows.

**Table 1 : Mapping of Torrance Incubation Models of Teaching stages with the course lesson plan and the suitable Visual Tools**

Stages	Torrance Incubation Models of Teaching	Lesson Plan	Visual Tools
1	Heightening Anticipation	Ice breaking and digital sketching process	Sketchpad- Digital Sketch: <a href="https://sketchpad.app/">https://sketchpad.app/</a>
2	Deepening Expectations	Graphical User Interface process	Figma: <a href="https://www.figma.com/">https://www.figma.com/</a>
3	Keeping it going	Mobile Apps Development process	MIT Apps Inventor 2

Visual mean something such as a picture, photograph, or piece of film used to give a particular effect or to explain something. Albert, Nussbaumer, & Steiner, (2010) use information visualization to deliver learners feedback on learning processes, a way to stimulate metacognition. While Schweitzer & Brown (2007) define interactivity is an activity and interaction with the instructor, with other students, or with technology (hardware or software that includes a feedback mechanism that allows a student to see the results of their actions. So, interactive visuals refer to graphics, methods and technology images transmitted and then interactively processed using active interaction towards learners so that students gain knowledge about the impact of their actions and, hopefully, about the topic being taught.



The following interactive visual tools are used in the interactive learning environment through visualization:

i. **Sketchpad- Digital Sketch:** <https://sketchpad.app/>

This learning environment provides Sketchpad as a drawing app to support free-flowing ideas and creativity. This tool can allow students to collaboratively use colour, scribble, and insert images during the first stage of the learning stages, Ice breaking and sketching. According to earlier studies, when students share their knowledge, they make use of knowledge-based resources both in and outside of the classroom to support their creative endeavours (Yeh et al. 2012; Fan & Chai 2022).

ii. **H5P**

The HTML5 package, also known as H5P, promises to make it simple for anybody to develop, share, and reuse interactive HTML5 content. Instead of relying on a single tool, interactivity may be added to content using a variety of powerful tools, including attractive navigable timelines, flip cards, visual drag-and-drop matching, quizzes, interactive films, and more. Suitable for visualisation and discovery. Notes provided within this learning environment were developed using H5P tools to create high interactivity with students.



Figure 1 : Example of H5P interactive learning environment using interactive button to allow student Self-explore additional notes.

iii. **Figma:** <https://www.figma.com/>

In stage two of the learning plan, students need to design the interface of the Mobile learning Apps. Figma has been used as it provide interactive colour picker interface and many icons, after which it can be exported as “png” or “web” files as needed.

iv. **MIT Apps Inventor 2**

The final Visual Tools used is MIT Apps inventor where students will continue the final stages to develop the Mobile Learning Apps based on the design proposed in the second stage. The MIT Appps Inventor is a drag-and-drop visual programming tool for designing and building fully functional mobile apps for Android. For creating mobile phone applications for the Android and iOS operating systems, it offers a web-based "What you



see is what you get" (WYSIWYG) editor. Anyone can create a mobile phone app using this block-based programming language, which was developed on Google Blockly (Fraser, 2013) and influenced by Scratch languages (Resnick et al., 2009).

### 3. Methodology

Experimental Research using One-Group Pretest-Posttest Design among 16 non-random non-major undergraduate computer science students learning computer programming subject was used. This research was held in a real educational setting, therefore, conducting a true experiment are challenging; hence pre-experimental is chosen. Participants will go through the learning activity for six (6) weeks using the Visual interactive learning environment to support their online face-to-face learning. Two (2) instruments were used, which is a performance test consisting of 20 multiple questions and Figural and Verbal test by Torrance Tests of Creative Thinking (TTCT). A semi-structured interview was also conducted to get more information from participants.

### 4. Finding and Discussion

To answer the first research objective, which is "Identify the performance differences among non-major undergraduate computer science students learning computer programming subject before and after learning using visual interactive learning environment through visualization", performance scores from the pre-service teachers during pre and post-test were collected and compared statistically.

**Table 2 : Descriptive Statistics on students' performance scores before and after learning using a visual interactive learning environment through visualization**

<b>Id Number</b>	<b>Percentage of Differences</b>	<b>Pre-Test</b>	<b>Post-Test</b>
S1	10%	7.5	8.5
S2	15%	6.5	8
S3	35%	6.5	10
S4	10%	8	9
S5	15%	6.5	8
S6	15%	6	7.5
S7	25%	6.5	9
S8	15%	7	8.5
S9	20%	7.5	9.5
S10	25%	6	8.5
S11	20%	8	10
S12	10%	8	9
S13	40%	5.5	9.5
S15	45%	4	8.5
S16	35%	6.5	10
**enrolled users who have not attempted the quiz			
S14	NULL	5	0
Overall score (Average except S14)		6.66	8.90

- Full mark 10



Based on Table 2, all respondents improved in the post-test level of performance from 10% to 45%. Respondent ID: S14 has been excluded from this performance data since the respondent did not attempt the post-test. Average performance different between pre-test and post-test are 6.66 to 8.90.

To support this quantitative data, a semi-structured interview was conducted. Data from the interview was transcribed and some of the statements are shown in Table 3.

**Table 3 : Selected examples of students' statements from semi-structured interview**

Statements	Tools
S9: " Visual Interactive help because at the introduction, I don't even know what the app inventor is, so when I look at all the tutorials, I only understand the App Inventor; after that, I can start practising, then I can self-explored for the next task what I want to do, haa like that".	H5P MIT App Inventor 2
S12 : "... The video miss attach in e-learning helps because when we watch the video in the middle of the video, it will stop and ask questions. only after we understand, then continue.	H5P
S13 : "... I like these components because they are exciting. There has never been a lecturer who uses visual content like that. The Video part helps the most (understand app development).	FIGMA H5P
S3 : "... Most helpful is the video, which has questions in between because when asking a question in between, it suddenly asks a question. I can answer and then when I answer the wrong question, the video tells the correct answer, so I will remember	H5P

All the respondents gave positive feedback and agreed that visual interactive tools helps enhanced the level of comprehension during an asynchronous visual interactive learning environment which helps respondents to perform better during the post-test.

Table 4 : Wilcoxon Sign Rank test on students performance before and after learning using visual interactive learning environment through visualization

Ranks				
		N	Mean Rank	Sum of Ranks
Post-Test - Pre-Test	Negative Ranks	0 <sup>a</sup>	.00	.00
	Positive Ranks	16 <sup>b</sup>	8.50	136.00
	Ties	0 <sup>c</sup>		
	Total	16		

a.  $POST-TEST < PRE-TEST$ ; b.  $POST-TEST > PRE-TEST$ ; c.  $POST-TEST = PRE-TEST$

**Test Statistics<sup>a</sup>**

POST-TEST - PRE-TEST	
Z	-3.526 <sup>b</sup>
Asymp. Sig. (2-tailed)	.000

a. Wilcoxon Signed Ranks Test

b. Based on negative ranks.



As shown in Table 4, the results imply that there are statistically significant differences ( $p = 0.000$ ,  $p < = 0.05$ ) among the student performance after learning using a visual interactive learning environment through visualization, where the Z value is (3.526). The Wilcoxon Sign Rank test shows that all participants have higher scores after learning using visual interactive learning environment through visualization ( mean rank = 8.50). The difference in Performance rank test and response through the interviews verified that the students' performance and comprehension improved after they were treated in the visual interactive learning environments.

To answer the second research objective, which is “Identify the creative thinking differences among non-major undergraduate computer science students learning computer programming subject before and after learning using visual interactive learning environment through visualization”, Figural and Verbal questions by Torrance Tests of Creative Thinking (TTCT) was used. TTCT are the most widely used test to measure creativity level (Hicks, 2018; Yarbrough, 2016; Bouchard, 2013). These tests invite examinees to draw and give a title to their drawings (pictures) or to write questions, reasons, consequences, and different uses for objects (words). The respondent will need to reflect upon their life experiences by answering the TTCT test.

The TTCT test for figural was divided into five (5) dimensions as listed below

- i. Fluency (F1): The quantity of pertinent ideas demonstrates the ability to create a variety of figurative images.
- ii. Originality (F2): The quantity of statistically rare thoughts demonstrates the capacity to come up with unusual or distinctive responses.
- iii. Abstractness of Titles (F3): The level beyond categorization; founded on the notion that creativity requires mental abstraction.
- iv. Elaboration (F4): The quantity of new ideas shows how well the subject may expand and develop ideas.
- v. Resistance to Premature Closure (F5): The degree of psychological openness, which is based on the idea that in order to engage in creative behaviour, a person must retain a "open mind" when processing information and take into account a variety of viewpoints.

The TTCT test for verbal was divided into three (3) dimensions (Yarbrough, 2016) as listed below

- i. Fluency (V1): The total number of pertinent responses used to calculate a test respondent's fluency score. Making the determination of whether a response was relevant was the focal point of the tasks for students learning how to score fluency.
- ii. Flexibility (V2): Flexibility is the count of the number of different categories. Scoring for the flexibility required becoming familiar with the lists of flexibility categories supplied in the manual.
- iii. Originality (V3): Based on the statistical rarity of these responses in the norming population, originality is assessed.



**Table 5 : Wilcoxon Sign Rank test on students Figural dimensions in terms of creative thinking before and after learning using visual interactive learning environment through visualization**

Figural Creative Ranks		N	Mean Rank	Sum of Ranks
Post_F1 – Pre_F1	Negative Ranks	3 <sup>a</sup>	5.00	15.00
	Positive Ranks	12 <sup>b</sup>	8.75	105.00
	Ties	0 <sup>c</sup>		
	Total	15		
Post_F2 - Pre_F2	Negative Ranks	0 <sup>d</sup>	.00	.00
	Positive Ranks	15 <sup>e</sup>	8.00	120.00
	Ties	0 <sup>f</sup>		
	Total	15		
Post_F3 - Pre_F3	Negative Ranks	1 <sup>g</sup>	3.50	3.50
	Positive Ranks	9 <sup>h</sup>	5.72	51.50
	Ties	5 <sup>i</sup>		
	Total	15		
Post_F4 - Pre_F4	Negative Ranks	1 <sup>j</sup>	1.00	1.00
	Positive Ranks	14 <sup>k</sup>	8.50	119.00
	Ties	0 <sup>l</sup>		
	Total	15		
Post_F5 - Pre_F5	Negative Ranks	0 <sup>m</sup>	.00	.00
	Positive Ranks	15 <sup>n</sup>	8.00	120.00
	Ties	0 <sup>o</sup>		
	Total	15		

As shown in Table 5, the results imply that there are statistically significant differences ( $p < = 0.05$ ) among the student Figural dimensions in terms of creative thinking before and after learning using visual interactive learning environment through visualization on all five dimensions (Fluency, Originality, Abstractness of Titles, Elaboration and Resistance to Premature Closure) where the Z value is (2,556, 3.408, 2.464, 3.352 and 3.409). The Wilcoxon Sign Rank test shows that all students have higher creative thinking level after learning using visual interactive learning environment through visualization ( mean rank = 8.50).

**Table 6 : Wilcoxon Sign Rank test on students Verbal creative dimensions in terms of creative thinking before and after learning using visual interactive learning environment through visualization**

Verbal Creative Ranks		N	Mean Rank	Sum of Ranks
PostV1 - PreV1	Negative Ranks	5 <sup>a</sup>	7.10	35.50
	Positive Ranks	8 <sup>b</sup>	6.94	55.50
	Ties	3 <sup>c</sup>		
	Total	16		



PostV2 - PreV2	Negative Ranks	6 <sup>d</sup>	5.25	31.50
	Positive Ranks	8 <sup>e</sup>	9.19	73.50
	Ties	2 <sup>f</sup>		
	Total	16		
PostV3 - PreV3	Negative Ranks	4 <sup>g</sup>	5.50	22.00
	Positive Ranks	11 <sup>h</sup>	8.91	98.00
	Ties	1 <sup>i</sup>		
	Total	16		

Based on findings in Table 6, the Wilcoxon signed-rank test demonstrated a significant difference ( $Z = -2.169$ ,  $p = 0.030$ ,  $p < 0.05$ ) between Verbal Originality dimensions of Creative Thinking before and after the treatment. However, the data shows that there is no significant evidence of a difference between creative thinking before and after learning using visual interactive learning environment through visualization for the other two (2) dimensions.

## 5. Conclusion and Implication for Future Research

The findings from this research shows significant evidence that the performance of students learning using visual interactive learning environment through visualization are better. On the other hand, the output also shows that significant evidence that the creative level of the students is better after learning using visual interactive learning environment for all dimensions of Creative thinking except for Verbal Fluency and Verbal Flexibility. This finding is similar as previous research done by Studente et al. (2016) when they create a learning experience with access to natural views, plants and the colour green increase visual creativity, but have no impact on verbal creativity in classroom settings. These results suggest that creativity is dimension specific and any practical measures taken to enhance creativity need to be aligned with the target dimension. Research done by Fan & Chai (2022) also finds that a creative learning environment can significantly enhance students' learning goal orientation, network ties, and knowledge sharing, which in turn facilitate their creativity. For future research, strategy to support Verbal creative should be included in the Interactive learning environment.

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## Online Learning Challenges Faced By Academicians During The Pandemic

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**Abstract:** *Utilizing e- learning platforms has become the norm for educators to disseminate knowledge and information to students during the Covid-19 pandemic. Hence, this study aims to analyse the e-learning setbacks and obstacles faced by 30 academicians in a private university in Malaysia. This study conducted via a survey-based questionnaire was able to successfully analyse responses from lecturers of varying experiences in multidisciplinary fields. It was found that the main obstacles most lecturers faced during online learning are related to technical, academic, communication and socio geographical challenges.*

**Keywords:** e-learning, challenges, Covid-19 pandemic

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### 1. Introduction

Institutes of Higher Learning (IHL) transitioned to online teaching and learning on a global scale in consequence of the 2020 COVID-19 pandemic. The situation was unprecedented, resulting in educators resorting to every and any available resource for the continuation of lessons, including learning management systems (LMS) and mobile technology (Ülker and Ylmaz, 2016). Distance learning is nothing new, having been available since the 1960s through the Open University in the United Kingdom, and the availability of the Internet has made open and distance learning (ODL) commonplace. However, the recent pandemic resulted in hitherto unseen interest in online learning, also known as e-learning, which refers to organising, planning and managing learning activities online, typically within an LMS, including accessing course information, lessons and materials, tests and assessments (Haghshenas 2019). E-learning can be both synchronous (in real-time) and asynchronous (learners learning in their own time), both of which act as a means of ensuring the continuity of education amidst the chaos of wholesale institution closures, closures which negatively impacted learners, disrupted education and deprived students of important social interaction and opportunities for personal development (UNESCO, 2020). However, through technology, e-learning has in many ways contributed to bridging this learning gap by facilitating access to learning through a variety of learning platforms, video-conferencing applications and mobile apps that connect students to their schools, instructors and learning activities (Idris and Osman 2015). Reciprocally, institutions can use these same systems to manage courses, plan and hold classes, distribute course materials and even track students' learning activities through learning analytics.



Although the use of such LMS and applications was not without challenges for many IHLs, the benefits of implementing such systems are clear. LMS such as Blackboard Learn include a comprehensive range of tools, assessment options and interactive features that benefit learners, despite the challenges of distance learning. Other applications such as Microsoft Teams and Google Classroom perform similar functions, albeit limited in capability, whilst being freely available to the user and institution. One common aspect all the systems have is their availability through the Internet and accessibility to learning resources from a range of devices, facilitating remote learning from any location, albeit with occasional issues with connectivity.

Despite the many benefits of e-learning systems, participation and actual learning remains dependent on students' acceptance of such technology and willingness to embrace it (Almaiah and Jalil 2014; Almaiah and Alismaiel 2019; Shawai and Almaiah 2018), with lack of LMS utilisation by students representing a waste of the IHL's resources and an obstacle to learning (Almaiah et al., 2019a; Almaiah et al., 2019b; Almaiah, Al-Khasawneh and Althunibat, 2020; Naveed et al. 2017). Research in this field is yet in its infancy with the efficacy of LMSs from students' perspectives as yet little studied (Tarhini et al. 2017; Almaiah and Alamri 2018). The current research focuses on the issues faced by academicians whilst teaching online using LMSs during the COVID-19 pandemic.

## 2. Literature Review

### 2.1 E-Learning

The rapid advancements in internet technology have revolutionized education, especially online distance education, with the emergence of various e-learning approaches. There are various e-learning concepts but a simple definition by Aboagye et al. (2020) is that, e-learning encompasses both internet and computer technology. According to Wang (2010), various e-learning platforms have been used by numerous universities, the pros and cons of which have been studied. In one of the findings by Wang (2010), e-learning was limited to the interactions between the instructors and students, but the concept of blended learning emerged to overcome this limitation (Azizan, 2010). Prior to the Covid-19 pandemic that hit worldwide in early March 2020, various universities adopted e-learning through a blended learning approach to support the face-to-face (F2F) learning. However, the pandemic transformed e-learning platforms to become a necessity for instructors in the delivery of teaching and learning to students, with many educational institutions and universities maximizing the utilization of these platforms during the pandemic. As a consequence, an increase in online activities among students was noted during the lockdown period (Radha et al., 2020).

The adoption of e-learning proliferated out of necessity in universities worldwide during the pandemic, with instructors and students still striving to make e-learning work to their advantage. Issues relating to technology use, individual and cultural attitudes, and course constraints were among the many challenges faced by them during the pandemic (Almaiah, Al-Khasawneh, Althunibat, 2020). These challenges were noted earlier in other research conducted by Ertmer (1999), Pelgrum (2001), Assareh and Bidokht (2011), and Quadri et al. (2017). A blended learning approach is still required during the pandemic even though e-learning has been practiced for a decade (Aboagye et al., 2020).



### 3. Methodology

This study adopted a qualitative and quantitative method where data was collected from 30 academicians who had varying experience levels from multidisciplinary fields at a private university in Malaysia. Twelve questions in a three-point Likert scale design online questionnaire and two open-ended questions were answered by the respondents. Data was collected, analysed and triangulated, backed by research and findings from previous studies. The aim was to explore and investigate various e-learning challenges faced by the respondents during the Covid-19 pandemic.

### 4. Result and Analysis

The results of the questionnaire are reported in Table 1 below.

**Table 1: E-learning Challenges Faced by Academicians**

Qu	Item	Agree f (%)	Sometimes f (%)	Disagree f (%)	SD
1	Students are always passive and silent during the online sessions.	13 43.3	16 53.3	1 3.4	0.563
2	Students have connectivity problems and are unable to come for online classes frequently	4 13.3	22 73.4	4 13.3	0.525
3	Students always have difficulty to understand the lecture during online lectures compared to face-to-face classes	6 20.0	17 56.7	7 23.3	0.669
4	Cheating and plagiarism are quite common during online assessments	15 50.0	10 33.3	5 16.7	0.758
5	It is challenging to mentor at risk students during online classes	21 70.0	6 20.0	3 10.0	0.675
6	Language is a barrier during online classes with my students	4 13.3	11 36.7	15 50.0	0.718
7	It is more tedious to mark and grade online assessments compared to face-to-face assessments	13 43.3	8 26.7	9 30.0	0.860
8	Students lack meaningful interaction with their peers and lecturers during online sessions	19 63.4	7 23.3	4 13.3	0.731
9	International students with different time zones are always absent during online classes	6 20.0	12 40.0	12 40.0	0.761
10	It is difficult for students to complete their online work or tasks on time	6 20.0	10 33.3	14 46.7	0.785
11	Preparation for online classes is more tedious compared to face-to-face classes	14 46.7	7 23.3	9 30.0	0.874
12	Students show lack of enthusiasm during online classes compare to face-to-face classes	11 36.7	16 53.3	3 10.0	0.640

#### 4.1 Lack of Human Connection

Among the issues faced by respondents was the degree of difficulty in mentoring at-risk learners during online classes (70%), as seen in Table 1. The impersonal 'feel' that results from the absence of face-to-face interaction only serves to increase the sense of vulnerability and insecurity often experienced by weaker students who are reticent to interact in synchronous, online classes due to



their low self-esteem. Additionally, students lack interaction with their peers and lecturers in this environment, often fearing being judged by others for their mistakes (63.4%), which presented challenges for their instructors. The lack of human touch reduces the ability to motivate and engage students through meaningful interaction, which would otherwise ensue from the bond between teacher and student. Attempts to humanize the online learning process as far as is practicable by extending two-way interaction can potentially improve the lack of engagement (Dhawan, 2020). Given the instantaneous nature of online interactions in synchronous class, engaging students, particularly weaker learners, is naturally challenging (Al-Kilidar and Sixsmith, 2021).

#### **4.2 Academic Dishonesty**

Another common challenge faced is that of plagiarism and academic misconduct during online assessments (50%), which constitutes a threat to learning and learning integrity. The absence of direct monitoring through physical invigilation provides ample opportunity for students to boost their grades through dishonest practices. Warnings against plagiarism do not have the desired effect of discouraging malpractice and despite the use of online similarity checking tools, such practices continue to proliferate among all disciplines. The practice of others sitting assessments (proxy) is commonplace and, to a large degree, unavoidable due to the inherent difficulty in regulating large numbers of students during testing, as well as the practice of copying and pasting, then employing the use of online translators, paraphrasing and grammar checking tools (Arkorful and Abaidoo, 2014).

#### **4.3 Time Consuming Online Class Preparation**

According to respondents' feedback, preparation for online class is considerably more arduous than preparing for the corresponding face-to-face class (46.7%). Classes held in person are more active and engaging, with immediacy of communication and often multiple spontaneous interactions. In online classes, the essence of this activity must be conveyed through the teaching presentation, notes and webcam. This places a burden on the instructor to continually update the way material is presented to keep it fresh and interesting. Finding the time to achieve this and to continually implement new and engaging learning technologies to inspire and challenge students is a demanding process, which involves considerably more than merely uploading content to a learning platform (Al-Kilidar and Sixsmith, 2021). As observed by Dhawan (2020), "there was an overnight shift of normal classrooms into e-classrooms, that is, educators have shifted their entire pedagogical approach to tackle new market conditions and adapt to the changing situations." Accomplishing this requires appropriate use of technology and even the adoption of alternative pedagogical methodologies (Dhawan, 2020).

#### **4.4 Absenteeism, Passiveness and Low Competency**

Another setback was that students are always unresponsive and silent during their online sessions (43.3%). In relation to this finding, students would be reluctant to voice their answers due to anxiety and shyness, which contributed to lack of engagement during online lessons. Furthermore, Di Pietro (2017) concurred that many university students and educators also face psychological problems during crises—there is stress, fear, anxiety, depression, and insomnia that lead to a lack of focus and concentration. On a similar theme, Arkorful and Abaidoo (2014) highlighted that e-learning is a method of learning that results in the learners undergoing solitary contemplation, remoteness, and a lack of interaction, therefore requiring considerable motivation and skills such



as time management in order to reduce such effects. Furthermore, Pham et al. (2021) asserted that due to the emergence of online teaching and learning during the COVID-19 pandemic, not all academicians and learners were prepared well academically for an online teaching and learning environment, resulting in communication not taking place as expected. In addition, Gómez-Rey et al. (2017) pinpointed that students were unresponsive and depended on their teachers in an Asian context, these meaningful findings suggesting that more attention could be paid to pedagogical training of online teachers, who should not only be equipped with relevant knowledge and skills in online content design, lesson delivery but also with facilitation and promotion of online social interaction.

In addition, setbacks such as students experiencing greater difficulty comprehending online lectures compared to face-to-face classes (20%) takes place when instructions are too wordy, difficult to understand, or the student lacks competency in English which presents an obstacle when trying to follow the lesson. Furthermore, international students with different time zones being absent during online classes (20%) was also a setback during the pandemic. For instance, students from countries such as Bangladesh, China, Pakistan, Maldives and Middle Eastern countries found it too challenging to accommodate Malaysian time, resulting in a small percentage of such students failing to attend online classes at unsociable hours in their home country.

#### **4.5 Lack of Discipline and Language Barriers**

Lack of self-discipline and ineffective time management among students contributed to untimely completion of online tasks by students (20%) as seen in Table 1. According to Chitra and Raj (2018), an individual who lacks self-discipline is not motivated to study, hence will procrastinate in completing tasks required by the instructor. Moreover, students were inept at managing work-life balance and their study obligations in a virtual learning environment (Dhawan, 2020). Students were found to be poorly prepared for both types of e-learning and academic competencies.

Language was not seen as a major obstacle between the instructor and students during online learning, with fifty percent of the academicians disagreeing that language was the main barrier during the pandemic, mainly due to most students being able to communicate in English, it being the only communication medium employed during online lessons. Only 13.3% of respondents perceived language as a communication barrier, it being challenging for both the instructor and students to have frequent, meaningful and uninterrupted communication during the pandemic.

#### **4.6 Connectivity and Attendance Issues**

Internet connectivity was acknowledged as one of the challenges faced by the academicians during the online classes, with connectivity disrupting online lesson when students were logged out prematurely. According to Table 1, only 13.3% of the respondents either agreed or disagreed that students have connectivity problems resulting in them being unable to regularly attend online classes. Chitra and Raj (2018) highlighted that many students who actively wanted to participate in an online course failed to do so due to their inability to access either a device with the internet connection, or the surrounding environment which had poor accessibility to internet. Dhawan (2020) highlighted the plight of underprivileged students from less well-off backgrounds and less tech-savvy families, their limited financial resources forming an obstacle to normal participation in online classes. Such students may lose out on learning due to their proportionately higher costs



associated with digital devices, laptops and internet data plans. This digital gap is thus widened when factoring in the inequality of accessing knowledge online due to the constraints of certain students' financial background. Favale et al. (2020) also identified various technical challenges that could be encountered by internet users and hence, impede teaching and learning activities.

Apart from the internet connection, more than half of the respondents (73.4%) identified that attendance in online classes sometimes presents a challenge for academicians. Student attendance needs to be monitored by them constantly on a weekly basis, as well as the students' academic performance. Such monitoring can ensure all the students are able to complete their online courses successfully with a passing grade. In this sense, the monitoring and controlling of both attendance and work of students during the online classes still pose a significant challenge in the 21st century (Park & Yun, 2018; Shu & Gu, 2018).

## 5. Conclusion

In conclusion, online teaching and e-learning became a vital mode of delivering education to replace the traditional face-to-face environment during the pandemic. In this study, academicians from multidisciplinary fields encountered technical, communication, academic, social and geographic challenges in their online teaching journey. In overcoming these obstacles, academicians proved to be steadfast, flexible and innovative while exercising their duties as educators to multi-racial students of diverse backgrounds and countries. Thus, these drawbacks serve as a stepping-stone for future research among global educators to collectively discuss and find concrete solutions in solving e-learning challenges in multidisciplinary, post pandemic academic settings.

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## Plastic Pollution: A review

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**Abstract:** *The problem of plastic pollution is complex. There are some suggestions and views related to this plastic pollution. Microalgae species used to synthesize bioplastic. In Thailand there are 3 main obstacles Thailand's government, private sector, and citizens from engaging in the sort of collective action needed to reduce marine plastic pollution. In Spain, a revision of European and Spanish legislation about plastics and marine pollution is needed and some strategies to reduce this kind of contamination in Spain. In Canada, recommendations to strengthen Single Use Plastic (SUP) management strategies and mitigate plastic pollution to improve future Canadian SUP reduction policies. Bangladesh raising a concern among the appropriate authorities to develop policies and impose necessary actions against plastic pollution before it is too late. Saudi Arabia demand a compressive solution that ranges from governmental policies to engineering solution to lessen the use of plastic in minimizing global carbon emissions and from Malaysia suggest better understanding of how human security can be factored into the crisis resolution of plastic waste pollution. A realistic transformation towards eco-effective nation.*

**Keywords:** Plastic, pollution, environment, waste

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### 1. Introduction

Plastic pollution has become one of the most pressing environmental issues, as rapidly increasing production of disposable plastic products overwhelms the world's ability to deal with them. Plastic is a kind of polymer organic compound, which is a general term for thermoplastic moulding materials such as filling, plasticizing and colouring.

According to the characteristics of the plastic after moulding, it can be divided into thermoplastic and thermosetting plastic materials. Thermoplastic is a chain linear molecular structure that softens after being heated and can repeatedly replicate products. The thermosetting plastic has a network structure and is permanently deformed after being processed by heat, and cannot be repeatedly processed and replicated.

Plastic materials in our life are usually. Polyethylene plastics (PE, including HDPE and LDPE) are often used as packaging materials; polypropylene plastics (PP) are often used as packaging materials and turnover boxes; polystyrene plastics (PS) are often used as foam liners and fast food lunch boxes; Vinyl plastic (PVC) is often used as a toy item, container, etc.; polyester plastic (PET) is commonly used to make beverage bottles.

There are four methods for waste plastic disposal; incineration, landfill, recycling and abandon in natural environment. Plastic is artificial substance that is hard to decompose. Plastic decompose very slowly under natural conditions, it will takes about 200 to 400 years to degrade, which will



reduce the ability of the landfill to dispose of the garbage. Once waste plastic been burned, not only producing a lot of black smoke, but also dioxin yield from the burning process.

## 2. Literature reviews

This article is to make a critical commentary on plastic pollution in several countries in the world including Malaysia. This paper reviews the major characteristics of plastic pollution in the environment to enhance present understanding of this issue. These characteristics, including diversity, persistence, global issues, combined pollution and threats to organisms and human health, are critically summarized in this work. Further, “plastic cycle” in the environment, namely, aquatic, atmospheric, and terrestrial system, is also discussed in this review. Finally, we highlight current challenges of plastic pollution posed to the public and recommend the research trends in future work (Li et al., 2021)

Many steps had been taken to control this plastic pollution globally, such as chemical treatments, plastic waste incineration, sanitary landfilling, and 7 R programs. Still, plastic pollution is one of the major international problems. Non-biodegradable plastic would not eradicate from our environment until we have an economically feasible and more biodegradable substitute. Algae in recent years, especially microalgae, have got attention worldwide, owing to their various applications. Microalgae is one of the sustainable ways of bioplastic synthesis as during cultivation, it also purifies wastewater. This review paper has summarized different microalgae species used to synthesize bioplastic, their cultivation system, and methods for bioplastic production by using microalgae biomass, followed by multiple challenges, solutions, and prospects (Khyalia et al., 2022).

Plastics are dominant pollutants in freshwater ecosystems worldwide. Scientific studies that investigated the interaction between plastics and freshwater biodiversity are incipient, especially if compared to the marine realm. In this review, we provide a brief overview of plastic pollution in freshwater ecosystems around the world. We found evidence of plastic ingestion by 206 freshwater species, from invertebrates to mammals, in natural or semi-natural ecosystems. In addition, we reported other consequences of synthetic polymers in freshwater ecosystems including, for instance, the entanglement of animals of different groups (e.g., birds). The problem of plastic pollution is complex and will need coordinated actions, such as recycling programs, correct disposal, stringent legislation, regular inspection, replacement of synthetic polymers with other materials, and ecological restoration. Current information indicates that the situation in freshwater ecosystems may be as detrimental as the pollution found in the ocean, although highly underappreciated (Azevedo-Santos et al., 2021).

Plastics are ubiquitous in the environment and have become a hot topic in academic circles. Extensive studies have focused on analytical methods, source, abundance, transport, fate, degradation of plastics in the environment and threats to natural surroundings, wildlife, or even human health. However, characteristics of plastic pollution, which are critical to understand this emerging problem, remain unknown up to now. Here, this paper reviews the major characteristics of plastic pollution in the environment to enhance present understanding of this issue. These characteristics, including diversity, persistence, global issues, combined pollution and threats to organisms and human health, are critically summarized in this work. Further, “plastic cycle” in the



environment, namely, aquatic, atmospheric, and terrestrial system, is also discussed in this review. Finally, we highlight current challenges of plastic pollution posed to the public and recommend the research trends in future work (Li et al., 2021).

Our concern in this paper is with the environmental governance of marine plastic pollution that emanates from Thailand, the sixth biggest contributor globally. By zooming in on land-based polluters in Thailand, we highlight both the systemic nature of the marine plastic problem and the relative impunity with which drivers of transboundary environmental harm function at all levels of governance. Drawing from 19 inter-views conducted with actors from the public, private and non-profit sectors, we examine three stages of the problem: production, consumption, and waste management. We found that three major barriers prevent Thailand's government, private sector, and citizens from engaging in the sort of collective action needed to reduce marine plastic pollution. They are: (i) insufficient incentives to enact political change; (ii) scalar disconnects in waste management; and (iii) inadequate public and private sector ownership over plastic waste reduction. As the state alone cannot change corporate and consumer behaviors, we argue that multi-stakeholder efforts across organizational scales of governance and administrative boundaries are needed to address the barriers (Marks et al., 2020).

The present work is a critical review, based on all currently available literature, that reports environmental status of marine plastic pollution, especially microplastic pollution, in Spain. The three Spanish water areas with the highest presence of plastics are the Alboran Sea, the Gulf of Alicante and the vicinity of Barcelona probably related to fishing and industrial activities and high population densities. Regarding microplastic contamination on beaches in Spain, annual monitoring by the Spanish government shows contamination along the entire coast of the country, with particularly high concentrations in the Canary Islands (between 800 and 8800 particles/m<sup>2</sup> in spring). Between 40 and 50% of the particles analyzed were pellets and the main factors postulated for the distribution of these particles are marine currents and the geomorphological characteristics. With regards to biota, ingestion of microplastics by fish has been intensely confirmed and, important differences were observed between the locations of the sampling, being bogues (Boops boops) one of the fish species more studied in Spain. Finally, the work includes a revision of European and Spanish legislation about plastics and marine pollution and some strategies to reduce this kind of contamination in Spain (Martín-Lara et al., 2021).

This study analyzed brand audit and beach cleanup data in four densely populated Canadian cities (Vancouver, Toronto, Montr´eal, Halifax) and a remote island (Sable Island) to determine efficacy of ongoing Single-use Plastic (SUP) mitigation measures. Cities were found to have similar litter type proportions, and six brands were found to disproportionately contribute to Canadian SUP litter, comprising 39% of branded litter collected. Results confirm that current Canadian SUP management appears to be insufficient to address leakage of SUPs into the environment. Recommendations to strengthen SUP management strategies and mitigate plastic pollution are recommended to improve future Canadian SUP reduction policies (Baxter et al., 2022).

In Norway, Danish seine ropes and trawls are the fishing gears that contribute most to this pollution. The main reason for this pollution is that the seine ropes are dragged along the seabed over a considerable distance, creating a friction force that results in high ropes wear. This note



reports the findings after examining the wear of Danish seine ropes used in Norwegian fisheries. The results show that, in Norway alone, an average of 77 to 97 tons of plastic will be added to the sea annually due to this specific fishing gear. Aggregated to include all fly dragging, anchor seining, and pair seining globally, this number is estimated to be about 311 tons per year (Syversen et al., 2022).

Bangladesh is no different from this global scenario, though there has been a little effort to assess the amount of plastic waste and its consequence which is necessary to encounter this mounting threat effectively. Taking this into consideration, current study investigates the impacts of plastic pollution including its most threatening form microplastics on environment and human health in Bangladesh. The study is based on critical review of existing literatures from the global perspective. It has been found that a major percentage of the used plastic is mismanaged in Bangladesh, posing a great threat to the environment and human health. This article also put forward some recommendations to tackle this pervasive problem alongside the measures already taken by the government. Overall, this work is aimed at creating an urge among the researchers to study the plastic pollution in Bangladesh comprehensively and raising a concern among the appropriate authorities to develop policies and impose necessary actions against plastic pollution before it is too late (Hossain et al., 2020)

The main objective of the study was to determine the amount of plastic waste that was generated from bottled drinking water consumption in Kingdom of Saudi Arabia, and its impact on the carbon footprint (CO<sub>2</sub> generation). An online random survey was conducted to estimate the daily consumption of bottled water in the province of KSA, Tabuk. The total generated plastic (PET) waste from drinking water bottles in Saudi Arabia was estimated at 8,27,114 tones each year, which produced 26,79,851 tones of CO<sub>2</sub> per year. When considering the consumption of plastic in the food industries, the impact becomes more severe, and it exponentially increases for the developing countries as compared to the developed countries. These phenomena demand a compressive solution that ranges from governmental policies to engineering solution to lessen the use of plastic in minimizing global carbon emissions (Islam, 2018)

The crisis of plastic waste pollution in Malaysia appears to be snowballing at an unmatched rate. It has also been concerning to know that a large portion of plastic waste was never recycled, in addition to containers of illegal Britain's plastic wastes shipped into the country to be dealt with. While the issues of plastic waste pollution in Malaysia surpasses crisis levels. This research identifies and analyses the ongoing issues with the crisis of plastic waste pollution, and the current approaches being adopted in solving the crisis. Aiming at devising a plan that addresses the root of the problem to catalyze a significant reduction in plastic waste pollution, this study applies a thematic qualitative analysis that can best be used to interpret and analyze the dataset. The findings indicate that economic development, although beneficial, has given birth to capitalist market, that eventually results in eco-economic crisis. The study also points out that several efforts has not been influencing the current plastic pollution mitigation in the country. Therefore, this study provides a better understanding of how human security can be factored into the crisis resolution of plastic waste pollution. A realistic transformation towards eco-effective nation holds the key to mitigation efforts.(Raudhah et al., 2020)



Plastic waste is one of the world's most pressing human health and environmental concerns. Plastic constitutes the third highest waste source globally, with the total volume of plastic waste growing in-line with increases in the global population and per capita consumption. Malaysia is tracking global trends in both the overall generation of plastic waste and the consumption of single-use plastics and since 2017 has been the world's largest importer of plastic waste. These elements create several major challenges for the country's waste management system. This review outlines the current state of plastic waste production and management in Malaysia, including options for landfill, recycling, and incineration. The paper closes by discussing options for and constraints on the switch to biodegradable alternatives and proposes a model of plastic management based on a circular economy approach and solid waste management hierarchy. Success in reducing the problems posed by plastic in Malaysia will require sustained effort at many levels, but positive experiences in other countries give some cause for optimism (Chen et al., 2021).

Microplastic pollution is an emerging environmental and public health threat worldwide including Malaysia. Microplastics are widespread in drinking water, but also food products especially seafood, an important dietary source for the Malaysians. Potential health hazards may be a result of chemicals, physical properties and microbial disturbance associated with microplastic exposure. However, most studies were performed in animals rather than in human. Nevertheless, in recognition of rising threat from microplastics, in 2018, the Malaysia's Roadmap to Zero Single-use Plastics 2018–2030 has been released. In this editorial, we firstly discussed the potential impact of microplastics on human health, followed by the strategies or limitations highlighted in the Malaysia's Roadmap (Ma et al., 2020).

Malaysia is locked in a huge battle over how it should manage the creeping trend of plastic waste dumps in the country. Huge tonnes of waste dumped on its soil have led to the formation of plastic trash mountains in some parts of the country. The setting often orchestrated by illegal waste factories seems far from the safe and secure haven the authorities are keen to portray. The study explores how this trend has been allowed to fester. It aims at the state of environmental governance in the country and addresses the pertinent issues confronting the country and the Southeast Asia region. The study finds that the lack of or inadequacy of collaborative efforts in monitoring and reporting detrimental activities on the environment as a basis for the present predicament of the country (Sarpong, 2020).

### **Islam and Environment**

Islam is a religion that prescribes a way of life that goes beyond the rituals. It provides a holistic guide to human beings in almost every aspect of life in this world. However, the modernization and economic growth have taken the leads in the society governance and therefore tarnished some of the Muslim society's perceptions on the holistic guidance of Islamic teachings. One of the consequences was readily displayed through attitudes and inefficient waste management practice of most of the Islamic country that lead to the environmental health problem. The paper discusses the existing waste management practice and positive roles of true Islamic understanding through the Qur'an and the Sunnah in terms of avoiding wasteful consumption and manners of cleanliness to resolve global environmental health problem caused by poor waste management (Omar et al., 2016)



This paper would firstly examine solid waste management currently experienced in Malaysia with special concentration given to waste incineration. Its function and benefits entailed from with special concentration given to waste incineration. Its function and benefits entailed from this system shall then be identified. This paper attempts to emphasize this notion within the Islamic perspective, stressing on the needs to conserve the environment. This study adopts a qualitative approach where the conceptual authoritative literature in the related field is utilized based on content analysis. The related principles of Islamic jurisprudence carefully examined along with the Quranic verses depicting on this issue. This study further submits that incinerating waste could mitigate environmental impact that might otherwise arise from waste. Finally, it further concludes that Islam provides a concrete model of environmental ethics which is based on divine revelation that needs to be observed (Samori et al., 2018)

### 3. Conclusion

The problem of plastic pollution is complex. There are some suggestions and views related to this plastic pollution. Microalgae species used to synthesize bioplastic. In Thailand there are 3 main obstacles Thailand's government, private sector, and citizens from engaging in the sort of collective action needed to reduce marine plastic pollution. In Spain, a revision of European and Spanish legislation about plastics and marine pollution is needed and some strategies to reduce this kind of contamination in Spain. In Canada, recommendations to strengthen Single Use Plastic (SUP) management strategies and mitigate plastic pollution to improve future Canadian SUP reduction policies. Bangladesh raising a concern among the appropriate authorities to develop policies and impose necessary actions against plastic pollution before it is too late. Saudi Arabia demand a compressive solution that ranges from governmental policies to engineering solution to lessen the use of plastic in minimizing global carbon emissions and from Malaysia suggest better understanding of how human security can be factored into the crisis resolution of plastic waste pollution. A realistic transformation towards eco-effective nation.

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## Political Connection and Family Business Create or Destroy Firm Performance: Evidence from Malaysia

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**Abstract:** *This study examines whether the family business is associated with firm performance and whether the political connection moderates the relationship between the family business and firm performance. The sample includes 3,120 firm-year observations from Main Market Bursa Malaysia covering the period 2013 - 2017. This study gathered financial data from the Eikon Datastream, while data on family business and political connections are hands collected from the annual report. We find that family chairmanship and high family ownership concentration will destroy firm performance, exhibited by low Tobin Q. However, the moderating effect of political connection between the family business and firm performance shows a positive and significant association. This implies that politician in the family firm's boardroom is able to increase firm performance as the politician can work as an external watchdog in the highly concentrated family firms. Also, it is supported by Resources Dependency Theories where the connected firms can enjoy resources from the politician. In the additional analysis, we separate the sample into high and low family ownership concentration, and we find that political connection in high family ownership will destroy firm performance. Thus, this association create Type I and Type II agency problem in the firms. These findings provide critical input for regulators and investors on the designation of family members and appointment of politicians in the firms as it may create agency costs and destroy firm performance. This study adds to the limited, albeit important evidence on the joint effect of politically connected firms and family businesses on firm performance.*

**Keywords:** Family business, Political Connection, Firm Performance

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### 1. Introduction

Unlike other countries in the world, Malaysian corporate sector is characterised by the existence of politically connected firms as it falls as the second highest politically connected firm after the United Kingdom (Faccio, 2010). Political intervention in business may involve all types of firms and not exceptional in family businesses. Political connections of corporate board members are also an essential factor of firm success since government policies have a significant impact on corporate decision-making and operations. Prior studies by Faccio (2010), Chung, Byun, & Young (2019) and Sun, Hu, & Hillman (2016) extensively looked at the effect between political connection and firm performance.

Despite of higher political connection, business environment in Malaysia also dominated by majority family businesses. Prior studies have shown 70% of Malaysian listed firms are based on family ownership (Che-Ahmad & Mustafa, 2017) and most large firms are family businesses



(Ibrahim & Abdul Samad, 2010). Their findings reveal that family business dominated and contributed to the major Gross Domestic Product (GDP) growth in Malaysia. However, Che-Ahmad & Mustafa (2017) found that family ownership is susceptible to Type II agency problems where the majority shareholders undermine the interest of minority shareholders.

Recent evidence has found that family ownership has the capacity to advance or deteriorate a company's performance. For example, due to the sheer COVID-19 pandemic, many family companies have been compelled to change or risk being left behind. According to PwC's Family Business Survey 2021, Malaysian family businesses saw mixed performance over the last financial years with 47% experiencing growth in terms of their sales performance while 29% of Malaysian family firms saw a sales reduction. This survey reveals that the effect of family ownership on firm performance is still inconclusive.

Thus, this study aims to examine whether the family firms and political connection are related to the performance of the company. This is due to the limited studies that looked at the interaction effect between political interventions and family firms because according to the resources dependent theory, politicians can be appointed as directors in family firms (Liew & Devi, 2021). This study also seeks to contribute to the existent family ownership literature by investigating several moderator effects on this relationship. Furthermore, the effect of political connections and family ownership on firm performance has not been examined jointly. Prior research has focused on the impact of family ownership on firm performance, with little attention paid to the political connection. As a result, this paper adds to previous research by investigating the benefits, or lack thereof, that political ties can bring to firm performance. Accordingly, the current study aims at examining the moderating role played by the family ownership on the association between the political connection and the performance of the company.

Our research builds on two significant lines of inquiry. The first focuses on the impact of family ownership on financial performance. The second is the study examining whether political connection is beneficial or detrimental for performance (Wang, Yao, & Kang, 2019). Therefore, the purpose of the study is to examine the possible association between political connection, family ownership and performance of Malaysian financial firms during the years 2013-2017.

This study is organized into five sections. Section 1 is the introduction, and then Section 2 introduces the previous literature on the relationship between family ownership, political connection and firm performance and also proposes the research hypotheses. Section 3 discusses the research methodology. Section 4 shows the results of the study, and in the end, Section 5 shows the conclusion with the implications of the study.

## **2. Literature Review and Hypothesis**

### **2.1 Family Business and Firm Performance**

Family ownership is related to a firm that is controlled and managed by family members. Most firms are normally controlled by their founders, or by family members and heirs (Burkart, Panunzi & Shleifer, 2002). Family business can be classified into four categories, which is 1) intra-family relationships that exist among family members; 2) extra-family relationships that exist between family members not directly involved in the family firm and non-family individuals and groups;



3) intra-firm relationships that exist among family and non-family members of the firm; and 4) extra-firm relationships that exist between the firm or its members (family or non-family) and external stakeholders (Zellweger et al., 2019).

There are two perspectives of agency costs in family firms. In the first perspective, family ownership is the internal mechanism to minimise information asymmetry and align resources to improve firm performance. In this situation, the board of directors remains under family members' scrutiny, which minimises conflict of interest. However, in the second perspective, family firms have a high tendency to generate agency problem Type II. This situation materialises when the presence of controlling shareholders has its associated costs, as they may engage in insider dealings at the expense of minority shareholders (Ahmed, Ali Shah, & Ali Bhatti, 2020). Firms with concentrated ownership are more likely to be tunnelled due to conflict of interest between controlling and minority shareholders (Che-Ahmad & Mustafa, 2017). In other words, the majority shareholders will undermine minority shareholders. Recent finding found that the heterogeneity of family firm behaviours as reflecting the values, biases and heuristics of individuals (Picone et al., 2021)

Further research discovered that large family businesses (Félix & David, 2019) and highly concentrated family ownership positively affect firm performance (Musallam et al., 2019). Ahmad, Omar, & Quoquab (2021) found that family involvement in businesses has a positive association with firm performance since a high family involvement can sustain a firm's longevity in the market. Family firms also have a positive relationship with financial strength and armed with superior strategic perspective. These advantages can form the foundation for the firm's sustainability. A concentrated family ownership enjoys favourable business relationships with external firms when compared to non-family firms. This perk can spur the performance of family firms (Lee, 2019). However, Gonzalez, Idrobo, & Taborda (2019) found that family firms only positively affect the return on assets (ROA), but not Tobin Q. In other words, family firms can increase accounting-based performance, but not market-based performance.

Despite ample evidence of a positive association between family businesses and firm performance, other studies found conflicting results. Directors' selection and appointment in family firms are based on social networking among family ties. Even though family firms can tolerate appointing inexpert family members as managers, the firm performance faced negative effect (Ibrahim & Abdul Samad, 2010). This observation is supported by Bhatt and Bhattacharya (2017), who found that board structures have a negative effect on family firm performance since they could be managed by individuals without the relevant knowledge, experience, and professional qualification. However, Al Farooque, Buachoom, & Sun (2020) also discovered that family ownership does not have any significant impact on firm performance.

Mixed results were found because regulation and corporate governance environment might influence family ownership and firm performance (Paiva et al., 2016). Studies based on Malaysian environment cannot ignore the characteristics of ownership structures because this ownership can control the Malaysian capital market. In addition, family firms are concern with their survival, reputation and performance since they invested their personal assets in the business (Al-Duais, Malek, & Abdul Hami, 2019). Family firms are more likely to run into agency problem Type II



between minority and majority shareholders. This is due to large shareholdings have more substantial incentives to influence the management decision making. Furthermore, they are concerned with the firm's survival and reputation. Family firms have considerable control over the firms, and strong internal control and governance may improve performance in family firms. Even though family firms have the final say in decision-making, the thoughts of survival and reputation supersede the urges to improve firm performance. In short, the focus to create firm value become their fundamental objectives since reputation and survival remain as the primary agenda of family firms.

Thus, based on mixed findings above, we developed the following hypothesis:

H1: Highly concentrated family ownership has high firm performance.

## **2.2 Political Connection and Firm Performance**

Political influence appears to be a two-edged sword, with both positive and negative consequences. The literature provides several reasons to support the positive and negative relationship between political connections and firm performance. A review of literature indicates that politically connected firms experience high financial performance (Wang et al., 2019; Faisal, et al., 2021). However, developing close ties with the government may not always be advantageous to a company.

The negative effect of political connection can be explained using the agency theory. According to the theory, governments pursue various objectives that may conflict with the firm's value-maximizing objective. According to Al-Sraheen & Alkhatib, 2016; Al-Sraheen et al., 2019, political influence has a significant impact on the Jordanian business environment and decrease the quality of financial reporting. Additionally, political connections businesses pay a price for being part of patronage networks that support the political leaders who currently hold power. (Johnson & Mitton, 2003). Based on the above discussion, this study postulates that:

H2: Political connection have low firm performance.

## **2.3 Family Business, Political Connection, and Firm Performance**

Family businesses may be susceptible to certain number of conflicts and ultimately lead to nepotism that may jeopardize the firms. In addition, Dyer (2018) found that firms with continued founding family presence would perform better in accounting and market signal rather than non-family firms. However, the connection between family business and political connection in boardroom has been a global issue extensively discussed in academic literature. Dominant family owners are expected to control the politicians on the boards.

Family ownership contributes in mitigating the negative effect of the political connection on the level of corporate risk companies. Su & Fung (2013) study the association between political ties and business performance in Chinese firms from 2004 to 2008 and find a positive relationship after controlling for ownership structure, related party transactions, and firm characteristics. Additionally, Joni, Ahmed, & Hamilton (2019) found that firms with political ties perform better than those that belong to family business associations.



Accordingly, the current study aims at examining the moderating role played by the family ownership on the association between the political connection and the financial performance. Based on the agency theory, we proposed the following hypothesis:

H3: There is an interaction effect between political connection, family business, and firm performance.

### 3. Research Methodology

The scope of this study is confined to Malaysian Public Listed Companies (PLC). This analysis will go a step further by incorporating data from 2013 to 2017. The data set of five years chosen is sufficient to reduce classification errors (Copeland, 1968, Grinand et al., 2013). This range of data enables this study to determine the impact of political connection and family businesses on company performance. Besides of this factor, Malaysia was the focus of this study due to the various statutes in the last decade (Rahmat, 2013).

This study used a panel data technique, which requires a model choice of Ordinary Least Squares (OLS), Random Effect (RE), or Fixed Effect (FE). The tests included all of the model's variables. The Breusch-Pagan LM test and the Hausman test were used in the investigation. We also looked at multicollinearity, heteroskedasticity, and serial correlation. When testing regression models with STATA Software, selecting a model is critical to determining which model is suitable for testing the regression. It is based on the Breusch-Pagan LM test and the Hausman test. The first stage involved deciding whether to use Ordinary Least Squares or Random Effect. If the Breusch-Pagan LM test result is significant, the model employs Random Effect rather than Ordinary Least Square. If the value is negligible, the regression model will employ OLS.

The second stage was to decide whether to employ the Random Effect or the Fixed Effect. To pick the regression model, a Hausman test was run. If the test value is substantial, the model will either use Fixed Effect or not. The regression model for both independent variables are as follow:

$$\begin{aligned} TobinQ_{i,t} = & \beta_0 + \beta_1 FDUMMY + \beta_2 FCEO + \beta_3 FCHAIR + \beta_4 FPN + \\ & \beta_5 FDO + \beta_6 PCON + \beta_7 ROE + \beta_8 ROA + \beta_9 DR + \beta_{10} CR + \beta_{11} FSIZE \\ & + \varepsilon \end{aligned}$$

*Model 1*

$$\begin{aligned} TobinQ_{i,t} = & \beta_0 + \beta_1 FDUMMY + \beta_2 FCEO + \beta_3 FCHAIR + \beta_4 FPN + \\ & \beta_5 FDO + \beta_6 PCON + \beta_7 PFN*PCON + \beta_8 ROE + \beta_9 ROA + \beta_{10} DR + \\ & \beta_{11} CR + \beta_{12} FSIZE + \varepsilon \end{aligned}$$

*Model 2*

### 4. Findings and Discussion



#### 4.1 Descriptive analysis

Table 1 reports the descriptive statistics for all the variables. The results in Panel A of Table 1 indicated that average Tobin Q was 5.450, with values ranging from 3.533 to 7.937. The average number of family member (PFN) in the boardroom was 21.8, with values ranging from 0 to 0.875. The average direct share ownership (FDO) of family firms was 10%, with values ranging from 0% to 100%. The average number of politicians in the boardroom (PCON) was 0.711, with values ranging from none to maximum 12 directors in the firms and reveals that the sample size consists of largest politician in the boardroom. The control variables of average Return on Equity (ROE), Return on Assets (ROA), Debt Ratio (DR), Current Ratio (CR) and firm size (FSIZE) were 0.518, 0.035, 0.385, 3.448, and 5.732 respectively.

Panel B of Table 1 present the descriptive statistics for the dummy variable. The percentage of family firm (FDUMMY) constituted 53% of the sample size. The percentage of family members hold CEO position (FCEO) in the firms was 26.4. Meanwhile, the percentage of family members as the chairman in the firms was 21.8% of the sample size.

**Table 1: Descriptive statistics**

Panel A: Continuous variables					
	Mean	Median	Max	Min	Sd
TOBINQ	5.450	5.349	7.937	3.533	0.743
PFN	0.218	0.222	0.875	0.000	0.224
FDO	9.996	2.460	100.000	0.000	15.078
PCON	0.711	0.000	12.000	0.000	0.994
ROE	0.518	0.058	7.076	-9.282	0.381
ROA	0.035	0.032	6.495	-2.723	0.165
DR	0.385	0.367	4.561	-0.011	0.257
CR	3.448	1.921	107.536	0.015	6.833
FSIZE	5.732	5.657	8.159	3.916	0.657

*Note: TOBINQ is ratio of market capitalisation plus total liability over total asset; PFN is percentage of family member over board size; FDO is the total direct share ownership owned by family members; ROE is a ratio of net income over total equity; ROA is a ratio of net income over total assets; DR is a ratio of total liabilities or total assets; CR is a ratio of current assets over current liabilities; and FSIZE is natural algorithm of total assets.*

Panel B: Dichotomous variables				
	Yes (1)		No (0)	
	N	Pct	N	Pct



<i>FDUMMY</i>	1,644	52.7	1,476	47.3
<i>FCEO</i>	823	26.4	2,296	73.6
<i>FCHAIR</i>	680	21.8	2,440	78.2

Note: *FDUMMY* is a dummy variable equal to 1 if firm is family business and 0 otherwise; *FCEO* is a dummy variable equal to 1 if CEO of the firm among the family members and 0 otherwise; and *FCHAIR* is a dummy variable equal to 1 if the chairman of the firm among the family members and 0 otherwise

#### 4.2 Correlation analysis

Table 2 report the correlation analysis of the variables. The tabulated results show that the correlation between the variables were relatively low. The highest correlation was between *FDUMMY* and *FCEO*, with a value of 0.763; *PFN* with *FDUMMY* and *FCEO* with a value of 0.788 and 0.758, respectively. However, there is not multicollinearity issues were suspected because the value is below than 0.8 (Hair, 2010 & Gujarati, 1995). The results showed that all proxied of family variables were negatively correlated with Tobin Q, indicating that low firm performance in the family business. However, the appearance of politician in the boardroom was positively correlated with Tobin Q and provides early findings that appointing politician in the boardroom could boosted firm performance.

The firm's profitability proxied by ROE and ROA, and solvency ratio of DR showed a positive correlation with Tobin Q. As suspected, larger firm size (*FSIZE*) positively correlated with market-based performance Tobin Q. However, the firm's liquidity of CR showed a negative correlation with Tobin Q and provides early findings that firm's liquidity does not necessarily increased firm performance.

Variables	TOBI NQ	FDU MMY	FCE O	FCH AIR	PFN	FDO	PCO N	ROE	ROA	DR	CR	FS IZ E
TOB												
INQ	1.000											
FDU	-											
MMY	0.089 ***	1.000										
FCE	0.079 ***	0.763 ***	1.000									
FCH	0.044 **	0.055 ***	0.423 ***	1.000								
PFN	0.104 ***	0.788 ***	0.758 ***	0.558 ***	1.000							
FDO	0.183 ***	0.388 ***	0.297 ***	0.191 ***	0.397 ***	1.000						
PCO	0.211 ***	0.135 ***	0.106 ***	0.145 ***	0.207 ***	0.133 ***	1.000					
ROE	0.223 ***	0.005	0.002	0.002	0.008	0.004	0.005	1.000				



ROA	0.218 ***	0.028	0.029 *	0.005	0.033 *	0.036 *	0.003	0.645 ***	1.000				
DR	0.023	0.039 **	-	0.063 ***	0.039 **	-	0.036 **	-	0.111 ***	1.000			
CR	0.057 **	0.029 *	0.009	0.088 ***	0.024	0.048 **	0.097 ***	0.007	0.026	0.322 ***	1.000		
FSIZE	0.858 ***	0.051 **	0.052 **	-	0.069 ***	0.157 ***	0.277 ***	0.094 ***	0.074 *	0.174 ***	0.112 ***	1.0 00	

Note: The reported t-statistics are in parentheses. Asterisks denote statistical significance at the 1% (\*\*\*), 5% (\*\*), or 10% (\*) levels, respectively. TOBINQ is ratio of market capitalisation plus total liability over total asset; FDUMMY is a dummy variable equal to 1 if firm is family business and 0 otherwise; FCEO is a dummy variable equal to 1 if CEO of the firm among the family members and 0 otherwise; and FCHAIR is a dummy variable equal to 1 if the chairman of the firm among the family members and 0 otherwise; PFN is percentage of family member over board size; FDO is the total direct share ownership owned by family members; ROE is a ratio of net income over total equity; ROA is a ratio of net income over total assets; DR is a ratio of total liabilities or total assets; CR is a ratio of current assets over current liabilities; and FSIZE is natural algorithm of total assets.

### 4.3 Empirical Regression Results

Table 3 present the regression estimates for the effect of the political connection and family business on the firm performance. For Model 1, we first estimated the effect of the family business and political connection on firm performance, with results showing that FCHAIR and FDO show a negative and significant relationship on Tobin Q. This result reveal that family firm chairmanship exhibited lower firm performance. Furthermore, high concentrated family ownership in the firms also showed lower firm performance and suggesting that high concentrated family ownership has higher tendency to create agency problem Type II and undermine the interest of minority shareholders. These finding rejected our first Hypothesis.

These findings are aligned with Gonzalez, et al. (2019) who found that family firms have a negative relationship with Tobin Q. Family firms did not take long-term performance or market based performance seriously due to the low quality of the board of directors. High director's tolerance appointment leads to the recruitment of inexperience and unqualified family members as directors, which negatively affects the firm's performance among Malaysian family firms (Bhatt & Bhattacharya, 2017; Ibrahim & Abdul Samad, 2010).

In Model 2, we observed the same relationship between FCHAIR and FDO on the Tobin Q. The PCON also showed insignificant relationship on the Tobin Q implying that there were no statistically differences between political and non-politically connected firms on firm performance and rejected our Hypothesis 2. However, we found the interaction effect between political connection and number of family members (PFN\*PCON) was a positive and significant relationship with Tobin Q. This result supported our Hypothesis 3 that the appearance of politician in the boardroom family business was able to increase firm performance. This finding aligns with the resources dependency theory that seen politician as a resource to the firms and eliminate the Type II agency cost existed between minority and majority shareholders. The political intervention in the business somehow able to help firms to increase their market-based performance.



For the control variables, the results show ROA and FSIZE in both Model 1 and 2 had a positive and significant relationship with Tobin Q and it is expected high profitability and larger firm size had higher firm performance. However, DR in Model 1 and 2 show a negative and significant relationship with Tobin Q. As expected, higher debt ratio led to lower firm performance.

**Table 3: Regression Result**

	Model 1	Model 2
<i>INTERCEPT</i>	0.585	0.598
	3.17***	3.24***
<i>FDUMMY</i>	-0.043	-0.047
	-1.230	-1.330
<i>FCEO</i>	-0.033	-0.035
	-0.880	-0.950
<i>FCHAIR</i>	-0.061	-0.057
	-1.980**	-1.830*
<i>PFN</i>	-0.044	-0.069
	-0.570	-0.870
<i>FDO</i>	-0.002	-0.002
	-2.180**	-2.290**
<i>PCON</i>	-0.008	-0.027
	-0.500	-1.450
<i>PFN*PCON</i>	-	0.122
	-	1.790**
<i>ROE</i>	0.052	0.050
	1.470	1.400
<i>ROA</i>	0.833	0.835
	8.490***	8.510***
<i>DR</i>	-0.499	-0.499
	-10.060***	-10.070***
<i>CR</i>	0.001	0.001
	0.500*	0.490
<i>FSIZE</i>	0.895	0.894
	27.130***	27.110***
Adj R <sup>2</sup>	8.34	8.90
n	3120	3120

Note: The reported t-statistics are in parentheses. Asterisks denote statistical significance at the 1% (\*\*\*), 5% (\*\*), or 10% (\*) levels, respectively. TOBINQ is ratio of market capitalisation plus total liability over total asset; FDUMMY is a dummy variable equal to 1 if firm is family business and 0 otherwise; FCEO is a dummy variable equal to 1 if CEO of the firm among the family members and 0 otherwise; and FCHAIR is a dummy variable equal to 1 if the chairman of the firm among the family members and 0 otherwise; PFN is percentage of family member over board size; FDO is the total direct share ownership owned by family members; ROE is a ratio of net income over total equity; ROA is a ratio of net income over total assets; DR is a ratio of total liabilities over total assets; CR is a ratio of current assets over current liabilities; and FSIZE is natural logarithm of total assets.

#### 4.4 Additional analysis



The main analyses reveal that family ownership (FDO) were associated with lower market-based performance, Tobin Q. Therefore, we further examine to test whether high or low family ownership concentration give a negative effect on Tobin Q. We divided sample into high and low family ownership by partitioning firms with high and low family ownership based on a median ratio.

Table 4 shows FCHAIR in low family ownership firms is negatively significant on the Tobin Q, but not in the high family ownership firms. However, FDO in high family ownership firms is negatively significant on Tobin Q and indicates that high family ownership created Type II agency cost by undermine the interest of the minority shareholders. It is contradicted with low family ownership firms where the majority shareholder does not create agency problem Type II.

Moreover, the political connection (PCON) shows a negative and significant on the Tobin Q in high family ownership firms. These results provide evidence that the existence of politician in the boardroom family firms could further reduce firm performance. Whereby high concentrated family ownership may undermine interest of the minority shareholders and the existence of politician in the boardroom may further reduce firm performance because it may divert firm's fundamental objectives to the politician objectives. Our additional findings, offer evidence on the political connection in high family ownership firms on firm performance.

**Table 4: High and Low Family Ownership Concentration**

	High	Low
<i>INTERCEPT</i>	0.172	0.507
	1.15	3.16***
<i>FDUMMY</i>	0.015	-0.078
	0.330	-1.410
<i>FCEO</i>	-0.004	-0.003
	-0.130	-0.060
<i>FCHAIR</i>	-0.028	-0.822
	-1.210	-1.740*
<i>PFN</i>	-0.051	0.037
	-0.700	0.280
<i>FDO</i>	-0.002	0.004
	-2.470**	0.180
<i>PCON</i>	-0.447	-0.005
	-2.690***	-0.280
<i>ROE</i>	-0.150	0.114
	-5.000***	3.720***
<i>ROA</i>	1.814	0.000
	12.610***	0.000



<i>DR</i>	-0.332 -8.060***	-0.375 -7.180***
<i>CR</i>	0.005 1.940**	-0.001 -0.760
<i>FSIZE</i>	0.933 37.390***	0.902 31.330***
Adj R <sup>2</sup>	8.52	8.36
n	1560	1560

*Note: The reported t-statistics are in parentheses. Asterisks denote statistical significance at the 1% (\*\*\*), 5% (\*\*), or 10% (\*) levels, respectively. TOBINQ is ratio of market capitalisation plus total liability over total asset; FDUMMY is a dummy variable equal to 1 if firm is family business and 0 otherwise; FCEO is a dummy variable equal to 1 if CEO of the firm among the family members and 0 otherwise; and FCHAIR is a dummy variable equal to 1 if the chairman of the firm among the family members and 0 otherwise; PFN is percentage of family member over board size; FDO is the total direct share ownership owned by family members; ROE is a ratio of net income over total equity; ROA is a ratio of net income over total assets; DR is a ratio of total liabilities over total assets; CR is a ratio of current assets over current liabilities; and FSIZE is natural logarithm of total assets.*

## 5. Conclusion

The goal of this research was to see if the family business is related to firm performance and if the political connection moderates the association between the family business and firm performance. Based on a sample of 3,120 company-year data from the Main Market Bursa Malaysia from 2013 to 2017, we discover that family chairmanship and high family ownership concentration undermine firm performance, as evidenced by a low Tobin Q. However, the presence of a political connection in the boardroom has been shown to improve corporate performance, and this is backed by Resources Dependency Theories, since firms can benefit from the politician's resources. In the extra analysis, we divide the sample into high and low concentrations of family ownership, and we find that political connections in high concentrations of family ownership undermine firm performance. As a result, this relationship causes Type I and Type II agency problems in firms.

The key contribution of this study was a better knowledge of political connection and family business, particularly in developing nations like Malaysia. This study has the potential to become the gold standard for examining existing rules and regulations on political connection and family business. Revisiting existing political connection norms and regulations necessitates a thorough understanding of the effects of political connections and their effects on corporate performance. For numerous reasons, the findings of this study may be useful to regulators and policymakers about the designation of family members and the appointment of politicians in firms, which may result in agency expenses and the destruction of corporate performance.

The findings should be regarded with caution. First, this study examines the impact of political connection and family business on the performance of Malaysian Public Listed Companies (PLCs). This study's sample included organisations having a political connection from 2013 to 2017. The conclusions of this study should not be extrapolated for a specified timeframe alone. Furthermore, the results are solely applicable to political connection firms.



Second, another weakness of the study is that characteristics other than family business such as institutional business and foreign business were chosen to determine the effect on firm performance. If other corporate governance criteria, as mentioned above, were used to analyse firm performance, the parameter estimations could generate different results.

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## Preservation of Malay Local Food Among Young Generation: A Study in Johor

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**Abstract:** *The purpose of the article is to disclose the demand of Malay traditional kuih with differing levels of acceptance among consumer in Peninsular Malaysia. Malaysia is well-known for being a diverse society with a wide variety of culinary characteristics. The Malay kuih became the traditional dessert in Malaysian cuisine due to a variety of historical influences. This study examined the quality, taste, and demand of traditional Malay kuih, particularly during festive occasions especially during wedding festivals. In needed to respond the research's objectives and complete the study, three independent variables were investigated. In addition, this study's methodology is consistent with the survey research design. This study used questionnaires to collect information from participants across Malaysia. 250 sets of the study's questionnaires were given out, and the analysis was performed using the window version of IBM's Statistical Package for the Social Science (SPSS) 27.0 programme. The results showed a positive association between the traditional dessert of Malaysia and the criteria of quality, taste, and demand. Besides, this article is hoped to contribute to further refining the traditional Malay food knowledge specifically in its kuih acceptance among the Malaysian society.*

**Keywords:** Malay food, Traditional food, Local food Johor, Young generation, Food preservation

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### 1. Introduction

Traditional Malay food is reported that have been established since the 13th century and was heavily influenced by Thai and Indonesian cuisine (Brissendan, 2010 & Mohd et al., 2013). Every state in Malaysia has their traditional cuisine and have different variances of the unique flavor profile. Meanwhile, Malay local food is categorized as traditional food that is frequently sold in hawkers or restaurants that are eaten in daily life. As Johor is located in southern Malaysia, most of the food was influenced and has distinctive tastes from foreign settlers such as Arabs, Javanese, and Bugis. Malay food mostly is produced by Malays and all the food are usually using local ingredients, equipment and recipes that have been passed down through generations (Mason & Omar, 2003).

According to Hutton (2015), Johor cuisine are mostly influenced by Javanese migrants who have been lived in the states over past two decades. The food has been adjusted and adapted through the diversity of the multi-ethnic population in Johor. Due to that, Johor Malay food is known for their spicy, sour and salty due to the usage of variety type of spices and herbs in their cooking. For



example, there is varieties type of local Malay food that can be found mostly in Johor including otak-otak, mee bandung, asam pedas, laksa Johor, nasi ambeng, burasak and satay.

Shariff et al., (2016) noted that, the younger generation nowadays is known for having insufficient knowledge of past and current local Malay. This is due to the young generation lack of interest in preserving Malay traditional and local food. Gallegos et al., (2011) and Mohd et al., (2013) argued that modernization and globalization are the contributors to the alteration in the food preparation, consumption, and transmission of food knowledge to the younger generation. This is because the younger generation nowadays did have lesser interaction and communication between the older generation and making them not interested in learning about local and traditional food. Most of the younger generation are preferred to buy food that is convenient and fast. They did not bother to learn to cook and prepare food from their parents as it preparing Malay food is time-consuming and they prefer fast things and convenience for them.

According to Cleveland (2009) and Noriza et al., (2012), the transmission of knowledge through media and social interaction significantly contributes to food cultural adaptation of every ethnic group. Latest technologies and devices are important to ensure the information of Malay food spread to the younger generation as most of the information is easy to access through social media and other platforms. Consequently, materials and documentation about Malay food in Johor are limited, making it hard for the younger generation to find the information. Moreover, there is rising of working mothers through the years which the impact of the rising number of woman participation in working labor have led to a lot of changes that have occurred to Malay food culture, cooking method, equipment and eating habits (Ishak et al., 2019). Working mothers are often busy with working loads make them have limited time to learn cooking from older generations (Sharif et al., 2015). As a result, it has impacted towards preservation of local Malay food. Most working women did not have enough time to learn and cook local Malay food. They also thus preferred to buy fast and convenient food for their family as they also have busy working and have enough time to cook for their family.

Previous researchers stated young generations act as cultural mediators as well as marketing and branding agents for traditional foods, which is critical for the long-term survival of local traditional food production. Many academicians have emphasized the necessity of preserving traditional and local food preparation and skills as they must be passed down to future generations to ensure the survival of local food for future generations (Kwik, 2008 & Yohannes, 2009). Moreover, Kwik (2008) as cited by Md Nor et al (2012) in the transmission modes of Malay traditional food knowledge within generations, If future generations abandon the practice of traditional cuisine, this will be a cause of great concern for all people, as the appreciation of traditional food will be gradually weaken.

From previous literature, not much literature was found related to preserving Malay local food among the young generation in Malaysia. As stated by Mohd et al., 2013, there is little attention given to discussed traditional food transmission and young generation practices. Also, non-published study looking at the issued from Malay ethnic perspective. Therefore, there is a clear need to do research on preserving local Malay food among the young generation especially in Johor as mentioned on how their attitude and social norms affect the Johor local food preservation.



Although there is an effort made by the government effort in bringing up Malay traditional and local food to the international level still there is a lack of effort to sustain Malay traditional and local food within the young generation. Moreover, in the state of Johor, there is still lacking resources on record-keeping local Malay food and the most concerning is where there is a less updated research paper on this scope of the study and making it hard for the next generation to carry the same further the research in the future. This statement is supported by Prof Madya Dr Shahrim Karim in his interview about 'Traditional dishes are getting forgotten' in Harian Metro. He stated that record keeping or documentation on traditional kuih are rarely documented by peoples.

Therefore, this study will examine the factors such as attitude effect toward limited skills and knowledge, attitude affect toward acculturation transmission, and social norm affect toward higher female participation in working labor that contributed to changes in local food preservation Johor within the Malay ethnic and food context. Moreover, the theory that has been used to analyze the following factors is the theory of reasoned action founded by Martin Fishbein and Icek Ajzen in 1967. Using and adapting this theory in the research will help to understand better the factors behind these issues and highlight the importance of the younger generation in preserving local Malay food in the future.

## **2. Literature Review**

### **2.1 Young Generation**

United Nations have stated "Youth" is a period of transition form of dependence of childhood to adulthood's independence and the age criteria for youth generation starting from ages of 15 to 24 years old (UNDESA, 2014). In Malaysia, through Youth Societies and Youth Development Act 2019 by the Ministry of Youth and Sports, (2019) stated young generation means any person who is not less than 18 and not more than 30. The latest amendment on old bills regarding the Youth ages has been renewed by the Malaysian Parliament in 2019 as they want to ensure that the age limit youth is in line with international standards. Aside from that, the Malaysian Parliament also want to ensure the youth generation in the country have sustainability of becoming future leaders, to reduce the gap among youth and accelerate the process of youth maturity.

Currently, the young generation is classified as Generation Y or Millennials to the Generation Z which is known as the post-millennial generation. Generation Y people are born between 1982 to 1994 which convert to the age of 27 to 34 years old and Generation Z people are born between 1995 to 2010 which convert to the age 26 to 11 years old. (Iberdrola, 2021). In Malaysia, the largest age group that represents 29% of the population is Generation z (Tjiptono et al., 2020). This generation is born in the technologies era where they have better access to the internet and other technologies.

### **2.2 Young generation towards the preservation of Malay traditional food in Malaysia.**

Malay traditional food is known for its spicy and fragrant flavors since all the preparations and materials used in the cooking are mostly made up of herbs and spices that are found in Malaysia (Rahman et al., 2018). The people who prepare and cook Malay food are mostly Malay people who are lived all around the states including peninsular and Borneo Malaysia. According to Omar et al (2011) cited by Rahman et al., (2018), stated that Malay food is closely related to the



geographical region and each state has its own unique traditional Malay food which is diverse in flavors as the separation of each continent has influenced the taste of the food. For example, in the southern region such as Selangor, Malacca, Negeri Sembilan, and Johor are known for having thick and rich flavor as the Malay food in southern has mostly influenced Javanese cuisine (Nor et al., 2012).

The previous study has stated that the younger generation's eating behavior has gradually changed from eating homemade food to eating outside the home. One of the reasons is that due to socio-cultural transformation in lifestyle and has changed the replacement of food consumption from traditional food that was previously prepared at home to convenience and fast food that are sold everywhere in Malaysia (Rahman et al., 2018). Nowadays, the young generation preferred to consume convenience and processed food rather than traditional food, as it will save time as most convenience and processed food are ready to eat and the availability of food is easy to purchase. This is due to modernization and globalization on food consumption and preparation (Nor et al., 2012 & Rahman et al., 2018). To ensure the continuity of preserving traditional food in Malaysia, the younger generation needs to act as a mediator to sustain the viability of local food. According to Hamzah et al. (2015) and Rahman et al. (2018), it is the necessity for the younger generation to continue preservation traditional food as this will help to sustain traditional food from disappeared due to rapid modernization.

### **2.3 Malay local food in Johor**

From the food perspective, Johor cuisine is mostly influenced by Javanese migrants who have been lived in the states over the past two decades (Wendy Hutton, 2015). Aside from that, Johor food also has been influenced by Arab traders who came before Malaysia was formed. Due to the assimilation from those countries, southern Malay food is known for its spicy and salty which resulted in the usage of a variety of spices and herbs in their cooking. The traditional food is mostly influenced by Arabs including arisa, kacang pol, nasi beriani gam, and halwa maskat. Meanwhile, traditional and local is mostly influenced by Javanese cuisine including mee soto, lontong, petal, burasak, nasi ambeng, satay, and kerutup. Malay local food in Johor is mostly can be found in the Muar district. Muar is located in the northwest of Johor beside Melaka, Segamat, and Batu Pahat. According to Rosdan et al. (2019), Muar is rich with histories and one of the most popular attractions in Johor that must be visited. Muar is a hub promoting mostly Malay local cuisine including mee bandung muar, satay, mee soto, asam pedas, mee rebus, and else.

According to Sharif et al., (2013) stated there are great concerns among nations about the potential loss in the context of traditional food knowledge and food practices among the young generation. Lacking knowledge on Malay Local food is one of the reasons why the younger generation has limited knowledge and decreasing the effort to preserve the Malay local food (Sharif et al., 2015). However, there is an effort made by the Ministry of Tourism and Culture (MOTAC) and Malaysia external trade development corporation (MATRADE) in promoting local cuisine but specifically, the intention of it just focused on attracting tourist interest in local cuisine in Malaysia. The program that has been developed by them include "Malaysia Kitchen Programmed" intending to bring up Malaysian Cuisine and local product to the international level. (Rosdan et al., 2019).



However, to ensure the sustainability of Malay local food in Johor, authorities must provide a lot of ideas and plans to attract the younger generation's interest in preserving Malay local food in Johor. Based on the remarks above, the following hypothesis is developed:

H1 There is a relationship between young generation attitude (Limited skills and knowledge & Acculturation transmission) towards the preservation of Malay Local Food in Johor.

#### **2.4 Attitude (Limited skills and knowledge)**

Food knowledge is defined as a concept that is related to tradition and involves the transition from generation to generation of knowledge and skills related to food (Kwik, 2008 & Cleland, 2013). As argued by, Sharif et al, (2016) food knowledge is associated with ethnic traditional practices taught by one generation to the next, through many ways including mouth to mouth, hands-on activities, observation, and consuming food.

According to Mohd et al. (2013), changes in family structure, working time, lifestyle, has decreased young people's interest in Malay traditional food preparation and practice. This, also lead to no other option to choose convenience cooking practices. Sharif et al, (2015) stated young generation nowadays has limited skills and due to their preference for buying ready-made traditional cuisine from markets or stalls rather than learning the technique of making traditional food from elder generations. Zainal Badari et al. (2012) stated that young people prefer not spending a long time when preparing their food. The young generation relies on the latest technologies when preparing traditional and local Malay food as it is more convenient, save time and energy when producing the food (Sharif et al., 2015).

Moreover, modern technologies indeed change the alteration on cooking and preparing Malay food. Modern and high-tech equipment have shortened the cooking time and fastened up the cooking process compared to past times. Based on the observation above, the following hypothesis is developed:

H1(a) There is a significant relationship between limited skills and knowledge among the young generation attitude towards the preservation of Malay local food in Johor

#### **2.5 Attitude (Acculturation transmission)**

Acculturation is identified as a process of learning the practices and customs of a new culture, acquiring the capability to function within the dominant culture while referring to one's original culture (Rudmin,2003 as cited by Noriza et al., 2012). Sean and Berry (2013) stated that acculturation is a process of cultural and psychological change or alternation that results in following meetings between cultures (Muhammad et al., 2016). Malay traditional food is formed through acculturation assimilation from different countries such as Thailand, Indonesia, China, and India as Malaysia is known as a multi-cultural country that is diverse with different races and heritage.

Apart from that, Cleveland (2009) and Noriza et al. (2013) explained that acculturation through food knowledge, language, media, and social interaction significantly contributes to food cultural adaption of every ethnic group. Nevertheless, in the process of transferring knowledge between



the younger generation and older generation, there is a lack of exposure of awareness preserving traditional food from older generation towards young generation (Shazali et al., 2013). This contributed to the reason the younger generation is not interested in preserving traditional food in Malaysia. Hence, language, media and social interaction play an important tool to spread the knowledge to preserve heritage food towards future generations. Based on the opinion above, the followings hypothesis is developed:

H1(b) There is a significant relationship between acculturation transmission among young generation attitudes towards the preservation of Malay local food in Johor.

### **2.6 Social norms (Higher female participation in working labour)**

Through the globalization and modernization wave, many women nowadays are currently participating in the labour working force alongside men who are known for their duties as breadwinners for their families. Indeed, the reason why many women actively participated in working labour is due to increasing household expenses and the high cost of living which they decide to work as they want to help their spouses in families financially (Hughes and store, 2006 as cited by Kamaruddin et al., 2012).

In Malaysia, over the last three-decade, women participation in the labour force have been seen to increase through the current development of global economics and export-oriented industrialization. (Kamaruddin et al., 2012). The social demographic has changed, and there is an increasing number of women in the workforce labour, and it has also affected the engagement between mothers and cooking practices. (Mohd et al, 2013). Due to their commitment to the job, working moms does not have enough time to practise or introduce traditional food to their children (Md. Sharif et al., 2016). Aside from that, Moison (2004) as cited by Kamaruddin et al., (2012), noted that a lot of working mothers have shown their frustration as they did not have time to organized proper meals due to their engagement with the workload, especially during working days. This has contributed to the lack of transferring traditional food knowledge to the young generation. Thus, mothers, one of the important roles must act the mediator in transferring the knowledge to the young generation and should take an initiative to attract them to get involved in cooking activities. Based on the opinion above, the following hypothesis is developed:

H2 There is a significant relationship between higher female participation in working labour among young generation social norms towards the preservation of Malay local food In Johor.

### **3. Methodology**

The sample for this study only including those experienced consumers who had experience with Malay local food in Johor. Hence, to gain the information on all independent variables including limited skills and knowledge, acculturation transmission and higher female participation in working labour, a set of questionnaires was formulating into five sections. The first section is involved demographic background of all respondents such as age, gender, race, educational level etc. In second section all the questions are reflecting on limited skills and knowledge as as nowadays they have insufficient knowledge on preparing and cooking Malay local food. Followed by third section, all the question is reflecting on Acculturation transmission as the researcher want to investigate the method of transmitting the knowledge from one generation towards one



generation. Next, forth section reflecting on Higher female participation in working labour as it could be a factor as woman's employment in working labour has become part of norms in our society. And lastly, fifth section all the questions are reflecting on the preservation of Malay local food in Johor.

#### 4. Results and Analyses

##### 4.1 Socio-demographic profile respondent

Table 1 displays the respondents' demographic background. Based on the results, the highest participation is among 21-25 (67.95%) years old which mostly were females with 107 respondents (76.45%) out of 140 total respondents. Majority of respondents were Malay with 135 respondents (96.4%) and whom mostly are students with 82 respondents (58.6%) with degree holder, 61 respondents (43.6%). Most of the respondents were born in Johor 78(55.7%) that staying at Johor with 73 respondents (52.1%).

**Table 4.1: Respondent's demographic profile**

Profile	Categories	Frequencies	Percentage
Age	18-20	35	25%
	21-25	81	57.95%
	26-30	14	10%
	31-40	10	7.1%
Gender	Male	33	23.6%
	Female	107	76.45%
Race	Malay	135	96.4%
	Indian	2	1.4%
	Chinese	2	1.4%
	Others	1	0.7%
Educational Level	Spm	22	15.7%
	Stpm	10	7.1%
	Matriculation	2	1.4%
	Pra Diploma	3	2.1%
	Diploma	40	28.6%
	Degree	61	43.6%
	Master	2	1.4%
Profession	Employed	35	25%
	Self-employed	6	4.3%
	Homemaker	4	2.9%
	Students	82	58.6%
	Unemployed	5	3.6%
	Looking for job	8	5.7%
Sector	Government	88	62.9%
	Private	46	32.9%
	Non-related (Missing)	6	4.3%
Born in Johor	No	78	55.7%
	Yes	62	44.3%
Stayed in Johor	No	73	52.1%
	Yes	67	47.9%



## 4.2 Validity and Reliability

Table below shows the results of the reliability test analysis. The number of items with limited skills and knowledge is 8 and the reliability results are 0.504 which is shown moderate reliability and is accepted. Next, Acculturation transmission has 6 items with the results of reliability is 0.864 which shows high reliability and it is acceptable. Followed with higher female participation in working labour has 3 numbers of the item with the result of reliability is 0.626 which shown moderate reliability and it is acceptable. Lastly, preservation of Malay local food in Johor with 5 items with a result of reliability is 0.862 which shows high reliability and it is acceptable.

**Table 4.2: Reliability Analysis Result**

Variable	Number of items measured	Reliability result
Limited skills and knowledge (IV)	8	0.504
Acculturation Transmission (IV)	6	0.864
Higher female participation in working labor (IV)	3	0.626
Preservation of Malay local food in Johor (DV)	5	0.862

## 4.3 Regression Analysis

### 4.3.1 Relationship between limited skills and knowledge among young generation attitude towards preservation of Malay Local Food in Johor

H1(a) There is a significantly positive relationship between limited skills and knowledge among the young generation attitude towards the preservation of Malay local food in Johor.

Table 4.3.1: F-test of Linear Regression for Limited skills and knowledge

Predictors *	Dependent variable= Preservation of Malay local food in Johor.
Limited skills and knowledge	0.905(Constant)
B (Unstandardized Constant)	0.670 (LSK)
R <sub>2</sub>	0.132
Adjusted R <sub>2</sub>	0.125
df (ANOVA)	1(Regression) 138(Residual)
F value (ANOVA)	20.912
Sig (p-value)	0.000

A simple linear regression was carried out to test if there is a significant relationship between limited skills and knowledge among the young generation's attitude towards the preservation of Malay local food in Johor. The result of regression indicated that the model explained 13.2% of the variance and that model was positively significant,  $F(1,138) = 20.912$ , ( $\beta_1$  0.670,  $p < .000$ ). The proportion of preservation of Malay local food in Johor =  $0.905 + 0.670(*LSK)$



Thus, the value significant p-value =  $0.000 < \alpha=0.05$ , the hypothesis can be accepted. Therefore, there is enough evidence to indicate that there is a significant relationship between limited skills and knowledge among the young generation attitude towards preservation of Malay local food in Johor. Based on  $\beta$  value, it proved that the increase in limited skills and knowledge among young generation attitude, the preservation of Malay local food in Johor also increase by 0.670. Therefore, the first sub-hypothesis H1 (a) is fully supported.

#### 4.3.2 Relationship between the Acculturation transmission among young generation attitude and preservation of Malay local food in Johor

H1(b) There is a significantly positive relationship between acculturation transmission among young generation attitudes towards the preservation of Malay local food in Johor.

Table 4.3.2: F-test of Linear Regression for Acculturation Transmission

Predictors *	Dependent variable= Preservation of Malay local food in Johor.
Acculturation Transmission	1.739(Constant)
B (Unstandardized Constant)	0.361 (AT)
$R^2$	0.055
Adjusted $R^2$	0.048
df (ANOVA)	1(Regression) 138(Residual)
F value (ANOVA)	8.048
Sig (p-value)	0.005

A simple linear regression was carried out to test if there is a significant relationship between acculturation transmission among the young generation's attitude towards the preservation of Malay local food in Johor. The result of regression indicated that the model explained 5.5% of the variance and that model was positively significant,  $F(1,138) = 8.048$ , ( $\beta_1 0.361$ ,  $p < .005$ ).

#### The proportion of preservation of Malay local food in Johor = $1.739 + 0.361(*AT)$

Thus, the value significant p-value =  $0.005 < \alpha=0.05$ , the hypothesis can be accepted. Therefore, there is enough evidence to indicate that there is a significantly positive relationship between Acculturation transmission among young generation attitudes towards preservation of Malay local food in Johor. Based on  $\beta$  value, it proved that the increase in acculturation among young generation attitude, the preservation of Malay local food in Johor also increase by 0.361. Therefore, the second sub-hypothesis H1 (b) strongly supported

#### 4.3.3 Relationship between higher female participation in working labour among young generation social norms towards preservation of Malay local food in Johor.

H2: There is no significant relationship between higher female participation in working labour among young generation social norms towards the preservation of Malay local food in Johor.



**Table 4.3.3: F-test of Linear Regression for Acculturation Transmission**

Predictors *	Dependent variable= Preservation of Malay local food in Johor.
Higher female participation in working labor	3.120(Constant)
B (Unstandardized Constant)	0.035 (WL)
R <sub>2</sub>	0.001
Adjusted R <sub>2</sub>	-0.007
df (ANOVA)	1(Regression) 138(Residual)
F value (ANOVA)	0.099
Sig (p-value)	0.753

A simple linear regression was carried out to test if there is a significant relationship between Higher female participation in working labour among young generation social norms towards the preservation of Malay local food in Johor. The result of regression indicated that the model explained 1% of the variance and that model was not statistically significant,  $F(1,138) = 0.099$ , ( $\beta_1 0.035$ ,  $p < 0.753$ ).

#### **The proportion of preservation of Malay local food in Johor = $3.120 + 0.035(*WL)$**

As the value significant p-value =  $0.753 < \alpha = 0.05$ , the hypothesis cannot be accepted. Therefore, there is enough evidence to indicate that there is no significant relationship between Higher female participation in working labour among young generation social norms towards preservation of Malay local food in Johor. Based on  $\beta$  value, it proved that the increase in higher female participation in working labour, the preservation of Malay local food in Johor also increase by 0.035. Therefore, the second hypothesis H2 (b) is strongly not supported.

### **5. Discussion and Conclusion**

Through the analysis of demographic respondents' profiles, the results revealed that most of the respondents are female with the range age of 21-25 years old. Most of them were Malay descendants and students. This is because most of the female respondents continue to pursue further studies until tertiary level education. Also, as they are mostly are students that familiar with an online-based survey as it is one of the tools that are mostly used in their education. Moreover, female respondents have more awareness towards Malay local food compared to men respondents which is why they are interested in becoming participants in this study.

Both limited skills and knowledge and acculturation transmission are found to have a positive and significant relationship with the preservation of Malay local food in Johor. This is because most of the younger generation have agreed that they can recognize and identify raw materials to use when cooking and preparing Malay local food as most of the younger generation agreed that they most love to help their family when preparing and cooking Malay local food at home. Furthermore, the younger generation agreed that they believe education contributes to their understanding of local Malay food where they can gain from social events, gatherings, and festivals which are the major contributor to their understanding of local Malay food. Additionally, the younger generation



also considers social interaction as part of acculturation transmission in learning about local food. Thus, the first hypothesis (H1), discovered that limited skills and knowledge and acculturation transmission significantly towards preservation of Malay local food in Johor. Both sub-hypotheses which are (H1a) and (H1b) have equivalent results, have unveiled both present significantly positive influence on the preservation of Malay local food in Johor.

However, the second hypothesis (H2) discovered that higher female participation in working labour is not significantly influenced towards preservation of Malay local food in Johor. This is due to the lack of data obtained in the survey to gain more information needed. Mostly, the young generation assumed that working time influences cooking practice at home which then makes them easier to find an alternative for family dinners which are convenient and frozen food as the best option for family dinner instead of home-cooked meals.

In conclusion, preserving Malay local food in Johor is indeed critically important to all Malaysian including governments, scholars, students, and public peoples. Preserving Malay local food may also be done by sharing and transferring the knowledge to improve the younger generation's knowledge, skills, and techniques, and it is an effective way to ensure the food will not become extinct soon in the future. Other than that, aside by transferring knowledge through one to one generation, many ways and incentives can be done to create awareness to younger people such as using media social platforms, by holding traditional or local Johor Malay food festivals, creating a museum specifically for traditional food in every state, etc. By providing constant incentive and ideas to preserve Malay local food, the younger generations need to learn and acquire knowledge in Malay ethnic food and hope the continuity will be rising the spirit of preserving Malay local and traditional food in the future

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## Sexuality Education and Its Implementation: The Views of Students and Teachers of Secondary Schools

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**Abstract:** *The views of students and teachers on school-based sexuality education (SBSE) play a crucial role in the implementation of SBSE. This study assessed students' and teachers' attitude towards SBSE and explored issues related to the implementation of SBSE. Data on secondary school students (N = 818, mean age = 15.3 year) and teachers (N = 135, mean age = 35.8 years) were collected via convenience sampling from three secondary schools. Participation was voluntary and anonymous. The data revealed that both students and teachers were supportive of SBSE. Teachers' considered the sexual topics included in the education program as important and felt comfortable in teaching the topics. They showed more positive appraisal of sexual topics than did students, though students also appraised the sexual topics positively and their ratings were related to that of the teachers'. Students and teachers believed that SBSE should start as early as in elementary school. Majority of the students expressed no strong preference of mixed gender to single gender classes, but teachers generally preferred classes of single gender. While only around one-fifth of the students considered teachers' training in SBSE adequate, less than one-tenth of the teachers considered themselves adequately trained to teach sexuality education. Both students and teachers perceived resources for SBSE as insufficient. Students' and teachers' attitude and appraisal were conducive to the promotion of SBSE. However, professional training for the teachers should be enhanced and supportive resources be provided for the effective implementation of sexuality education in the secondary schools.*

**Keywords:** Attitudes, school-based sexuality education, secondary school students, teachers

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### 1. Introduction

The AIDS Concern and the Family Planning Association of Hong Kong reported that more young people have engaged in sexual activity with inadequate information and insufficient support from school-based sexuality education (SBSE) (AIDS Concern, 2016; FPAHK, 2017). Apparently, Hong Kong adolescents are not receiving an adequate sexuality education. They turn to other sources for sexual information. It has been found that their sexual attitudes are mainly acquired through channels such as pornographic magazines or the Internet which might contain distorted sex knowledge and improper sexual attitudes (HKASERT, 2008). It has been shown that adolescents in Hong Kong are increasingly more liberal in their sexual attitudes (Ng, 2018). Majority (60% to 80%) of them accept pre-marital sex and they tend to engage in risky sexual behavior which are harmful to their sexual and psychological health. Most adolescents are



secondary school students and schools should shoulder the responsibility to disseminate accurate sexual information and to foster healthy sexual attitude among the adolescents.

Schools are considered ideal settings for implementing comprehensive sexuality education since school authorities can regulate many aspects of the learning environment to make it supportive and protective (UNESCO, 2009). The school setting also provides an environment where sexuality education can be delivered in developmentally relevant sequence over several grades, building knowledge successively (Gordon, 2008).

Sexuality education involves a learning process to acquire knowledge of cognitive, emotional, social, interactive, and physical aspects of sexuality. It aims to foster and enhance the capability of children and young people to make wise decisions regarding satisfactory interpersonal and sexual relationships and to make wise and respectful choices to maintain health in the emotional and physical domain (EEGSE, 2016).

## **2. Literature review**

### **2.1 Efficacy of sexuality education**

Weaver et al. (2005) found that young people in France, Australia, and the Netherlands where the government adopted a positive policy of sexuality education enjoyed better sexual health status than their counterparts in the US where more restricted policies were adopted.

Kirby (2008) showed that comprehensive sexuality education was effective in delaying the age of first sexual intercourse. It was also helpful in increasing the effective use of condoms and other contraceptive methods among sexually active adolescents. More recently, Goldfarb and Liberman (2021) conducted a systematic literature review of three decades of research on SBSE education programs. The review included a wide range of outcomes, e.g., appreciation of sexual diversity, prevention of intimate partner violence, prevention of child sexual abuse, improvement of social/emotional learning, media literacy, and development of healthy relationships. Substantial evidence of efficacy was provided and it was suggested that sexuality education should begin in elementary school.

### **2.2 Implementation of SBSE in Hong Kong**

Sexuality education in Hong Kong began in the 1950s largely through the works of the Family Planning Association. It focused on birth control and the promotion of various contraception methods. It was only in 1971 that the Education Department (now named Education Bureau) issued a memorandum to schools. The memorandum advised all schools to incorporate topics of sexuality education in the school curriculum. This was followed by subsequent guidelines published in 1986 and 1997 on specific topics, resources, and references aiding the implementation of sexuality education (Education Department, 1997). However, the guidelines have not been further revised since published 25 years ago.

The Education Bureau adopts a permeated approach or a cross-curricular approach to SBSE, where various sexual topics are included in relevant school subjects (e.g., moral and civic education) rather than treating sexuality education a separate subject. This approach is supplemented by topic-related extra-curricular activities such as talks, workshops, and exhibitions organized by



schools. However, individual schools have great flexibility to adapt the approach, content, and delivery mode in accordance with their background, mission, ethos, and resources. With no formal curriculum specifically implemented, schools lack of well-established programs of sexuality education. Furthermore, as Fok (2005) concluded in her examination of SBSE in Hong Kong, the importance of sexuality education has always been subsidiary because it is not an examination subject.

A survey conducted by the Hong Kong Government between 2012 and 2013 revealed that the major barriers to providing sexuality education were: (i) schools being too busy and had no time for sexuality education, (ii) low priority was given to sexuality education, (iii) sexuality was not treated as an explicit learning objective by the schools, (iii) schools lacked documented policy, and (v) teachers were not well equipped to teach sexuality education, and (vi) lack of learning and teaching resources (see Cheng, 2018). Apparently, with these barriers in the way, SBSE had not met with much success. Three years after the Government Survey, a survey conducted by the Hong Kong Association of Sexuality Educators, Researchers and Therapists (HKASERT, 2016) pointed out three major problems in sexuality education that were still encountered by many schools in Hong Kong. The three major problems were similar to three of the major barriers reported in the Government survey, which were (i) lack of time to conduct sexuality education due to very tight teaching schedules; (ii) lack of relevant teaching resources; and (iii) lack of competent sex educators and psychological support from the school.

Lo (2011) reported that students typically complained that the content of sexuality education was too narrow, as it focused more on the physiology of sex in human beings rather than on human sexuality. Besides, teachers were too conservative and tended to avoid detailed discussions of sexual topics. Students felt that teachers of sexuality education should receive advanced training and deliver sex topics more effectively.

Apparently, the implementation of SBSE in Hong Kong has not met with much success (Andres et al., 2021). Some barriers to its success have been identified. Nonetheless, factors related to attitudes of students and teachers towards SBSE have not been looked into empirically and systematically, notwithstanding the attitudes of students and teachers are important contributing factors to the effective implementation of SBSE.

### **2.3 Students' attitude towards SBSE**

Past research indicated that the effectiveness of SBSE depends largely on students' positive attitudes towards SBSE. In a study on adolescents' views on SBSE, Byers et al. (2003) found that students' perspectives on SBSE were different from that of their teachers'. Byers et al. asserted that to implement SBSE effectively, students' views should be taken into consideration. Hilton (2003) found that boys (aged 16 or over) had specific preferences regarding the characteristics of teachers who were teaching sexuality education. Hilton argued that the development of sexuality education programs should always collect data from young people's views which should be incorporated into the implementation of SBSE.

In a study conducted in Tanzania, Mkumbo (2012) found that a great majority of students (more than 80%) were supportive of school-based sex and relationship education. However, students



had different opinions on certain sexual topics to be included in SBSE. For example, they objected to the inclusion of such topics as homosexuality and masturbation to be included in the sexuality education program. It was found that students' attitudes towards sexual topics were also associated with certain demographic characteristics e.g., religious affiliation, age, and gender. Mkumbo concluded that students' attitudes should be considered in the implementation of sexuality education in schools.

More recently, based on their qualitative analysis of 32 students aged 18 to 19, Unis and Sällström (2020) found that students' views on sexual topics were different from those of the school authority that developed the sexuality education program. Unis and Sällström maintained that students' views should be taken into account in running sexuality education in school.

#### **2.4 Teachers' views on SBSE**

Besides the views of the students, teachers' views on the sexual topics in SBSE are also important factors to be considered. Milton (2003) found that teachers felt uncomfortable in teaching certain topics (e.g., wet dreams, masturbation, diverse relationships). Teachers also shows concerns about how to handle students' discomforts attending classes of sexuality education. Mathew et al. (2006) observed individual differences in willingness to engage in the implementation of HIV/AIDS education programs among high school teachers. It appears that assessment of how teachers feel about certain sexual topics is essential before engaging them in sexuality education.

As Pokhran et al. (2006) pointed out, teachers would be more willing to teach sexual topics that they considered important, knowledgeable, and comfortable teaching. Based on their qualitative study of in-depth interviews and focus group discussions, Oshi et al. (2004) found that secondary school teachers in Eastern Nigeria were not willing to teach HIV/AIDS sexuality education. Teachers felt uncomfortable teaching sexual topics related to cultural and social inhibition.

Mkumbo (2012) reported that even though teachers expressed commitment to teaching SBSE, they also experienced difficulties and discomforts in teaching some sexual topics (e.g., masturbation, homosexuality, etc.). Mkumbo argued that the effectiveness of sexuality education not only rested on positive attitudes towards SBSE but also on teachers' feelings about teaching specific sexual topics. The efficacy of sexuality education would be negatively affected if teachers were not knowledgeable and felt uncomfortable teaching the sexual topics included in the sexuality education curriculum. Hence, teachers', knowledge and comfort feelings regarding teaching sexual topics were important elements to be considered in the implementation of SBSE.

The above literature review suggested that students' and teachers' attitude towards SBSE as well as their appraisal of sexual topics included in SBSE are important factors that contribute to the efficacy of SBSE. Implementation of SBSE without consideration of students' and teachers' attitudes towards SBSE is hard to meet with much success. Both students' and teachers' opinions on issues of SBSE implementation should also be considered in order to promote SBSE effectively.



## 2.5 Objectives of this study

This study examined secondary school students' and teachers' attitudes towards SBSE and their appraisals on specific sexual topics included in SBSE. A comparison of students' and teachers' opinion on issues on SBSE implementation was made.

## 3. Methodology

### 3.1 Questionnaire design

Two questionnaires were designed respectively for students and teachers. The two questionnaires were similar in content except for items specifically applicable to respective respondents. For example, students' information on education was classified into grade levels, whereas teachers' information on education included academic degree awarded, teaching experience in SBSE, training in SBSE, etc.

The questionnaires consist of three sections. Section I was a brief introduction of the purpose and significance of the study and students/teachers are invited to participate in the study. Section II consisted of items of sociodemographic characteristics. Section III included the measuring instruments of Attitude towards School-based Sexuality Education, Appraisal of Sexual Topics, and items on Implementation of SBSE.

#### Attitude towards SBSE (A-SBSE)

The A-SBSE consists of 8 items (e.g., "Sexuality education in school can foster correct sexual attitudes among children and adolescents", "Sexuality education should be implemented in schools"). Respondents are asked to indicate their views on a 4-point scale (1 = strongly disagree, 4 = strongly agree). Possible scores range from 8 to 32. The conceptual mid-point of A-SBSE is 20. High scores (i.e., > 20) represent positive attitude towards SBSE. The scale had been used to assess secondary school students' attitudes towards SBSE and was found to be of satisfactory reliability (Cronbach's  $\alpha = .91$ ) (Ng et al., 2019). Construct validity was demonstrated by its relationship with teachers' ratings of importance for teaching sexual topics ( $r = .41$ ).

#### Appraisal of Sexual Topics (AOST)

The AOST measures how students and teachers appraised 22 sexual topics included in the SBSE program in Hong Kong secondary schools. The topics encompassed five areas of sexuality, i.e., Human development (e.g., reproductive system, puberty, sexual identity, self-concept, etc.), Health and behavior (e.g., sexual drives, contraception, unwanted pregnancy, etc.), Interpersonal relationships (basic values, personal skills, friendships), Marriage and family (e.g., the meaning of family, marriage, parenting), and Society and culture (e.g., gender role, sex and mass media, sex and law, etc.).

Students first indicate their rating of need for learning and then rate their comfort in learning each of the 22 sexual topics on a 5-point scale (1 = not at all, 2 = a little, 3 = average, 4 = very much, 5 = extremely). A rating of 3 is the mid-point of the rating scales. Teachers are asked to rate the importance for teaching and then the comfort in teaching each topic on a similar 5-point scale.

Possible total scores of ASOT subscales range from 22 to 110, with 66 as the conceptual mid-point. The AOST was validated on a sample of 572 secondary school students and the subscale of



need for learning and comfort in learning were found to be of satisfactory reliability (Cronbach's  $\alpha = .94$  and  $.96$  respectively). Factorial validity was examined by principal component analysis, which showed that the need for learning and comfort in learning were two relatively independent dimensions. Construct validity was supported by the positive correlation of need for learning and comfort in learning ( $r = .30, p < .01$ ). Reliability of teachers' rating of importance and comfort is the same as those found among students, with Cronbach's  $\alpha = .94$  and  $.96$  respectively. The significant correlation of teachers' rating of importance for teaching and comfort in teaching ( $r = .29, p < .01$ ) provides supportive evidence for the construct validity of teachers' version of AOST. Both the rating of importance for teaching and comfort in teaching were positively related to A-SBSE ( $r = .41$  and  $.22$  respectively), which further demonstrated the validity of AOST.

#### Items on Implementation of SBSE

Seven and nine items were include in Section III of the students' and teachers' questionnaire respectively. Five close-ended items common to students and teachers were analyzed in this study. These items gathered information on: (i) appropriate years of education to introduce SBSE, (ii) opinion on classes of mixed genders vs. single gender, (iii) matching of gender between students and teachers, (iv) adequacy of teachers' training in SBSE, and (v) adequacy of resources provided.

### 3.2 Data collection and participants

Data were collected via convenience sampling from three secondary schools. Participation in the study was voluntary and anonymous. Informed consent of students' parents was solicited before questionnaires were administered in groups after class. Teachers' questionnaires were distributed with an invitation letter explaining the purpose and significance of the study. Teachers' participation was also voluntary and anonymous. Completed questionnaires of the teachers were returned through mail. This study followed the guideline of the Research Ethics Committee of the institute to which the first two authors were affiliated. Approval of conducting the study was approval by the Committee.

A total of 818 secondary school students (Grade 7 to Grade 12, 70.6% were males) were collected. The mean age of students was 15.3 years ( $SD = 1.6$ ). Data on 135 teachers (mean age = 35.8,  $SD = 8.1$ , 40% were females) were gathered. About 40% of the teachers graduated with a Bachelor's degree, and the rest hold a master's degree.

## 4. Results and Discussions

### 4.1 Students' and teachers attitude and appraisal

Table 1 and Table 2 present a general description of students' and teachers' perspectives on sexuality education. Test scores on attitude and appraisal are classified into four categories. Test scores  $\leq 50\%$ , 51% - 59%, 60% - 69%, and  $\geq 70\%$  of the maximum total possible scores were respectively classified as very low, low, high, and very high. Both students and teachers were overwhelmingly positive in attitude towards SBSE. Merely 6.9% of students obtained low to very low scores on A-SBSE and 0.8% of the teachers' scores were in the category of low or very low.



**Table 1: Students' and teachers' scores on A-SBSE and AOST**

	Very Low %	Low %	High %	Very High %	M (SD)	Mid-point
Students:						
A-SBSE	4.8	2.1%	10.4	82.7	24.4 (4.2)	20
Need for learning	16.7	13.5	31.8	38.0	71.7 (19.3)	66
Comfort in learning	13.5	13.4	24.3	48.8	75.4 (19.4)	66
Teachers:						
A-SBSE	0	0.8	7.4	91.8	26.5 (3.5)	20
Importance of learning	0	5.2	17.2	77.6	85.7 (12.5)	66
Comfort in teaching	1.6	4.7	17.8	76.0	86.4 (13.2)	66

**Table 2: Rating of Students and Teachers on appraisal of sexual topics**

	Range of rating	Mean (SD)	Conceptual mid-point
Students:			
Need for learning	2.9 – 3.5	3.2 (0.3)	3.0
Comfort in learning	3.2 – 3.8	3.4 (0.2)	3.0
Teacher:			
Importance for teaching	3.4 – 4.3	3.9 (0.3)	3.0
Comfort in teaching	3.1 – 4.3	3.9 (0.3)	3.0
	Range of rating	Mean (SD)	Conceptual mid-point
Students:			
Need for learning	2.9 – 3.5	3.2 (0.3)	3.0
Comfort in learning	3.2 – 3.8	3.4 (0.2)	3.0
Teacher:			
Importance for teaching	3.4 – 4.3	3.9 (0.3)	3.0
Comfort in teaching	3.1 – 4.3	3.9 (0.3)	3.0

The means rating of both the students and teachers were above the conceptual mid-point. Teachers' attitude towards SBSE and their appraisal of sexual topics were significantly more positive than students' (see Table 3). This findings may reflect the effects of age and education on attitudes towards sexuality education. Onwuezobe and Ekanem (2009) conducted a study on 320 secondary school teachers with median age of 37 years. It was found that older teachers (aged 45 to 49 years) were more willing to teach sexuality education than teachers who were younger. The study also indicated that teachers with higher educational qualification showed more positive attitudes towards sexuality education than teachers with lower qualification.

**Table 3: Comparison of scores on A-SBSE and AOST between students and teachers**

	Very Low %	Low %	High %	Very High %	$\chi^2$
Students' A-SBSE	4.8	2.1	10.4	82.7	



Teachers' A-SBSE	0	0.8	7.4	91.8	8.58*
Need for learning	16.7	13.5	31.8	38.0	78.23***
Importance of teaching	0	5.2	17.2	77.6	
Comfort in learning	13.5	13.4	24.3	48.8	37.89***
Comfort in teaching	1.6	4.7	17.8	76.0	

It is interesting to note that the ranking of students' need for learning and teachers' ranking of importance for teaching were highly correlated (see Table 4). Students' comforts in learning and teachers comforts in teaching were very highly related ( $r = .92$ ,  $p < .001$ ). On the other hand, students' need for learning was not significantly predictable of their comfort in learning.

**Table 4: Rank order correlation of students' and teachers' appraisal of sexual topics**

	Comfort in learning	Importance for teaching	Comfort in teaching
Need for learning	.29	.68***	.26
Comfort in learning		.51*	.92***
Importance for teaching			.40

Students' need for learning a sexual topic may not necessarily implicate that they feel comfortable in learning the topics ( $r = .29$ , not significant), nor were teachers feel more comfortable in teaching topic students were interested ( $r = .26$ , not significant). Similarly, teachers' ranking of importance for teaching and comfort in teaching were not significantly correlated ( $r = .40$ , not significant). Perhaps, teachers' comfort in teaching depends on how knowledgeable they are regarding the topics they are teaching. Previous studies indicated that teachers' comfort feelings in teaching were positively related to teachers' levels of knowledge about the topics (Pokhran et al., 2006). On the other hand, teachers would feel uncomfortable in teaching topics that are associated with cultural and social inhibition (Oshi et al., 2004).

#### 4.2 Starting of SBSE

Students showed different views from their teachers regarding when SBSE should be introduced. While 43.7% of the teachers considered SBSE be introduced in Primary 1 to Primary 3 or even as early as in kindergarten, only 18.7% of the students indicated that sexuality education should start in early schooling (see Table 5). On the other hand, nearly a third of the students considered it appropriate to start SBSE in secondary school, only one tenth of the teachers agreed that sexuality education begins in secondary. Generally, both students and teachers were positive about introducing sexuality education at the primary school level, but teachers tended to think it is appropriate to start sexuality education earlier than what would be considered by students.



**Table 5: Appropriate school year for implementing SBSE**

	Kindergarten	P1-P3 Grade 1 - 3	P4-P6 Grade 4 - 6	S1-S3 Grade 7 - 9	S4-S6 Grade 10 - 12	$\chi^2$
	N (%)	N (%)	N (%)	N (%)	N (%)	51.25**
Students	82 (10.1)	70 (8.6)	415 (50.9)	185 (22.7)	63 (7.7)	
Teachers	31 (23.0)	28 (20.7)	62 (45.9)	13 (9.6)	1 (0.8)	

Note. K = kindergarten, P = primary, S = secondary, \*\*\*p < .001

Many sexuality educators even proclaim that sexuality education should start among the toddlers when they are 13 to 24 months old (AboutKidsHealth, 2019). It was thought that toddlers are conscious about their body, including touching their genitals when naked. The ability of self-awareness is a unique dimension of early development (Brownell et al., 2007). Toddlers may ask questions about their body and children are curious about pregnancy and childbirth. Parents should be prepared to answer toddlers' questions appropriately. A recent study on child sexual abuse (Boey & Ng, 2021) found that the greatest proportion of child sexual abuse incidents (33.3%) happened when the victims were at 4 to 6 years old. Thus, it is appropriate to start sexuality education at least as early as in Kindergarten to teach children how to protect themselves from being sexually abused.

#### 4.4 Mixed vs. single gender Classes

Single gender classes may tailored programs for individual gender, but students may not have the opportunity to learn expressing themselves in mixed gender situation. Mixed gender classes provide that learning opportunity. Nonetheless, more than half (58.5%) of the students thought it did not matter whether to have mixed or single gender classes (see Table 6). On the other hand, more than half (53.3%) of the teachers preferred to have single gender classes for sexuality education, which is easier to meet the learning needs of individual gender.

**Table 6: Preference of mixed vs. single gender classes**

	Mixed gender	Single gender	Doesn't matter	$\chi^2$
	N (%)	N (%)	N (%)	100.28***
Students	207 (26.1)	122 (15.4)	463 (58.5)	
Teachers	19 (14.1)	72 (53.3)	44 (32.6)	

\*\*\*p < .001

Majority of the students did not mind if their teachers were of the same to or different from their own gender. Though teachers took a similar view regarding gender of the students, they did showed a preference to have students of the same gender as theirs (see Table 7). With students of the same gender, teachers may have the benefit of teaching sexual topics based on their own personal experience. It may be easier for male teachers to discuss wet dreams with boys and female teacher to talk about menstruation with girls.



**Table 7: Preference of same vs. different gender between students and teachers**

	Same gender	Different gender	Doesn't matter	$\chi^2$
	N (%)	N (%)	N (%)	
Students	102 (13.0)	147 (18.8)	534 (68.2)	56.38***
Teachers	31(47.0)	2 (3.0)	33 (50.0)	

\*\*\*p < .001

#### 4.5 Training in SBSE

As table 8 shows, about half (47.0%) of the students thought that their teachers had adequate training to teach SBSE. However, less than one tenth (8.2%) of teachers considered their training was adequate. Apparently, there was a discrepancy between teachers' self-perception and how they were perceived by their students. Notwithstanding the discrepancy, that teachers need to be better trained in teaching SBSE appeared to be implicated by the data. To implement SBSE effectively, professional training should be promoted among teachers. In-service training may be organized so that teachers are better equipped in teaching SBSE. In this regards, parents may also need to receive training in sexuality education, if sexuality education is to start in toddlers.

**Table 8: Perception teachers' training in sexuality education**

	Highly inadequate	Inadequate	Average	Adequate	Highly adequate	$\chi^2$
	N (%)	N (%)	N (%)	N (%)	N (%)	
Students	63 (7.8%)	47 (5.8%)	320 (39.4%)	284 (34.9%)	98 (12.1%)	180.00***
Teachers	26 (19.4%)	52 (38.8%)	45 (33.6%)	11 (8.2%)	0 (0%)	

\*\*\*p < .001

#### 4.6 Resources for SBSE

Table 9 shows that less than a third (28%) of the students considered resources supporting SBSE were adequate. The proportion of teachers regarding resources as adequate was less than 10% and none of them thought resources were highly adequate.

**Table 9: Resources for the implementation of SBSE**

	Highly inadequate	Inadequate	Average	Adequate	Highly adequate	$\chi^2$
	N (%)	N (%)	N (%)	N (%)	N (%)	
Students	123 (15.0%)	159 (19.4%)	308 (37.6%)	200 (24.4%)	29 (3.6%)	65.81***
Teachers	21 (15.6%)	67 (49.6%)	34 (25.2%)	13 (9.6%)	0 (0%)	

\*\*\*p < .001

Greater proportion of teacher than students considered resources provided by school were inadequate (65.2% vs. 34.4%). This is understandable as teachers were more directly experienced the shortage of teaching resources than did students. Students may be less involved with the administration office that handles resources of the school. Albeit the different perception between students and teachers, the findings supports previous reports that two major barriers to effective



implementation of SBSE were: (i) teachers not well trained to teach sexuality education, and (ii) lack of learning and teaching resources (see Cheng, 2018; HKASERT, 2016).

#### **4.7 Limitations of the study**

While convenience sampling was adopted in this study for its ease of use and availability of data, it does impose certain limits on the generalization of the results. A sample recruited via population-based sampling may secure a more representative sample that allows for generalization of findings to other secondary schools.

One may also take note that A-SBSE is a global attitudinal measure without detailed specification of the content of sexuality education. Attitude measured with reference to different contents may vary. For example, individuals with and without religious affiliation may react differently to such items as “effective use of condom”, “homosexuality”, and issues on “illegal abortion” and “contraception method”. Attitude towards SBSE is likely dependent on the content or orientation of the education program. Future studies are needed to clarify the issue empirically.

#### **4.8 Conclusion**

Both students and teachers were overwhelmingly supportive of SBSE. Their positive appraisal of sexual topics was very encouraging. Positive attitude and appraisal facilitate the implementation of SBSE. Majority of students and teachers were of the opinion that SBSE should start at elementary school. More than one-fifth of the teachers thought it was appropriate to introduce SBSE in kindergarten. While most students expressed no strong preference of mixed gender to single gender classes, more than half of the teachers preferred classes of single gender. Whether or not students and teacher are of the same gender was not an issue of concern.

There was a very slight tendency that students considered teachers’ training in SBSE was adequate. By contrast, majority of the teachers considered their trainings in SBSE were far from adequate. Insufficient of resources were perceived as barrier to effective implementation of SBSE. Apparently, professional training for teachers should be organized and supportive resources be provided for the promotion of sexuality education in the secondary schools.

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## Teachers' Attitudes and Intention Regarding Inclusive Practice in Hong Kong Higher Education

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**Abstract:** *The policy of inclusive education (IE) aims to build an inclusive society that provides educational opportunities for all students regardless of learning disabilities or special educational needs. However, the outcomes of IE reported in the literature were rather inconsistent, with no solid evidence to confirm the effectiveness of IE. Among the many factors associated with the effectiveness of IE, teachers' attitudes and intention regarding teaching inclusive classrooms play an important role. Previous studies on IE were conducted mainly in primary and secondary schools. This study examined factors associated with teachers' attitudes and intention about teaching IE in a higher education setting. A questionnaire containing items on demographic characteristics and instruments measuring IE was designed for data collection. The questionnaire was put online in an institution of higher education and teachers were invited to participate in the study. A total of 107 teachers (mean age = 49.9 years, SD = 11.4, 49.5% were males) responded. The data revealed that teachers hold positive attitudes towards IE and they showed fairly high intention to engage in inclusive practice, which provides a fertile ground for the implementation of IE. However, teachers' self-evaluation of confidence, experience, knowledge, and training regarding inclusive practice were rather poor, suggesting that they were not well-prepared for teaching IE. Poor self-evaluation was associated with low intention to teach inclusive classrooms. It constituted a potential barrier to the effective implementation of IE. In-service training is recommended to prepare teachers for their engagement in inclusive practice.*

**Keywords:** Attitudes, higher education, inclusive education, intention, teachers

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### 1. Introduction

Inclusive education (IE) responds to the diversity in learning needs by increasing the participation of students with special educational needs in regular classrooms or in the mainstream school system. It promotes respect for individual differences and provides an equal learning opportunity for all individuals. IE seeks to ensure equity in education and fosters high-quality common learning environments for all students. According to UNESCO's Salamanca Statement, regular classrooms are the most effective means of reducing discriminatory attitudes (UNESCO, 2015). It creates welcoming communities and builds an inclusive society to achieve education for all students. It reaches out to all learners, respects the diverse needs of individuals, and their differences in abilities and characteristics, with an aim to reduce all forms of discrimination in the learning environment



Broadly defined, IE refers to all students, regardless of special needs, gender, ethnicity, culture, or social background, have their rights to participate in common learning activities within the ordinary school system. As pointed out by Moriña (2017),

*“Inclusive education can be defined as an educational approach proposing schools in which all students can participated and all are treated like valuable school members. It is an educational philosophy and practice that aims to improve the learning and active participation of all the students in a common educational context” (p. 3)*

Narrowly defined, IE means students with special educational needs (SEN) are entitled to study in a normal school setting (Haug, 2017). The definition of IE is highly value-driven. In a study on equal learning opportunities, Sin et al. (2012) listed a set of five core values of IE. First, all students with and without SEN should be provided with educational opportunities. Second, learning in a regular class is a basic human right of a student with SEN. Third, IE is a representation of civilization. Fourth, IE is an expression of social justice. Fifth, rejecting students with SEN to participate in regular classes signifies a discriminatory practice.

The above core values of IE and the philosophical basis of IE are easy to accept but difficult to deny or reject (Haug, 2017). Some advocators of IE (e.g., Booth, 1996; Rustemier, 2002) contended that research is irrelevant to the implementation of IE and there is no need for empirical support for IE. However, Sin et al. (2012) found that stakeholders of IE (school principals, teachers, students and their parents, social workers, etc.) expressed different opinions about the core values of IE. For example, about a quarter of them disagreed with the view that schools should provide equal educational opportunities to all students regardless of disabilities. They did not think that IE represents social justice nor is it a symbol of civilization. Over a half of the stakeholders did not consider excluding students with SEN a discriminatory practice. Investigators who uphold the principles of evidence-based research conducted research to evaluate the outcomes of IE. Thus far, the meta-analyses on the outcomes of IE failed to provide solid evidence for its effectiveness of IE.

## **2. Literature Review**

### **2.1 Outcomes of IE**

In a review of 10 studies on secondary school students with mild disabilities, Blankenship et al. (2005) included studies of different methodologies to widen the review's scope. No consistent evidence for the efficacy of IE was found. The review concluded that more studies should be conducted to gather reliable information on the efficacy of IE. A review by Lindsay (2007) focused on studies that adopted evidence-based outcomes measures of school performance, self-concept, and social well-being. Of the 1373 studies published from 2001 to 2005 in renowned academic journals, only 1% of the studies adopted objective evidence-based measures. Again, the review revealed no clear endorsement for the efficacy of IE.

On the other hand, negative findings on the outcomes of IE were reported by Zeleke (2004) and Skrypiec et al. (2016). Students with SEN were found to be lower in academic self-concept and they felt more negative about school life than their peers without SEN. Heward (2009) reported



that students with SEN were low in academic achievement and showed poor academic self-concept. Heward's findings were supported by Wong-Ratcliff and Ho (2011) in their review of social and affective outcomes of IE.

## 2.2 Attitudes towards IE

Past research revealed that teachers' attitudes towards IE directly influenced students' learning and development. Teachers adopting a positive attitude towards IE are more capable of using educational strategies in inclusive classes. They feel competent in meeting the learning needs of students with SEN. Teachers with a positive attitude towards IE are willing to adapt teaching materials for students with SEN (Campbell et al., 2003). However, not many teachers hold a positive attitude towards IE.

McLeskey and Waldron (2006) pointed out that much of the lack of progress in IE was due to the negative attitude of teachers who failed to change the classrooms to be more accommodating for students with SEN. Indeed, successful IE not only involves school reform, but also teachers' positive attitudes towards IE. Forlin et al. (2010) contended that teachers need a positive disposition towards IE because they serve as models for acceptance of IE. Teachers' positive attitude would foster greater approval for students in their classes. Indeed, many researchers pointed out that teachers' attitudes are essential for the success of including all students in inclusive classrooms (Avramidis & Norwich, 2002; de Boer et al., 2011; Yada & Savolainen, 2017).

Among the many factors that affect the effectiveness of IE, teachers' attitudes towards IE were commonly reported in the empirical literature (e.g., Park & Chitiyo, 2011; Secer, 2010; Sucuoglu, 2004). However, teachers' attitudes towards IE are mixed. Several studies reported teachers' negative attitudes towards IE (Avramidis & Kaylva, 2007; Rakap & Kaczmarck, 2010). Other studies found that teachers were relatively neutral in their attitudes towards IE. They neither held a positive nor a negative attitude towards IE (Engstrand & Roll-Petersson, 2012; Sari et al., 2009; Sucuoglu et al., 2013).

## 2.3 Intention to engage in IE

Apart from attitudes towards IE, the efficacy of IE also depends largely on how well teachers are prepared to teach IE. In other words, it relied on teachers' intention to teach in inclusive classrooms. Teachers' intention is closely related to teachers' confidence, skills, and knowledge regarding teaching inclusive classrooms.

Research in social psychology showed that attitude and behavior are correlated, but with a correlation of less than .30 (see Armitage & Conner, 2001), which accounts for less than 10% of the variance in behavior. On the other hand, intention to engage in behaviors is a better predictor of behavior, with correlations ranging from .47 (Armitage & Conner, 2001) to .62 (van den Putte, 1993). Hence, teachers' intention to engage in inclusive practice and its associated factors are research areas worth pursuing.

In a study of 841 teachers from primary and secondary schools in Hong Kong, Yan and Sin (2014) found that teachers' attitude towards IE and their professional training were predictive of intention to implement inclusive practice. Many other factors, such as teachers' attitude towards inclusive



education, the social pressure to carry out IE, the confidence and professional training regarding IE were found to exert significant influence on teachers' intention to implement IE.

Similar findings were reported by Gilor and Katz (2018), who found that attitudes toward inclusion and a sense of competence in teaching inclusive classes explained most of the variance in the willingness to engage in inclusive teaching. Aiello and Sharma (2018) found that teachers with lower concerns (i.e., less worries about the negative effects of IE), higher levels of teaching efficacy, and a more favorable attitude towards IE were more likely to have higher intentions to engage in inclusive practices. Miesera et al. (2019) found that less worries about IE were related to positive attitudes toward IE, greater self-efficacy, and stronger intention to teach inclusive classes. In a study of 763 mainstream school teachers from several cities in Turkey (Kisbu-Sakarya & Doenyas, 2021), several factors associated with teachers' willingness to teach inclusive classes and intention to implement special education techniques were identified. These factors included special education training, practice in IE, development of strategies for the management of developmental disabilities, and evidence-based special education applications. Besides, the study also reported that attitudes toward IE was predictive of willingness to teach inclusive classes and intention to use special education techniques.

#### **2.4. Effects of personal characteristics**

As we have shown, mixed results were reported in studies of teachers' attitudes towards IE. Avramidis and Norwich (2002) identified three groups of factors that might account for the mixed results, viz.: (a) teacher-related factors (e.g., demographic and professional characteristics, perceived efficacy in teaching IE classes); (b) student-related factors (e.g., nature, severity, and type of disabilities); and (c) environment-related factors (availability of resources, staff supports, and supports of teaching materials). Factors related to teachers are relevant to the present study. Specifically, teachers' personal characteristics are found to be associated with their attitudes towards IE.

Female teachers tended to hold more positive attitudes towards IE than did male teachers (Avramidis et al., 2000; Boyle et al., 2013). However, it was also reported that male teachers showed more positive attitudes than did their female counterparts (Dorji et al., 2019). Mixed results were also reported by Avramidis and Norwich (2002) and Monsen et al. (2014) who found that gender did not play a role in attitudes towards IE.

Empirical literature revealed that age and teaching experience are important determining factors. Younger (aged 20 to 30 years) or inexperienced teachers showed more positive attitudes than teachers over 40 years old or with more years of teaching experience (Savolainen et al., 2012; Yada & Savolainen; 2017). Yet, it was also found that the effect of age and teaching experience was rather weak (Savolainen et al., 2012). More consistent finding was about teaching experience specifically related to inclusive practice. Experience of IE teaching was positively related to attitudes towards IE (Avramidis et al., 2002; Leatherman & Niemeier, 2005).

Contact with people with disabilities is also an influential factor of attitude towards IE. Previous studies showed that close contact with people with disabilities and experience of teaching students



with SEN was associated with positive attitudes towards IE (Avramidis et al., 2002; Peebles & Mendaglio, 2014; Song et al., 2019).

The above literature review suggests that the intention to engage in IE is related to positive attitude toward IE. Attitudes towards IE is in turn associated with gender and teaching experience, but mixed results are reported. Personal characteristics appears to play a role in the intention to engage in inclusive practice. A cross-validation study is indeed needed to examine findings reported in Western studies.

## 2.5 Objectives of the study

This study aimed to explore teachers' intention to engage in inclusive practice and examined if intentions were associated with attitude towards inclusive education. The effects of demographic characteristics (e.g., gender, age, education, etc.) and professional characteristics (self-evaluation of confidence, teaching experience, knowledge, and training regarding inclusive education) on the intention to engage in inclusive practice were also explored.

## 3. Materials and Methods

### 3.1 Questionnaire design

A questionnaire which consists of three sections was designed for data collection. Section I of the questionnaire explains the purpose and significance of the study. Section II are items on demographic characteristics. This section also includes four items of self-evaluation regarding inclusive practice, viz., self-confidence, teaching experience, knowledge, and adequacy of training. Section III contained the measuring instruments of Attitude towards Inclusive Education (ATIE) and Intention to Teach in Inclusive Classrooms (ITIC).

Attitudes towards Inclusive Education (*ATIE*)

This scale was developed by Sharma and Jacobs (2016). It consists of 10 items which are based on 10 most frequent themes appeared in the literature of IE. Each theme is written as a statement (e.g. "All students can learn in inclusive classrooms if their teachers are willing to adapt the curriculum", "All students regardless of their ability should be taught in regular classrooms"). According to the original ATIE, respondents are asked to indicate their views on a 7-point Likert scale (1 = strongly disagree, 4 = undecided, 7 = strongly agree). To be consistent with the response format of other scale in our questionnaire, a 6-point scale (with the option of "undecided" removed) is used for the rating.

Factor analytical studies revealed two factors of the *ATIE*, which represented beliefs and feelings of attitudes towards IE. Two negative items which did not load on either of the two factors were suggested to be deleted. The 8-item version of *ATIE* was adopted in this study. Possible scores range from 8 to 48, with higher scores represent more positive attitudes towards IE. The conceptual mid-point *ATIE* is 28. Scores > 28 indicates positive attitude towards IE.

Based on data gathered from Australia, India, Canada, and Hong Kong, Cronbach's  $\alpha$  of *ATIE* was found to be .87, indicating that it is of good reliability. The scale was also found to be predictive of inclusive practice intention, with  $\beta$  value of 0.17 ( $p < .001$ ) and a medium effect size of  $sr^2 =$



.15 (.02 = small, .13 = medium, .26 = large). Hence, the measure of *ATIE* is considered a reliable and valid measuring scale which is applicable to teachers in Hong Kong.

### **Intention to Teach in Inclusive Classroom (ITIC)**

The *ITIC* consists of seven items that measure educators' likelihood to be involved in activities of inclusive practice. Items of this scale are identified based on the same literature review undertaken to develop the *ATIE* (Sharman & Jacob, 2016). However, items of this scale are more on actions than on belief. *ITIC* consists of seven items which is divided into two subscales. The first subscale concerns with the change of situation (e.g., "Change the curriculum to meet the learning needs of a student with learning difficulty enrolled in the class") and the second subscale is about consulting others for further self-improvements (e.g., "Consult with colleagues to identify possible ways to assist a struggling student"). Respondents are to rate their likelihood to engage in teaching practice described by the items on a 6-point scale (1 = extremely unlikely, 6 = extremely likely). Scores of *ITIC* range from 7 to 42. The neutral mid-point is 24.5. A score  $\geq 25$  represents an intention to teach in inclusive classrooms.

The *ITIC* has been validated by a group of teachers in higher education (Ng & Boey, 2021). Reliability (Cronbach's  $\alpha$ ) of the whole scale of *ITIC* and its two subscales (Intent to change and intention to consult) were .93, .82, and .90 respectively. The two subscales were also highly correlation ( $r = .86$ ) and both were significantly related to a measure of Core Values of Inclusive Education ( $r = .31$  and  $.30$ ,  $p < .05$ ), which provides supportive evidence for the construct validity of *ITIC*.

### **Self-evaluation regarding IE**

Teachers' self-evaluation on various aspects of IE (confidence, knowledge, experience, and training) is measured by a single item on a 5-point scale or a 6 point scale. Self-confidence in IE, knowledge about IE policy, and experience in teaching IE are rated on a 5-point scale (e.g., 1 = very low, 3 = average, 5 = very high; 1 = nil, 3 = moderate, 5 = very much). Perceive adequacy of training is measured on a 6 point scale (1 = very inadequate, 3 = slightly inadequate, 4 = slightly adequate, 6 = very adequate). Reliability of self-evaluation on teachers was reported to be satisfactory (Cronbach's  $\alpha = .71$ ) (Ng & Boey, 2021). Data of this study confirmed that the measure of self-evaluation was highly satisfactory (Cronbach's  $\alpha = .81$ ).

### **3.2 Data collection and participants**

This study was approved by the Research and Ethics Committee with which the first two authors are affiliated. The questionnaire was put online and teachers were invited to participate. Participation was voluntary and anonymous. Teachers were requested to complete the online questionnaire within 10 days. Two weeks after the questionnaire was put online, an email was sent out to remind teachers to complete the questionnaire.

A total of 107 teachers (mean age = 49.9 years,  $SD = 11.4$ , 49.5% were males) responded to the online survey. While more than half (54.2%) of the respondents had a doctoral degree or a postdoctoral qualification, the rest hold a Master degree. Nearly half (49.5%) of the teachers believed in Christianity (Catholics or Protestants), 47.7% reported no religious affiliation, the rest were either Buddhism or Islamic. Only 15.9% of the teachers had general teaching experience



for more than 20 years, whereas 42.1% reported less than 10 years of teaching experience. The rest of the participants had been teaching for 10 to 20 years.

## 4. Results and Discussions

### 4.1 Effects of demographic characteristics

Findings of this study on demographic characteristics were different from previous studies reported in the West in two aspects. First, we found no gender difference in attitudes towards IE and intention to teach inclusive classrooms. Second, we observed that older teachers (aged 50 or above) scored significantly higher on intention to teach inclusive classroom than younger teachers (aged 49 or below) [ $F(1, 105) = 13.11, p < .001$ ]. No other demographic characteristics were significantly related to intention to teach or attitudes towards IE.

### 4.2 Attitudes towards IE

To present a description of teachers' attitudes towards IE and their intention to engage in inclusive practice, test scores < 50%, 50 to 59%, 60 to 69%, and  $\geq$  70% are classified as very low, low, high, and very high respectively (see Table 1). Table 1 shows that teachers hold a positive attitudes towards IE. Greater proportion of teachers believed in the benefit of IE for students with SEN. Teachers also felt good about teaching IE classes. The mean scores of the two subscales of ATIE were above the conceptual mid-points. The teachers' positive attitudes towards IE is conducive to effective implementation of IE.

**Table 1: Distribution of Test Scores on Attitudes towards Inclusive Education**

	Very low %	Low %	High %	Very high %	M (SD)	Midpoint
Belief	23.4	14.9	22.4	39.3	15.21 (4.75)	14
Feeling	11.2	22.4	22.4	43.9	16.21 (4.15)	14
Total	17.8	14.9	25.2	42.1	31.41 (8.30)	28

### 4.3 Intention to teach inclusive classrooms

The distribution of the test scores on intention to teach inclusive classrooms is similar to that of attitudes towards inclusion. Table 2 shows that a great proportion (77.6%) of the teachers expressed high intention to teach inclusive classes.

**Table 2: Distribution of Test Scores on Intention to Teach in Inclusive Classroom**

	Very low %	Low %	High %	Very high %	M (SD)	Midpoint
Change	14.0	16.8	34.6	34.6	11.51 (2.93)	10.5
Consult	8.4	13.1	32.7	45.8	16.41 (3.60)	14.0
Total	9.3	13.1	31.8	45.8	27.93 (6.16)	24.5

Teachers were willing to accommodate teaching materials and were happy to consult colleagues or professionals on methods to help students with SEN. The relatively high intention to teach inclusive classrooms the teachers facilitate the implementation of IE in higher education.



However, teachers' self-evaluation of self-confidence, experience, knowledge, and adequacy of training is rather unfavorable

Attitudes towards IE was positively related to intention to teach inclusive classrooms ( $r = .43, p < .001$ ). This finding is consistent with the report of Aiello and Sharma (2018) who found that teachers with favorable attitudes towards IE were more likely to have positive intentions to implement inclusive practices. Similarly, a study by Miesera et al. (2019) on pre-service teachers also found significant correlation between attitudes towards inclusive education and intention to teach inclusive classrooms. The positive relationship of attitudes towards inclusion education and intention of teaching inclusive classroom was also implicated from findings of other researchers (e.g., Yan & Sin, 2014).

#### 4.4 Self-evaluation

Table 3 reveals that teachers' self-evaluation tended to be negative. The mean scores of self-confidence to teach IE classrooms, knowledge of IE policy, and experience of working with students with SEN were all below the conceptual midpoint of 3. The teachers also tended to consider their training in IE inadequate (mean score below the midpoint of 3.5). While only 6.5% of the teachers perceived their training in IE as adequate or very adequate, 54.2% considered their training in IE was inadequate or very inadequate. Poor self-evaluation could constitute a barrier to the effective implementation of IE.

**Table 3: Distribution of Teachers' Self-evaluation Regarding Inclusive Education**

	Very low %	Low %	Moderate %	High %	Very high %	M (SD)	
Confidence	1.9	17.9	64.5	11.2	4.7	2.99 (0.75)	
Knowledge	10.3	34.6	47.6	4.7	2.8	2.55 (0.85)	
	Nil %	Very Little %	Little %	Sufficient %	Very much %	2.84 (1.17)	
Experience	14.0	20.6	42.1	18.7	4.7		
	Very Inadequate %	Inadequate %	Slightly Inadequate %	Slightly Adequate %	Adequate %	Very Adequate %	2.63 (1.21)
Training	15.9	38.3	22.4	16.8	3.7	2.8	

Our findings of poor self-evaluation among the teachers were consistent with the observation reported by previous researchers. For example, Mastropieri and Scruggs (2000) found that three quarters of teachers did not think they had the skills to effectively manage inclusive classroom. McConkey and Bhlirgri (2003) also observed that teachers who work in preschool settings felt that they lacked the skill and knowledge to teach students with developmental disabilities, even though they were devoted to inclusive teaching.



Though teachers in higher education were positive in their attitudes towards IE and showed relatively strong intention to engage in inclusive teaching, yet their self-evaluation regarding teaching IE were rather poor. Teachers' poor self-evaluation reflects that they are not well-prepared in teaching IE, which is frequently observed among in-service teachers (Forlin & Sin, 2017).

#### 4.5 Self-evaluation and intention to teach

To examine the how self-evaluation was associated with intention to teach inclusive classrooms, categories of self-evaluation were clustered into smaller groupings so that the sample size of groups is larger for a more meaningful ANOVA.

Table 4 shows that self-evaluation was significantly associated with intentions to teach inclusive classrooms. The mean scores of intention were lower among teachers who had lower self-confidence or lower knowledge of IE policy. Teachers with perceived insufficiency in IE teaching experience or with perceived inadequacy in IE training showed lower intention to teach inclusive classrooms. Among the four aspects of self-evaluation, self-rated experience with IE teaching was most significantly associated with intention to teach inclusive classrooms, thus, show the highest relative efficiency in differentiating teachers' intention to teach IE.

**Table 4: Self-evaluation and Intention to Teach Inclusive Classroom**

Confidence in teaching IE	Low (N=21)	Moderate (N=69)	High (N=17)	F (2, 104)	Relative efficiency
	M (SD)	M (SD)	M (SD)		
	24.67 (6.30)	27.75 (5.57)	32.65 (5.70)	9.18***	.75
Knowledge in IE policy	Low (N=48)	Average (N=51)	High (N=8)		
	M (SD)	M (SD)	M (SD)		
	25.71 (6.34)	28.84 (5.08)	35.38 (4.21)	11.38***	.93
Experience with IE teaching	Insufficient (N=82)		Sufficient (N=25)		
	M (SD)		M (SD)		
	26.83 (6.02)		31.52 (5.27)		12.28***
Adequacy in training:	Inadequate (N=82)		Adequate (N=25)		
	M (SD)		M (SD)		
	27.15 (5.64)		30.48 (7.17)		5.86*
					0.48

\*p < .05, \*\*\*p < .001

Table 4 shows that self-evaluation of confidence, knowledge, experience, and training are all significantly related to intention to teach inclusive classrooms. Lower levels of confidence and knowledge were associated with lower levels of intention to teach inclusive classes. Teachers who felt inexperience with IE and perceived themselves to be adequate in training for IE teaching also



showed lower intention to engage in inclusive practice. Among the four aspects of self-evaluation, perceived insufficiency in teaching experience of IE was most significantly associated with low intention to teach IE. The association of negative self-evaluation with intention to teach inclusive classrooms may constitute an impediment to the efficacy of inclusive practice.

#### 4.6. Relative contribution of self-evaluation

Multiple regression analysis was performed to examine the relative contribution of age, attitudes towards IE, and self-evaluation (self-confidence in teaching IE classrooms, experiences with IE teaching, knowledge about IE policy, and perceived adequacy in training) to intention to engage in inclusive practice. Only variables that were found related significantly to teachers' intention to engage in inclusive practice were entered into multiple analysis. Results of the analysis are present in Table 5.

**Table 5: Relative contribution of variables to intention to engage in inclusive practice**

	$\beta$	t-value	p-value
Age	.23	2.83	.006
Attitude towards IE	.34	4.31	.000
Self-Confidence in teaching IE	.12	1.15	.253
Experience teaching IE	.14	1.44	.154
Knowledge of IE policy	.35	3.06	.003
Perceived adequacy of training	-.12	-1.10	.273

As previously shown, self-confidence, experience with IE, and perceived adequacy of training in IE were independently and significantly associated to intention to engage in inclusive practice (see Table 4). However, they made no significant contribution to the prediction of teachers' intention in addition to age, attitudes towards IE, and knowledge of IE. The latter three variable made good prediction of teachers' intention to engage in inclusive practice ( $R = .63$ ,  $p < .01$ ). Among the three predictors, attitudes towards IE made the greatest contribution, followed by knowledge of IE policy. The findings implicates that to raise teachers' intention to engage in inclusive practice, promotion of attitudes towards IE and upgrading of knowledge regarding IE are crucial aspects to be considered. Nonetheless, although self-confidence, experience, and perceived adequacy training in IE were not significant in the multiple regression analysis, their roles in IE practice should not be ignored. This is because these variables did independently associated with intention to teach inclusive classroom.

The overall findings of this study indicated that teachers showed high intention to teach inclusive classes. However, poor self-evaluation appeared to be an inhibitor of teachers' good intention. Furthermore, previous studies suggested that poor self-evaluation and lower self-efficacy were closely related (Loreman et al., 2013). Monteiro et al. (2019) found that teachers who showed lower self-rating of knowledge, confidence, and training about teaching students with SEN showed lower in self-efficacy in handling with children with disruptive behavior. Self-efficacy is a concept put forward by Bandura (1997) in his social cognitive theory. Teachers with lower levels of self-efficacy put less effort in their teaching and show less perseverance in challenging teaching tasks.



With teachers' poor self-evaluation, and expected low efficacy in teaching inclusive classroom, students with SEN may not be able to benefit from participating in a common learning settings. Furthermore, it is speculated that teachers' low self-efficacy may also produce job stress that is detrimental to teachers' sense of well-being, which in turn affects their management of inclusive classes. Hence, there is a need to enhance teachers' self-evaluation and their self-efficacy in teaching inclusive classrooms

To promote teachers' self-efficacy in teaching inclusive classroom, in-service training is regarded as the best practice models (Forlin & Sin, 2017). Sokal and Sharman (2017) found that in-service education program was effective in promoting positive attitudes towards IE and in reducing worries about negative effects of IE. The program significantly increased in-service teachers' self-efficacy for inclusive practices. Similar positive outcome of in-service training were reported by Moore (2015). With positive attitudes towards IE promoted, worries about negative effects reduced, and self-efficacy in teaching students with SEN increased, it is expected that in-service training would also enhance teachers' self-evaluation and consequently promotes the effectiveness of IE.

#### **4.7 Limitations of the study**

This study adopted a cross-sectional and correlational design that did not allow for causal inference. Though we can predict teachers' intention from their attitudes towards IE, it does not implicate causal relationship between the two variables. Yet, the relationship between the two constructs could well be bidirectional or reciprocal (see Bandura, 1986). Second, this study were gathered through convenience sampling, a method commonly used in an exploratory study. It is adopted because of its ease of use and availability of data. However, it has a limitation in generalizing findings to the population. Results of this study may be cross-validated on a more representative sample which is population-based. Future studies may also recruit a larger sample so that the factorial validity of ITIC or ATIE could be examined through confirmatory factor analysis. ITIC and ATIE are two measuring instruments commonly used in the field of IE. Findings of studies using common measures should facilitate the comparison of findings. Certainly, future studies may adopt other measures so that the findings of the present study may be cross-validated by a different set of measurements.

#### **4.8. Conclusion**

Notwithstanding some limitations of this study, the data gathered from this study show that teachers in an institution of higher education hold positive attitudes toward IE and generally showed a high intention to teach in an inclusive classroom. Positive attitudes and intentions provide a fertile ground for the implementation of IE. However, teachers' self-evaluation of confidence, knowledge, experience, and perceived adequacy in training regarding IE was rather unfavorable. The negative self-evaluation was associated with a lower intention to teach inclusive classrooms, which is not conducive to the effective implementation of IE. The overall findings show that intentions to teach inclusive classrooms were more significantly predicted by age of the teachers, their attitudes, and self-evaluation regarding IE. However, teachers' self-evaluation regarding IE practice should be promoted. In-service training to enhance teachers' self-evaluation is strongly suggested.



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## The Classification of Knowledge in Islam by Imam Al- Ghazali and Al- Farabi: A Comparative Study

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**Abstract:** *It is undeniable fact that history is the record of past events and civilization is an advance development in the society marked by rapid progress in economy, politics, science, knowledge and Information technology. Down the centuries, Islam as a religion of comprehensive way of life has paid a huge attention to the issue of knowledge, it invites people to seek it at all costs; it also urges them to think and contemplate in order to reach the true meaning of ontological reality. If that indicates something, it proves that Islam is totally against ignorance and illiteracy. Based on this fact Islamic civilization during its golden era has witnessed some giangantic Muslim scholars who shoulder the message of Islam and whose contributions to the field of different knowledge can not be underestimated. For instance, Imam Al- Ghazali(Hujjah Al-Islam) and Alfarabi are renouwned Muslim scholars of all time. They both contributed immensely to the field of social sciences , humanities and mysticism. Their contributions to these field have become splendid references to contemporary Muslim scholars in their academic researches. Thus, the main objective of this paper is to investigate the classification of knowledge by Imam Al- Ghazali and Al- Farabi respectively. Yet, in order to achive our objective the comparative approach is applied followed by brief conclusion and some recommendations*

**Keywords:** Imam Al- Ghazali, Al- Farabi, Classification of knowledge,, Islam, Qur'an, Sunnah.

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### 1. Introduction

The classification of knowledge in Islam had been discussed by many Islamic scholars. Down the centuries , the Muslim scholars such as Abu Al-Hamid Al-Ghazali and Al Farabi have contributed immensely to classification of knowledge, their tireless efforts and their unique endeavours in this dimation have become a great reference for scholars and academicians alike. Indeed, this article aims to explore the biography of these two Muslim scholars followed by their classification of knowledge. Therefore, the article will apply a comparative approach in order to achieve it aims and objectives, that is by drawing comparision between the classification of knowledge by Imam Al-Ghazali and the classification of Knowledge by Alfarabi. Lastly, the brief conclusion will be provided, followed by some suggestions and some recommendations .



## 2. Definition of Knowledge in Islam

Knowledge is from Arabic word 'ilm, which is derived from root word 'alima' knowledge in Islam literally can also mean Al-Ma'rifah (المَعْرِفَةُ) which is also derived from root word 'arafa'<sup>1</sup> and that means to know something by experiment. Furthermore. Knowledge in Islam is synonymous to Al-Fiqh (الفِئْه) which is related to understanding. Along with other synonymous words that refer to knowledge. Such as Tadabbur (تَدَبُّرٌ) means observation, Basiran (بَصِيرًا) mental perception, Tazakkur (تَذَكُّرٌ) that is remembrance and Tafakkur (تَفَكُّرٌ) which simply means thought.

Technically: According to Imam Al- Gazali, knowledge is a realization of the meanings of things<sup>2</sup>. It means realization of something in its true nature through different levels of understanding and in arrangement with the facts or true to nature.

According to Sayed Naqib Al- 'Attas, knowledge is the obtainment of the ma'na (meaning) of an object in the soul & its arrival at the meaning.<sup>3</sup> Knowledge is attainment by the heart of something in accordance to the fact whether this thing is ontological or non-ontological.

Knowledge is the perception of the realities of things through traditional and intellectual channels (ma'suman wa ma'qulan)..

Knowledge is attainment (tehsil) by the heart of something in accordance to what it is, whether this thing exist or does not exist.<sup>4</sup>

Knowledge is the arrival in the soul of the meaning of a thing or an object of knowledge and the arrival of the soul at the meaning of a thing or object of knowledge.<sup>5</sup>

## 3. General Classification of Knowledge in Islam

According to Sayed Nasr, The history of classification can be traced back to the Hellenic period where the Plato and Aristotle were the first to classify the knowledges<sup>6</sup>, However, in Islamic worldview, , knowledge can be classified into two different domains namely : absolute knowledge and limited knowledge.. Indeed, in this context, the meaning of classification of knowledge is simply the types of Knowledge in Islam, and the exploration of the kinds of knowledge will help our readers to gain the full insights of knowledge in Islamic perspective, and that can enable them to understand the differences between the classification of knowledge in islam and the classification of knowledge in the western perspectives. Thus, the following is the general classification of knowledge in Islam.

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<sup>1</sup> Munir Al Ba'labaki, (1989), Al Mawrid, Amodern English- Arabic Dictionary, Darul 'Ilm Lilmalaayin, Beirut

<sup>2</sup> Abu Hamid al- Ghazali,(1963) The Book of Knowledge, Translated by Nabih Faris, Lahore.

<sup>3</sup>Al-Attas, M. N. (1984). Islam and Secularism.Hindustan Publications. Retrieved from <https://books.google.co.id/books?id=14RtPwAACAAJ>

<sup>4</sup> See Ibn Arabi, Futuhat, 1, 91, in Rosenthal, p.57

<sup>5</sup> See, al Jurjani: P. 160-161

<sup>6</sup> Sayed Hussain Nasr, (1993), Science and Civilization in Islam, Suhail Academy, Lahore, Pakistan, P.6



### 1) Absolute (perfect) knowledge

This is the knowledge of God who knows the reality, essence and details of all things. He is the sole Creator Who created everything from nothing and Who is Perfect and Who is Uncaused Caused.

### 2) Limited knowledge

The knowledge given to His creations; angels, prophets, human beings, jinn, and animals. This kind of knowledge is different from the absolute knowledge because it belongs to the creations of God who are imperfect and whose lives depend on Almighty God. Furthermore, the limited knowledge can be divided into gifted knowledge and acquired knowledge.

#### i) Gifted knowledge

- a) Instinctive knowledge (natural): it is imparted in the very nature of the creation.
- b) Revealed / sacred knowledge: the knowledge that Almighty God reveals to human beings.

#### ii) Acquired Knowledge

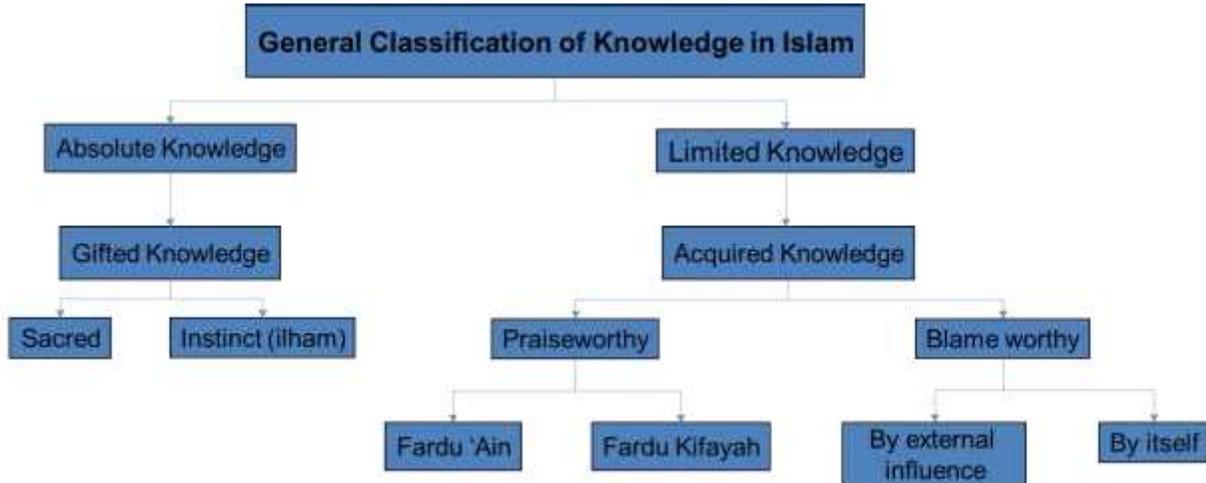
Gained through effort by way of reflection, senses and experience. This can be further divided into two categories; namely, recommended knowledge (praiseworthy) and prohibited knowledge.

##### a) Recommended (praiseworthy)

is two types, namely; individual obligatory (Fard 'ayn) and communal obligatory (Fard kifayah). In fact, Individual obligatory (Fard 'Ain) means what should be learned by each and every Muslim, it is what we called individual responsibilities or things which can't be done on behalf of others such as; beliefs, worship, halal and haram, core moral values, how to discharge one's responsibilities towards others (man's obligations to family and society), necessary skills for daily life. Whereas, Communal obligatory (Fard kifayah) means the community's needs that can be performed by a sufficient group on behalf of others. It is also known as collective responsibilities. Such as, religious sciences, knowledge that is not needed for daily practice of Islam, Intellectual knowledge such as medicine geology a, astronomy and etc.. or all types of knowledge needed for the welfare of the society in this life.

##### b) Prohibited (blameworthy) Blameworthy Knowledge

it is a kind of acquired knowledge that does not meet the requirement of science, or it is purely or usually harmful. It is divided into two, namely; blameworthy by its nature or by an external factor, such as magic (Al- Baqarah:2:102) or involving in business for the sake of negative external factor, such as cheating or duping and taking illegal interest (al riba). Based on above classification of knowledge, we might conclude that in our contemporary life, man can acquire any knowledge for the sake of knowledge, especially the absolute knowledge that may assist him to recognize the omnipotence of God, he can also acquire the limited knowledge with particular reference to gifted knowledge and acquired knowledge that might benefit him in Dunia and in Al-Akhirah. The following diagram and chart below is the best example and perfect explanation for categorization of Knowledge in Islam



#### 4. Classification Of Knowledge According To Imam Al-Ghazali And Al- Farabi

##### 4.1 Classification Of Knowledge According To Imam Al-Ghazali

###### *Brief Biography of Imam Ghazali*

First of all and foremost, it will be worthwhile to shed some lights on the biography of Imam Al-Gazal before we can proceed to his classification of knowledge. His actual name is Abu Hamid Muhammad al Gazali, al-Tusi famous in the world of learning as al-Ghazzali<sup>7</sup>. The Imam was a jurist, Philosopher, and debater, theologian, mystic, expert in the principles of doctrine and those of jurisprudence. He was born in 450 AH (1058 A.D). in Tus (modern Mash'had in NE Persia). He attended the village madrassa and as a young man went to the Nizamia Madrassa, which was a very famous educational institution in Nishapur. He was a clever and keen student who took interest in all subjects His cleverness as a student was commented upon in court circles in Persia and the Grand Mufti took special interest in his progress and encouraged him to devote himself to the pursuit of knowledge.

Furthermore, Al-Ghazzli justified the confidence shown in him by his patron and graduated from the Nizamia Madrassa at Nishapur, with distinction. Al-Ghazali died at Tabran in Jamadi al Ukhra 505 AH (1111 A.D) at the age of 53 years. Imam al-Ghazali today is known as Hujjat al-Islam, Arabic for “the Proof of the Religion”.

Here are some important books of imam al-Gazali

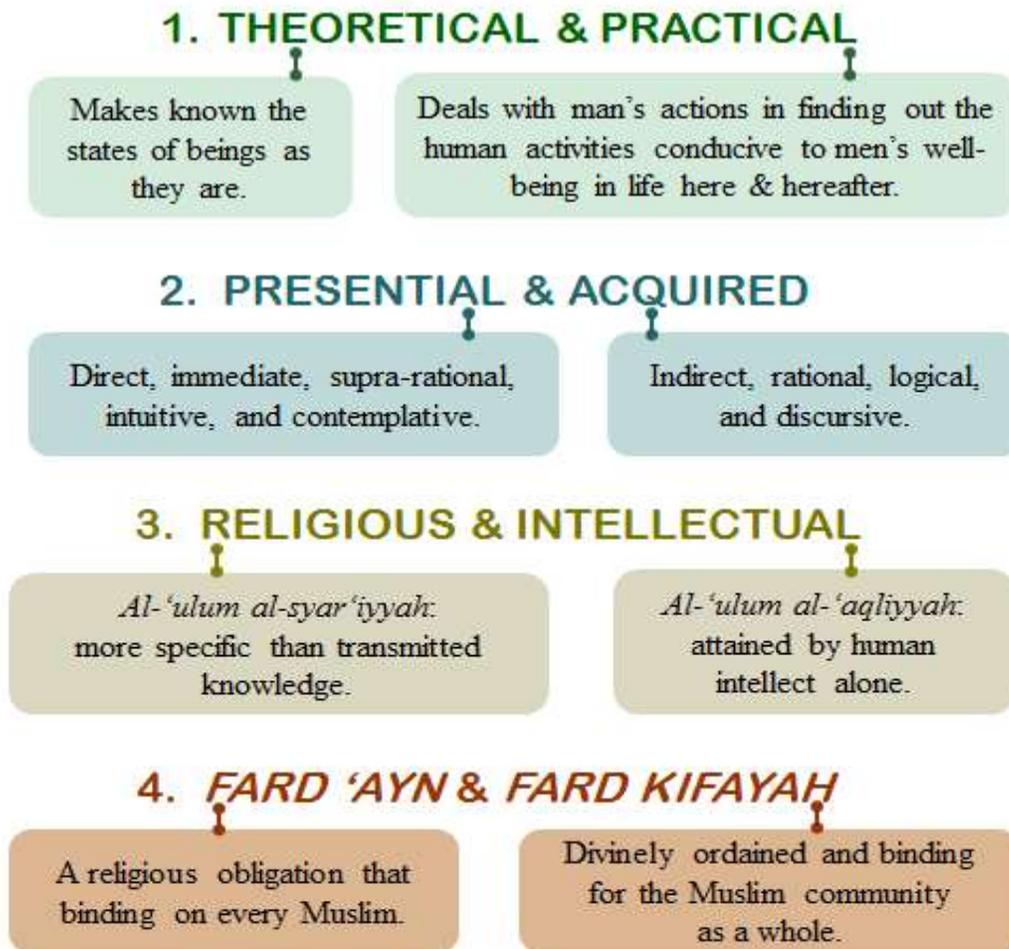
- i. Tahafut al-falasifa (The Incoherence of the Philosophers), (1095)
- ii. Mi'yar al-'ilm (The Standard Measure of Knowledge) (1095)
- iii. Ihya' 'ulum al-din (The Revival of the Religious Sciences) (1096-7)
- iv. Mishkat al-anwar (The Niche of the Lights) (1096-7)
- v. Al-Munqidh min al-dalal (The Deliverer from Error) (1108). And many more..

<sup>7</sup> Ludwig W. Adamec (2009), Historical Dictionary of Islam, Scarecrow Press, p. 109



In short, knowledge according to imam al- Gazali is the realization of the meaning of things. Therefore, he classified the knowlege as followed:

- i. Theoretical and practical
- ii. Presential and acquired
- iii. Religious and intellectual
- iv. Individual obligatory- and communal obligatory.



The most extensive class<sup>8</sup> is division into religious (shariyyah) and intellectual ('aqliyyah) sciences. Al-Ghazali proposed that, all four classes mentioned above are valid even though those classes do not have the same degree of validity. Each class is based on certain conditions of the relationship between man and knowledge as well as on a particular perspective of looking at that relationship.

<sup>8</sup> Osman Bakar, (1992), *Classification of Knowledge in Islam*, Institute of Policy Research, Kuala Lumpur, P223



Besides that, Al –Ghazali also claimed that all religious sciences; fard ‘ayn and fadr kifayah, are praiseworthy<sup>9</sup>. As for intellectual sciences, al Ghazali means these kinds of sciences are attained by human intellectual alone and the differences between these two<sup>10</sup> categories of sciences is a logical consequences of the mutakallimun conception of the relationship between revelation and reason.

Lastly, Al-Ghazali divides the knowledge of wisdom into the theoretical and practical parts. The first part which is theoretical part discussed about the conditions of beings. For the second part which is practical parts discussed about how to deal with man’s actions. The aim is to find out the human actions and his well-being in this life as well as in the hereafter such as Ulum shar’iyyah.

## 5. Classification Of Sciences According To Al-Farabi

### Brief Biography of Al- Farabi

His name is Abu Nasr Muhammad ibn Muhammad ibn Turkhan al-Farabi. He was born of Turkish stock in Turkistan about 265/878<sup>11</sup>. He was brought to Baghdad by his father where he learned Arabic, mathematics, medicine and philosophy. He started his life in Damascus where he devoted himself to read philosophical books. He subsequently left for Baghdad where he learned from two gigantic logicians of that time namely; Mata Ibn Yunus and Yuhana Ibn Haylan. He was known and famous as Muallim Thani (The second teacher). Simply because he reconstructed the science of logic founded by Aristotle, then comented and wrote treatise on it. He died in 339/950.

Here are some Primary sources of Al-farabi which have been translated into English

Primary Sources (Fārābī) in translationEnglish

- i. Al-Farabi's Commentary and Short Treatise on Aristotle's De interpretatione, Oxford: Oxford University Press, 1981.
- ii. Short Commentary on Aristotle's Prior Analytics, Pittsburgh: University of Pittsburgh Press, 1963.
- iii. Al-Farabi on the Perfect State, Oxford: Clarendon Press, 1985.
- iv. Alfarabi, The Political Writings. Selected Aphorisms and Other Texts, Ithaca: Cornell University Press, 2001.
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- vi. Alfarabi's Philosophy of Plato and Aristotle, translated and with an introduction by Muhsin Mahdi, Ithaca: Cornell University Press, 2001.
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- viii. "Al-Farabi's Long Commentary on Aristotle's Categoriae in Hebrew and Arabic", In Studies in Arabic and Islamic Culture, Vol. II, edited by Abrahamov, Binyamin. Ramat: Bar-Ilan University Press, 2006.

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<sup>9</sup> Abu al Hamid al- Ghazali, (1939), Ihya ‘Ulum al-Din, Mustapha Al Babi Al Halabi & Sons, Egypt.

<sup>10</sup> Osman Bakar, Classification of Knowledge in Islam, , P223

<sup>11</sup> Seyyed Hossein Nasr and Oliver Leaman, ed. (2001). History of Islamic Philosophy. History of World Philosophies. Routledge.



### **Al- Farabi Classification of Sciences**

Al Farabi classified sciences in his book *Kitab Ihsa' 'Ulum* (The book of the Enumeration of the Sciences) in this book, Al- Farabi categorised the various disciplines of knowledge under seven heading namely: the linguistic, the mathematical, the logical, the physical, the metaphysical the judicial and the political sciences<sup>12</sup>

Besides that, Al- Farabi writing also dealt with physics (*tabi'iyat*), the natural philosophy, for this physics branch, Al- Farabi distinguished it into three categories which are:

- i. Commentaries on a number of works of Aristotle and of some of his greek commentaries
- ii. The second one consists of a number of independent scientific treatises of an expository nature on following subjects such as, psychology, zoology, meteorology, the nature of space and time, and the vacuum.
- iii. The last category is refutation of the views of certain philosophers and theologians on particular aspects of natural philosophy.

Moreover, Al-Farabi also was an expert theoretician not to mention as an excellent composer and performer. In this field, Al- Farabi has written a treatise about judicial astrology (*Ahkam al-Nujum*), known as *Fi ma yasihh wa ma la yasihh min ahkam al- nujum* (on the true and untrue in judicial astrology). In addition, in the field of metaphysics which has something to do with the knowledge behind nature, *Fusus al- Hikam* is the most continuously influential work<sup>13</sup> of al- Farabi in the East. His contribution in this field has proved Al- Farabi's real worth as a metaphysician.

In short, al-Farabi's name came from the uncertain regions where he was born to reach the space, where he is marked in one of the asteroids of the great belt that surrounds the solar system, this in honor of one of the greatest intellectuals that emerged within the civilization of medieval Islam. Thus, Al Farabi had provided an excellent classification of knowledge. His *Kitab Ihsa' (The book of Enumeration)* has significantly demonstrated this fact, where Abu Nasr Muhammad ibn Muhammad ibn Turkhan al-Farabi categorized different disciplines of Knowledge under seven heading. May God bless his soul.

### **6. Concluding Remarks**

The immense contribution of Muslim scholars to the field of knowledge is remarkable. Down the centuries the early Muslim scholars such as Al- Farabi, Imam Al-Ghazali have contributed largely to the classification of knowledge. For example, Al Ghazali classified the knowledge into Theoretical and practical. Presential and acquired, Religious and intellectual, Individual obligatory- and communal obligatory. Whereas Al- farabi categorised the various disciplines of knowledge under seven heading namely: the linguistic, the mathematical, the logical, the physical, the metaphysical the judicial and the political sciences. Their classification of knowledge has become a great reference for the contemporary Muslim scholars,

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<sup>12</sup> al-Farabi, *Kitab ihsa' al-'ulum* (The Book of the Enumeration of the Sciences), ed. and trans. A. González Palencia, *Catálogo de las Ciencias*, Arabic text with Latin and Spanish translation, Madrid: Imprenta y Editorial Maestre, 1953. (A survey of the learned sciences of the day, of encyclopedic range.)

<sup>13</sup> Seyyed Hossein Nasr and Oliver Leaman, ed. (2001). *History of Islamic Philosophy. History of World Philosophies*. Routledge.



## 7. Suggestions and Recommendations

- i. The contributions of early Muslim scholars (such as Al- Farabi and Al-Ghazali) to the field of various knowledge can not be measured in small scale. This shows their love for knowledge for the sake of knowledge.
- ii. Exercising Ijtihad and creativity are highly needed for contemporary Muslim Ummah, in order to solve the various problem and predicaments faced by the ummah today.
- iii. There's a need for mutual beneficial reciprocal relationship between the contemporary Muslim scholars and Muslim leaders, so that the scholars will be able to produce meaningful researches that will benefit the Muslim ummah at large.
- iv. The great lesson that we can learn from the glory of our early Muslim scholars and from the golden age of the Islamic civilization is that, the strength of any civilization is based on knowledge and knowledge is power.

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# The Effect of Ease, Speed, and Security on Customer Satisfaction of LIVIN By Mandiri Users in Bogor City

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**Abstract:** *This research aims to analyze the effect of ease, speed, and security on customer satisfaction of Livin users by Mandiri in Bogor City. The data used in this research were primary obtained from the results of respondents' responses through a Google Form questionnaire. The analytical methods employed in this research is the ordinary least square with regretion technique. In this research were used include reliability test, validity test, and classical assumption test. The research was conducted in the city of Bogor, West Java, Indonesia with a total of 112 respondents. The method of sample selection from population used Slovin technique. The results of this research indicate that the ease, speed and security influenced on customer satisfaction customer banking in Bogor City, Indonesia.*

**Keywords:** M-Banking, Ease, Speed, Security, Satisfaction.

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## 1. Introduction

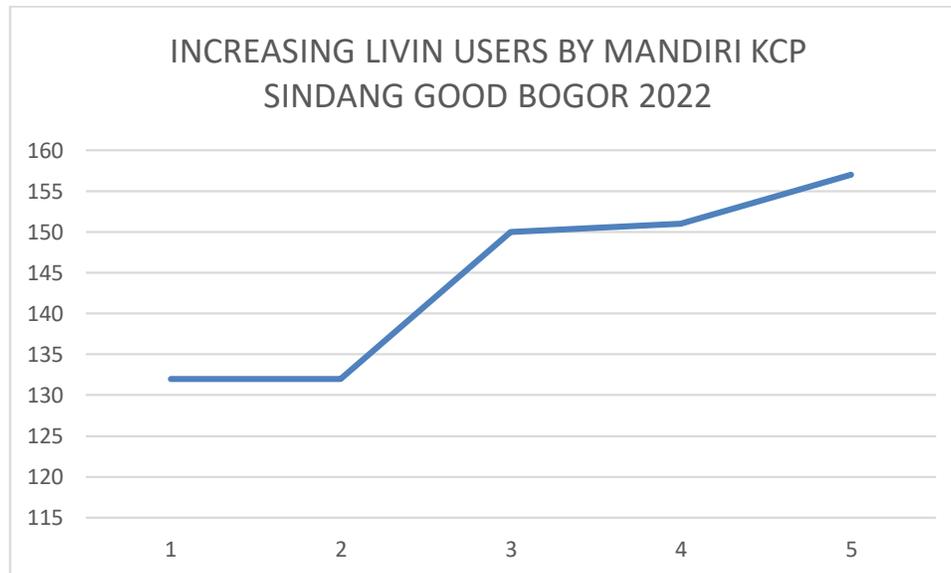
In this era of globalization, the way people make payments has become increasingly varied due to innovation and technological developments in this era. The Payment System continues to evolve following the evolution of money with 3 driving elements namely technological innovation & business models, community traditions, and authority policies. The beginning of the means of payment was the system of barter between people who were traded. Then developed commodity money. Commodities here are basic goods that almost everyone needs, for example, salt, tea, tobacco, to grain. Farm animals were used as commodity money in the years 900 to 6000 BC. Wheat, vegetables, and herbs were later also used as commodity money after the emergence of agricultural culture.

Subsequently primitive money began to be used around 1200 BC and in the form of clam shells or shells of other animals. Subsequently banknotes began to be used on as a means of payment. Sweden was the first country on the European continent to use banknotes in 1661. In the era of globalization, human thinking has developed so that there is an innovation in banking digitalization, which now there is no need to use cash or can be called cashless. M-Banking services have become a payment system and banking transactions in the digital era, so as to achieve effectiveness in daily transaction activities.

At this time, most people in Indonesia certainly use Mobile Banking (M-banking). One of the advantages of the presence of various digital technologies is a more practical and efficient activity, especially in terms of time. The rapidly increasing development of technology in Indonesia has a major impact on society. Technological developments can give rise to various innovations,



including in the field of finance. With the innovations created by banks, it greatly affects the effectiveness and mobility of customers because Mobile Banking is a service that allows bank customers to make banking transactions through mobile phones or smartphones. Mobile banking services can be used using the menu that is already available through an application that can be downloaded and installed by customers. With this, of course, the number of customers of a bank can increase because they are interested in innovations and facilities provided by a bank. Moreover, according to Neha and Datta (2010) stated that the existence of internet banking has a better level of security than conventional bank services.



**Figure 1. The Development of Livin Users in Bogor 2022**  
Source: data processed by Bank Mandiri Kota Bogor 2022

Based on the chart above, independent livin users at KCP Sindang Barang Bogor have increased in the last 5 months until March 2022. Moreover, there was a significant increase from December 2021 to January 2022 and continued to increase until March 2022. The increase can be explained that the effectiveness of Livin Mandiri services has a positive impact on both parties, namely customers and banks, this has resulted in the number of bank mandiri livin users in the last 5 months at KCP Sindang Barang Bogor City feeling satisfied. Based on the above exposure, this study aims to analyze the effect of x1-3 on customer satisfaction. Therefore, it is interesting to study in order to find out the "Effect of Effectiveness (Convenience, Speed, Security) on Customer Satisfaction of LIVIN By Mandiri Users in Bogor City" during May to early August 2022. Especially in its efforts to support the Financial Services Authority (OJK) program in the Banking Digitalization Transformation Blueprint which aims to increase innovation in banking services in the era of rapid and rapid development in Indonesia from 2020 to 2025.

## 2. Literature Review

### Mobile Banking

Mobile Banking is a banking innovation in the era of digital development, with the aim of making it easier for users to make transactions and things that support the needs of customers and banks.



According to the Financial Services Authority (2015) mobile banking or m-banking is a payment system in banking transactions that uses mobile media or gadgets in the form of m-banking applications and other applications that function to make transactions. The benefits of using M-Banking are:

- i. Practical because it reduces the amount of cash carried and has a security system in the form of a PIN or secret code so as to reduce crime or loss of money.
- ii. Providing convenience in non-financial transactions and financial transactions without visiting existing banks.

In addition, Nurdin, Jalil, et al (2020) mentioned that M-Banking is a service that provides easy access and speed to get updated information and also financial transactions in real time. So that it provides easy access for customers who use M-Banking in transacting quickly, accurately at that time. Mobile banking is an innovative service from banks offered to customers to support the process of banking transactions through smartphones (Riswandi, 2005). In using m-banking services, according to Ernawati (2018) several criteria are needed that must be met by users such as:

- i. Must have a bank savings account
- ii. The customer registers at the nearest bank with his identity
- iii. Fill out the registration form for opening an m-banking account
- iv. Installing the m-banking application that will be used
- v. After the installation is complete, customers can register a username and password to use m-banking.

### **The Effect of M-Banking Convenience on Customer Satisfaction**

In carrying out innovations, you must pay attention to several more aspects that can support the occurrence of an innovation, one of which is the convenience aspect. In the indicator of effectiveness, one of the supporting aspects is the convenience variable. Zulkarnain (2021) Mobile banking provides convenience for its customers in financial transactions anytime and anywhere so that it can affect their satisfaction. Having an easy-to-understand application will certainly make it easier for users to make transactions. Maharsi and Mulyadi (2006) mentioned that the ease of using internet banking affects the level of user satisfaction. The convenience provided to customers can also increase user trust in the innovations carried out. Wibowo (2006) also mentioned that if the ease of use of a technology can be a benchmark for the level of trust and satisfaction of the individual in using technology because it is easy to understand. Therefore, the benefits of an easy-to-understand application are very important because it covers all ages.

### **M-Banking Security Relationship to Customer Satisfaction**

Security in a banking service is one of the most important aspects, because it can directly increase customer trust and customer satisfaction with the services provided. This is supported by Research nurdin, Jalil, et al (2020) security factors are the main factor that is the priority for every customer to use m-banking services, so that when security is guaranteed by the m-banking issuer, customers are satisfied with the security of the service. One of the creations of m-banking is to minimize criminal acts. Wandu, et al. (2020) argue that the security of the m-banking application is one of the reasons that affect customers using the service, because m-banking that is safe to use, minimal



risk of criminality, and prioritizes the confidentiality of customer personal data will increase customer satisfaction in using the M-Banking Livin by Mandiri service.

In addition, according to Wijanarto & Wardani (2020) = Security issues are an important factor that can affect customers in using m-banking, especially in minimizing the risks that occur when transacting directly through banks. Customer data is privacy that must be maintained by the bank. This is because customer data is personally confidential data that must be maintained. Neha, D. (2010) The level of security in keeping customers or nasabah from security disturbances that threaten the confidentiality of personal data will affect the level of trust and satisfaction in the services used.

### **The Effect Between the Speed of M-Banking Use and Customer Satisfaction**

In variable speed, the M-Banking application service can affect the level of customer satisfaction because the faster the connection and transaction services, the more effectiveness it will be for its users. Connection speed is one of the aspects that must be met in the mobile banking system (Nurdin, et al. 2020). Improving service quality can be done by updating applications regularly which can increase the speed of transaction services. Service quality can be shown by several indicators, one of which is Speed which means the speed and ease of customers in carrying out m-banking services (Sari, 2015).

### **3. Research Methods**

Data collection in this study was carried out from May-August respondents for needs. with a location in Bogor City, West Java. The reason for choosing the location is because it is in accordance with the source of research data taken from secondary data from the Sindang Barang Branch Office of PT. Bank Mandiri (Persero) Tbk, Bogor City, West Java. The site selection was based on the consideration that the bank had implemented a livin by mandiri program and the new bank was running its operations. The population used is customers who use independent livins residing in the Bogor region of West Java as many as 112. sampling is obtained based on the characteristics of the selected population based on characteristics that are considered to be in accordance with the needs of the study and can represent the total number of the population (Sunyoto D, 2011). The method used determines the number of samples with the Slovin formula as follows:

$$n = \frac{N}{1+(N \times e^2)}$$

Information:

- n = many samples
- N = many populations
- E = error percentage (0.05%)

The sample selected in the study was intended for users of M-Banking Livin by Mandiri, especially in the Bogor City area, West Java and obtained the number of respondents as many as 113 samples from a total population of 157 in March 2022 at the Sindang Barang Branch Office. The data used in the uni research is primary data obtained through filling out a questionnaire using the Google Form application. After the data was obtained from the responses of the respondents, a measurement scale was carried out. The Likert scale is a measurement using ranking in the scale value of respondents' responses (Sunyoto D, 2011). The variables used in this study include Livin



Ease (X1), Livin Security (X2), and Livin Speed (X3) as independent variables to Livin User Satisfaction (Y) as dependent variables.

The data analysis method used in this study is multiple linear regression with ordinary least square (LS) technique. To calculate the magnitude of the regression coefficient using Statistical Product and Service Solution (SPSS 22.0) software with the stages of data analysis carried out including data quality tests, classical assumption tests, and multiple linear regressions. Models of multiple linear regression equations used in Research (Gujarati, 2009):

$$\hat{Y} = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \mu_i$$

Information:

- Y = Livin User Satisfaction
- $\beta_0$  = Constant
- $\beta$  = Regression coefficient
- X1 = Ease
- X2 = Security
- X3 = Speed
- $\mu$  = Term error

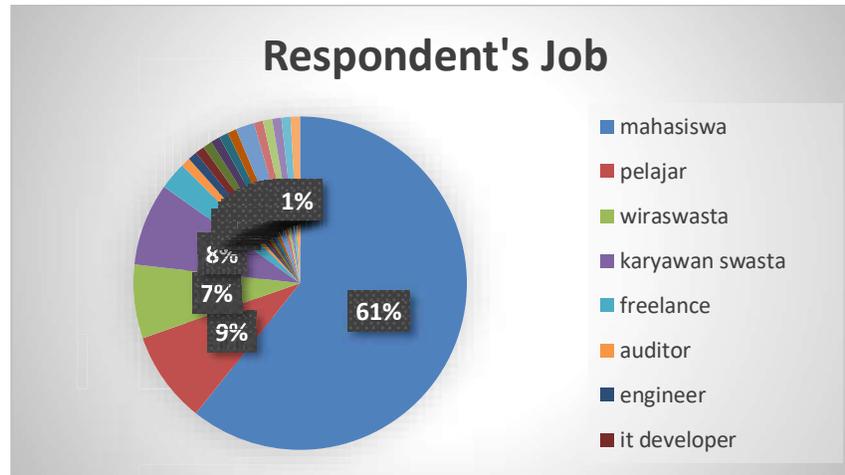
#### 4. Results and Discussion

Data collection was carried out using surveys that were distributed directly to users of the Mandiri M-Banking Livin service. Data obtained through social media to get respondents who can meet the research criteria. Researchers used the purposive sampling technique by taking sample criteria, namely users of the Independent Livin M-Banking service in Bogor City and getting 112 respondents from the total population in the data obtained. The respondent profiles obtained are as follows:

**Table 1: Long time Users**  
Source: processed data

Long Use	Total
1 year	15
> 1 year	55
< 1 year	42

From the data that has been obtained through respondents' responses, the majority of livin users in this study have been more than one year, namely as many as 55 respondents. Furthermore, there were 42 respondents who were under 1 year of use, and there were 15 respondents who were exactly 1 year in the use of the M-Banking Livin by Mandiri service.



**Figure 2: Respondents Job**  
Source: processed data

From the results of the data above, students are the highest number of users in this study by 61% with people aged 21-22 years. Followed by students as much as 9%, and the rest is used by customers who have other professions. This shows that Livin by Mandiri is used by all circles.

**Table. 2 Descriptive Statistical Results**  
Source: SPSS 22.0 processed data

	<i>N</i>	<i>Min</i>	<i>Max</i>	<i>Mean</i>	<i>Std.Deviation</i>
Ease of M-Banking (X1)	112	92,25	260,24	206,91	37,4256
M-Banking Security (X2)	112	102,44	260,04	203,48	42,0391
M-Banking Speed (X3)	112	93,02	234,51	182,61	36,3759
M-Banking User Satisfaction (Y)	112	78,58	314,82	250,49	47,8309

In the variable ease of use mbanking (X1) has an average of 206.91. which respondents tend to point to the highest choice who feel the ease of service of the mbanking livin application by mandiri. Then the security variable (X2) has an average of 203.48 meaning that customers feel guaranteed security in livin by mandiri. Furthermore, the variable speed (X3) has an average of 182.61 so that customers are satisfied with the transaction speed provided by livin.

**Table 3. Validity Test Results**  
Source: SPSS 22.0 processed data

Variable	Instruments	R-count value	R-table value	Value.Sig	Decision
Ease of M-Banking Livin by Mandiri (X1)	X1.1	0,867	0,1857	0,000	Valid
	X1.2	0,765	0,1857	0,000	Valid
	X1.3	0,660	0,1857	0,000	Valid
	X1.4	0,780	0,1857	0,000	Valid
	X1.5	0,723	0,1857	0,000	Valid



	X1.6	0,752	0,1857	0,000	Valid
Security of M-Banking Livin by Mandiri (X2)	X2.1	0,793	0,1857	0,000	Valid
	X2.2	0,848	0,1857	0,000	Valid
	X2.3	0,790	0,1857	0,000	Valid
	X2.4	0,821	0,1857	0,000	Valid
	X2.5	0,845	0,1857	0,000	Valid
	X2.6	0,755	0,1857	0,000	Valid
Speed of M-Banking Livin by Mandiri (X3)	X3.1	0,760	0,1857	0,000	Valid
	X3.2	0,769	0,1857	0,000	Valid
	X3.3	0,670	0,1857	0,000	Valid
	X3.4	0,759	0,1857	0,000	Valid
	X3.5	0,786	0,1857	0,000	Valid
	X3.6	0,590	0,1857	0,000	Valid
Customer Satisfaction of M-Banking Livin by Mandiri (Y) Users	Y.1	0,695	0,1857	0,000	Valid
	Y.2	0,759	0,1857	0,000	Valid
	Y.3	0,863	0,1857	0,000	Valid
	Y.4	0,760	0,1857	0,000	Valid
	Y.5	0,855	0,1857	0,000	Valid
	Y.6	0,844	0,1857	0,000	Valid
	Y.7	0,783	0,1857	0,000	Valid

Before conducting data analysis, in this study, a data quality test was carried out on the research instrument. It consists of a validity test and a reliability test. For the validity test, how to compare the calculated  $r$  value against the  $r$  table and also the significance value to the probability. If the calculated  $r$  value is greater than the  $r$  table and the significance value is  $>0.05$  then the test results of the Research instrument are declared valid. Validity test results This study obtained  $r$  table on  $df = n-2$  ( $112-2$ ) is 0.1857 so that it is found in all questionnaire questions submitted to respondents is declared valid because the value of  $r$  value counts  $> r$  table.

**Table 4: Reliability Test Results**  
Source: SPSS 22.0 processed data

No.	Variable	Cronbach's Alpha	Decision
1	Ease of M-Banking (X1)	0,812	Reliable
2	M-Banking Security (X2)	0,894	Reliable
3	M-Banking Speed (X3)	0,812	Reliable
4	M-Banking User Satisfaction (Y)	0,903	Reliable

In the reliability test research using the Cronbach's Alpha method with the aim of confirming the consistency of the research instrument applied. The results of such tests can be considered reliable



if the correlation value of Cronbach's Alpha . of 0.70 (Ghozali, 2016). In table 3, the results of the reliability test produce the value of the Cronbach's Alpha coefficient in each research instrument  $> 0.70$ , so that all research instruments are considered reliable

### Test of Classical Assumptions

**Table 5: Normality Test Results**

Monte Carlo Sig. (2-tailed)	Standard	Information
0,302	$> 0.05$	Normal Distributed Data

In this study, the normality test used the One-Sample Kolmogorov-Smirnov Test model and was seen in the Monte Carlo Sig. (2-tailed) value  $> 0.05$  so that it could only be stated that the data in this study were distributed normally. The results obtained in table 4 for the normality test were  $0.302 > 0.05$  and stated that the research data this time were distributed normally.

**Table 6: Multicollinearity Test Results**  
Source: SPSS 22.0 processed data

Type	Collinearity. Stat		Tolerance	VIF	Information
	Tolerance	VIF			
Ease (X1)	0,541	1,850	$>0.10$	$< 10$	No Multicollinearity Occurs
Security (X2)	0,534	1,871	$>0.10$	$< 10$	No Multicollinearity Occurs
Speed (X3)	0,561	1,782	$>0.10$	$< 10$	No Multicollinearity Occurs

In the multicollinearity test, the research data can be said that there are no symptoms of multicollinearity if the VIF value  $< 10$  and the tolerance value  $> 0.10$  in each free variable used. Based on the results of the multi-collinierity test carried out, the VIF value for  $X1 = 1.850$  ;  $X2 = 1.871$  ; and  $X3 = 1.782$  where all three have a VIF value  $< 10$ . At the tolerance value obtained  $X1=0.541$  ;  $X2 = 0.534$  ; and  $X3 = 0.561$  where all free variables had tolerance values  $> 0.10$  so that this study was declared free of symptoms of multi-cholera.

**Table 7: Heterokesdasticity Test Results**  
Source: SPSS 22.0 processed data

Variable	Significance	Standard	Information
Ease (X1)	0,506	$> 0.05$	No Heterokesdasticity Occurs
Security (X2)	0,333	$> 0.05$	No Heterokesdatsis
Speed (X3)	0,380	$> 0.05$	No Heterokesdatissity Occurs

In the heterokesdaticity test using the statistical method of the Glejser test by looking at the signification value (sig. $>0.05$ ) it can be stated that the study does not have symptoms of heterokesdastifitas. The results obtained in this test for the three free variables have a signification value of  $X1=0.506$ ;  $X2=0.333$ ; and  $X3=0.380$  where the overall sig value  $> 0.05$  so that this study was declared symptom-free of heteroskdasticity.



## Multiple Linear Regression Test

**Table 8: Multiple Linear Regression Results**  
Source: SPSS 22.0 processed data

Variables	Coefficient	Standart Error	t	Sig.
C	1533,619	1514,358	1,013	0,313
Ease (X1)	0,231	0,090	2,571	0,011
Security (X2)	0,444	0,081	5,508	0,000
Speed (X3)	0,531	0,091	5,849	0,000
Included Observations			112	
R-Squared			0,711	
Adjusted R-Squared			0,703	
F-Statistics			88,473	
Sig(F-statistic)			0,000000	
F-table			3,08	
t-table			0,67677	

In table 7 for multiple linear regression, the equation is obtained as follows:

$$Y = 1533.619 + 0.231 X1 + 0.444 X2 + 0.531 X3$$

So the equation can be explained that if there is an increase in convenience services (X1) the use of M-Banking can increase customer satisfaction of Livin by Mandiri by 23.1%. Then from the security sector (X2) customer satisfaction increased by 44.4%. The last from the speed sector, (X3) customer satisfaction also increased by 53.1%. Furthermore, the results of the r squared interpretation of 0.711 or 71.1% which means that variations in the three indpende variables (X1,X2,X3) are able to explain 71.1% of the dependent variables of customer satisfaction in livin by mandiri services in the form of the satisfaction level of livin by Mandiri bogor (Y) services, and the remaining 30.9% is influenced by other variables outside of the research regression.

### Hypothesis Test

In this study, the hypothesis test was carried out by looking at the results of p-value intepretation and the results of statistical tests t and F, namely:

- i.  $H1 = x1(\text{ease of mbnking } t \text{ count} = 2.571; \text{ sig} = 0.011 ; t \text{ table } (112-3=109) = 0.67677, t \text{ count} > t \text{ table}, 2.571 > 0.676777 = \text{reject } H0, H1 \text{ was accepted and it was stated that there was a significant relationship and positive influence between the variable ease on the variable satisfaction of the livin by independent service}$
- ii.  $H2 = x2(\text{mbnking security } t \text{ count} = 5.508; \text{ sig} = 0.000 ; t \text{ table } (112-3=109) = 0.67677, t \text{ count} > t \text{ table}, 5.508 > 0.676777 = \text{reject } H0, H2 \text{ was accepted and it was stated that there was a significant relationship and positive influence between variable security variables on the satisfaction of livin by standalone services}$



- iii.  $H_3 = x_3$  (mbanking speed t count = 5.848; sig = 0.000 ; t table (112-3=109) = 0.67677, t count > t table, 5.848 > 0.67677 = reject  $H_0$ ,  $H_3$  was accepted and it was stated that there was a significant relationship and positive influence between the speed variables on the livin service satisfaction variable by self
- iv.  $H_4 = F$  count = 88,473; sig 0.000000; F table = (DF numerator: 3-1=2; DF denominator; 112-3= 109) = 3.08; F count > F table, 88,473 > 3.08 =  $H_0$  rejected,  $H_4$  accepted. So all independent variables, namely the convenience, security and speed of mbanking application services, affect the dependent variables of customer satisfaction of independent livin users in the city of Bogor.

### **The Effect of Convenience on User Satisfaction Livin by Mandiri**

Based on the results of the analysis carried out, the P-value of  $0.011 < 0.05$  and the t-table of  $2.571 > 0.676777$  was obtained so that it was stated that the convenience variable had a significant effect on the effect of user satisfaction livin by mandiri. The ease of using livin by mandiri in the form of various transaction services such as connecting with several digital wallets, ease in paying bills such as credit, restaurants, electricity, water, credit, etc. In addition, customers can also invest in livin by mandiri. the convenience of M banking users themselves is strengthened according to Titania (2021), the reason why people use mbanking is because the ease of services provided is considered to be able to help the financial transaction needs of customers. Currently, banking services have become a must owned by the public. This is because the services provided facilitate various transactions (Syamsul & Novi, 2020). The purpose of creating mobile banking is not to make it difficult for customers to complete financial transaction needs online or digitally (Jalil W, 2020)

### **The Effect of Speed on Livin by Mandiri Users**

The result of the P-value of  $0.000 < 0.05$  and the t-table of  $5.508 > 0.676777$  so it is stated that the speed variable has a significant effect on user satisfaction livin by mandiri. The speed referred to in the use of the application is intended for the lack of obstacles in making financial transactions online, which should be done offline or coming to the bank, now it is only enough to use the application on the smartphones of customers anywhere and anytime. This application also rarely occurs problems because it is updated regularly to optimize application services to customers. One of the aspects needed in mbanking is the need for connection speed to improve mobile banking services which can affect satisfaction for its users (Nurdin, Abdul, et al 2020). Based on pratama research (2019) that speed has a positive and significant effect on the satisfaction of Mbanking services for customers in the city of Surabaya. Likewise, livin user customers in Bogor City are satisfied with the speed of the M banking application service owned by bank mandiri. Speed is an important factor in meeting the criteria for mobile banking (Sari, 2015).

### **The Effect of Security On Livin by Mandiri Users**

The results of the analysis were obtained on the P-value security variable of  $0.000 < 0.05$  and the t-table of  $5.848 > 0.676777$  so that it was stated that the security variable had a significant effect on the security of livin by standalone users. The Security aspect is very important because it concerns the confidentiality of the personal data of customers. This is because the data should not be known by a common person other than the data owner and users of the standalone livin application. In avoiding fraud and theft, security aspects are one of the things that must be



considered, which aims to protect customers before making transaction decisions using m banking (Erina, 2021). Security conditions in mobile banking also continue to be improved in line with the increasing number of users and the rapid development of banking digitalization to support customer data security (Jalili W, 2020). M banking aims to minimize customer risks when making transactions directly at the bank. This proves the importance of security in the mobile banking application itself (Riyadi, et al 2013).

### **Urgency towards the Development of Banking Digitalization in Indonesia**

In the era of digitalization, developed countries are aggressively innovating in all fields. This is evidenced by several new discoveries from various foreign countries in the world. In banking digitalization, various ways are carried out to achieve the effectiveness of customers provided by the bank, such as E-money, M-banking, etc. This can affect the circulation of money in the community, because users do not need to carry cash. One of the innovations that has been carried out by one of the state-owned banks in Indonesia, namely Livin by Mandiri, which is an M-Banking application, aims to facilitate and help customers to be more effective in carrying out daily financial transactions. This is shown by the results of research obtained that customer satisfaction is influenced by effectiveness which includes the convenience, security and speed of the Livin Mandiri application. The government also participated in regulating policies by issuing a blueprint design for banking digitalization transformation. This design prioritizes digitalization innovation in 2020-2025. The existence of Livin by Mandiri shows that banking institutions in Indonesia participate in supporting and realizing policies that have been issued by the government, especially the Financial Services Authority.

### **5. Conclusion**

Based on the exposure of data and the results of data analysis in this study, it provides conclusions, namely the influence of blablaba The distribution of questionnaires for 5 months, namely from May to August 2022, with the number of respondents as many as 113 out of the total population of 153, data analysis results were obtained which resulted in variables of ease of 0.011, security of 0.000, and a speed of 0.000 which was below a significant level of 0.05 so that the three independent variables has a significant effect in meeting the customer satisfaction criteria for Livin by Mandiri users. Bogor City at the Sindang Barang Branch in 2022. In this case study, it can be concluded that the M-Banking service application is effective in supporting banking digitalization, because this helps realize government policies in its efforts to transform banking digitalization in 2020-2025.

### **6. Suggestion**

This research was made to be intended to be a reference for the government in taking policies related to banking digitalization. The government should conduct counseling to the public so that people use Mbankin services. This is because it can affect the money supply. The government must also participate in taking policies that support and make it easier for the banking industry to digitize its services, in addition to supporting the OJK program. Banks continue to promote M-Banking services to the public and improve the application and provide more convenience for the public. In addition, for subsequent researchers, it is better to conduct research that covers a wider scope, using other methods, and not forgetting to make the latest updates for the coming year. Furthermore, prospective customers can take advantage of the application services that are already



available to facilitate daily financial transactions. With this, customers participate in supporting OJK's policy, namely banking digitalization in 2020-2025

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## The Factor that Influences Customer Satisfaction on Food Delivery Service During the New Norm

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**Abstract:** *Online food delivery is one of the courier services, whether it involves restaurants, or food delivery companies. The studies will give a broad overview of the study that include the introduction, literature review, methodology, finding, discussion and conclusion. The purpose of the study was to investigate the relationship of factor that influence customers satisfaction with food delivery service during the new norm and to identify the most important factor that influence customers satisfaction with food delivery service. The customer satisfaction was representing by four factors that were food quality, consumer convenience, timesaving and price. The study sample was identified as all costumer that using food delivery service just focuses Kedah people only. The population and sample analysis for this study is 360 respondents to answering this survey. This is because, Kedah people is a part of state that using online food delivery service, it also the preferred that location because it is an urban area and easy to collect data. As the result this study, the hypothesis relationship of the factor that influence customer satisfaction on food delivery service during new norm is supported.*

**Keywords:** Food delivery service, Food Quality, Consumer Convenience, time-saving, price; customer satisfaction.

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### 1. Introduction

Online food delivery is one of the courier services, whether it involves restaurants, or food delivery companies. It will usually be made through a restaurant or a website application to easy using online food service. With this also, the general issue of the new norm today proves that food delivery services have the various internet ordering platforms suitable for every people. For example, in 2020, 84.2% of Malaysians have internet access, 88.3% use apps for shopping every month, and 6.86 million people use this online food delivery service to buy take-away food (Kemp, 2021). So, from these issues, what factor that influences customer satisfaction with food delivery service during the new norm?

First and foremost, in this new norm, the online food delivery service is becoming more popular from time to time. This is due to the fact that food has recently emerged as one of the most popular online purchasing categories, with a 12 percent annual growth rate (Chang et al., 2014). Chengyi Lin (2020) stated that delivery technology assisted in solving new norms such as COVID-19 pandemic problems and safe meals to customers at home. So thorough that citizens are pretty engaged when using online food ordering apps, particularly in the new norm today.



Secondly, a simplified ordering system can attract customer satisfaction to use this online food service. According to Yeo, et al., (2017), the internet food delivery services sector can seem essentially endless and the nature of this business is mostly unclear. Then, for customer satisfaction in delivery service to get a competitive advantage, so that every service industry must provide exceptional service in order to boost customer satisfaction (Caro & Garcia, 2007). As a result, online food delivery service must provide exceptional services in order to obtain client happiness. This is because customer happiness is influenced by service quality (Ozer et al., 2013). So, this study focuses on the factors that influence customers' satisfaction with food delivery services in the new norm. This is proven to increase customer satisfaction when using food delivery services.

According to Sonali (2020), the online market is now dominated by the food delivery business. In fact, through customers can also order from various restaurants with a single tap on their mobile phones. The online food delivery services have now been expanded with a wide range of options and convenience to customers (Hirschberg et al., 2016). According to Chang et al. (2017), customers can shop easily, compare products and prices effectively, as well as arrange product delivery promptly due to the availability of a website platform. Besides that, the research has four factors that influence customer satisfaction on food delivery services during the new norm. From this factor, food quality, consumer convenience, time savings, and price are other factors that contribute to customer satisfaction (Suhartanto et al., 2018; Mat Nayan & Hassan, 2020; Yeo et al., 2017). Thus, the researcher has decided to know more details about the research on the factors' influence of food quality, consumer convenience, time-saving, and price on customer satisfaction by Kedah people during a new norm.

## **2. Literature Review**

### **2.1 Food Delivery Service**

Food delivery service can be defined as a procedure in which food is purchased online and delivered to the consumer (Li et al., 2020, p. 3). For this, there are a number of integrated food delivery service platforms such as Grabfood, Panda, and Sprouts, to name but a few. They are for the development of this service. Furthermore, this service is increasingly advanced as it has occurred since the COVID-19 outbreak. According to Nayan and Hassan (2020), the food delivery services sector is growing over time and has a potential worldwide rate. In addition, this food delivery service involves technology to facilitate communication between sellers and customers.

### **2.2 Food Quality**

Food quality is a part of the success of producing food products, especially since every online food delivery service will strive to remain competitive in the global market. In addition, food quality is also related to the overall performance of a restaurant in meeting customer needs and customer satisfaction. This is so because it can be seen as an important aspect of every customer experience (Ha & Jang, 2010; Sulek & Hensley, 2004). According to Ha and Jang (2010), food quality was used to know the impact of customer experience on customer satisfaction and the intention to return to use the services through online food delivery. Food quality is determined by the extent to which the food meets the needs of customers in the restaurant (Ha & Jang, 2010; Suhartanto et al., 2019). Then food quality also affects the performance of food. This performance food involves the menu, presentation of the food produced, and size of the meal quality of a restaurant (Liu et al.,



2017). According to Namkung and Jang (2007), customer satisfactions toward restaurants also have the food quality that has a significant impact on customer satisfaction.

H1: There is a relationship between food quality of food delivery service toward customer satisfaction

### **2.3 Consumer Convenience**

Customer convenience is one of the most important aspects of meeting customer satisfaction (Mat Nayan & Hassan, 2020). Therefore, various online food delivery service qualities also involve digital applications to easy using these services for customers. This is because when a customer wants to make an online purchase, they will expect a high level of service from the website (Caruana & Ewing, 2010). According to research conducted by Jayadevan et al. (2019), digital applications have been established as one of the fastest-growing developments in online food delivery services. So, through this digital application, the mobile commerce such as website application involved to makes customers easily use this website.

H2: There is a relationship between consumer convenience of food delivery service toward customer satisfaction

### **2.4 Time-saving**

Time-saving is one of the most important aspects that can influence customer satisfaction (Meuter et al., 2003). One of the major contributors to influencing customer satisfaction when buying online is time-saving (Khalid, 2014). Time-saving is crucial to customer satisfaction. Though that, every customers have different goals and needs when using online food delivery services. For example, the customer can get a higher value with the goods and delivery desired (Lin et al., 2011). This matter also refers to the fact that it is very important to know all the delivery routes to ensure timely delivery (Chandrasekhar, 2019). According to Wu (2003), he said, changes in consumer habits and a lack of time can cause consumers to find it increasingly difficult to shop in physical places such as stores and malls. Then, Wu (2003) also stated that as long as there is online purchasing, it can save time and people are more interested in continuing the service. Furthermore, time-saving is also involved in busy customers' daily routines. In fact, because of their hectic lifestyles, most customers nowadays despise the effort of finding and waiting for food at restaurants. Therefore, every people will prefer food that is prepared for them without much effort and as quickly as possible (Yeo et al., 2017). Wu (2003) has also found that changes in sociocultural daily routines and a lack of time make it extremely difficult for customers to physically enjoy their food purchases.

H3: There is a relationship between time-saving of food delivery service toward customer satisfaction

### **2.5 Price**

The price is the monetary or non-monetary value that an individual must provide in exchange for a product or service (Nagle et al., 2011). The internet makes it easy to compare costs among different online vendors, which has proven to benefit consumers by allowing them to purchase items at a lower cost, which has a substantial impact on their intention to shop online. As a result,



customers will be happier with their online meal ordering experience and are more likely to utilize these services again in the future. According to Nagle et al. (2010), purchase agreements have been priced as the monetary value in exchange for goods and services. Besides that, in price, in online food delivery service it can be an affordable price. This is because affordable prices can attract customers to use this online service. Then, according to Jin and Gu Suh (2005), consumers are very concerned about price and value. In addition, customers have a tendency to feel positive toward sellers who produce quality products or services at affordable prices (Yieh et al., 2007).

H4: There is a relationship between the price of food delivery service toward customer's satisfaction

## 2.6 Customer Satisfaction

Customer satisfaction can be linked to a customer's joy in doing something. Trough that, it is can show that customer satisfaction represents the difference between customer expectations and the product provided. With this, a customer's level of enjoyment or dissatisfaction represents sentiments about whether a product or service meets or exceeds their expectations. For example, a response to a service or product delivered, they have different views on whether the requirements are met or not, and the overall feeling of acceptance of a product (Biesok & Wyród-Wróbel, 2018). In addition, customer satisfaction is very important because it acts as an evaluation of the customer's experience with a service. Customer satisfaction can occur when the service provider can meet the customer's needs.

## 2.7 New Norm

Almost all countries are affected by the new norm. This is due to the spread of the COVID-19 pandemic. Countries worldwide have advised people to be careful and get used to this norm. Therefore, the strategy of locking and staying at home has been implemented as a necessary action to flatten the curve and control the spread of disease (Sintema, 2020). With this, online food delivery is becoming more popular making it easier for customers to use this food service even in the new norm. Then, since the outbreak of the COVID-19 pandemic, customers have become accustomed to this new norm. Despite the economic downturn, customers are still interested in online food delivery in their daily lives and this service will remain viable. This is because everyone needs to eat in their life.

## 3. Methodology

According to McCombes (2021), any person approachable by the researcher is included as a sample in a facility sample. This analysis has sample frame, so the technique of non-probability sampling will be used. Non-probability sampling is quicker and less costly than probability sampling (Showkat & Parveen, 2017). The reason why we use purposive sampling is to identify the quality respondents for this study and to eliminate respondents who do not fit the requirements (Etikan, 2016). The non-probability sampling designs that fit into the large categories of purposive sampling are used in this research. This is because the respondents in this study are customers from various Kedah states; calculating the minimum sample size required for the survey is nearly impossible for the researcher. The population of this research will be customers who use food delivery services such as Kedah people in this research. The data analysis for the research collected of 360 respondents. The effect size of the Kedah people population is a part of state that using



online food delivery service, it also the preferred that location because it is an urban area and it easy to collect data via Google Form. For example, spread at WhatsApp and telegram application for family members, friends, the contact, Facebook platform as media social for collect the data analysis. This study also can be described as a descriptive study that is interested in describing the characteristics of a population or phenomenon. It will be implemented in order to describe the characteristics of factors that influence customer satisfaction with food delivery services during the transition period. As for the development of the questionnaire, six sections will be constructed to each of the research objectives as well as research questions. Questions from each section will be developed, addressing the research objective.

## 4. Result and Analyses

### 4.1 Reliability Coefficient

A reliability test was conducted prior to the examination of the objective and research questionnaires. This reliability of tool used is important for show the quality of the measurement method, it is the for internal consistency in quantitative measurements is Cronbach's Alpha Coefficient of the scale used (Pallant, 2005)

Table 4.1: Reliability Coefficient for Each Section of the Questionnaire

Questionnaire	No. of Items	Cronbach's Alpha
Section B: Food Quality	5	.932
Section C: Consumer Convenience	5	.911
Section D: Time - Saving	4	.948
Section E: Price	4	.898
Section F: Customer Satisfaction	4	.926

**Note: No. of respondents = 360**

Refer to this table 1, the coefficient alpha for the independent variable time-saving high coefficient value of followed by food quality and customer satisfaction which is .948, .932 and .926 coefficient value. Another coefficient alpha is the consumer convenience .911 coefficient value and for the price of coefficient, alpha is a .898 coefficient value that has the lower coefficient value. But the overall that conclude that is all variable is positive coefficient value. According to Ryan (1995), any test should be considered reasonable and acceptable if the coefficient value is greater than 60.

### 4.2 Respondent's Demographic Characteristics

A total of 360 respondents' data were respondent's demographic's characteristic was analyzed using frequency analysis. The characteristic of the respondents including gender, age, employment status, marital status and state. The first frequency test is looking at respondents' gender. There were 32.7% male respondents (n= 11) and 67% for female respondents (n=242). Through this result, it was predicted that female customers were more likely to use food delivery services compared to male customers. Secondly, the highest respondents in age are 18 - 25 years old



consisting of 59.0 % only (n=213) respondents followed by 26- 35 years old (n=74) respondents with 20.5 %. Then, another age under 17 years old with 11.1 % which is (n= 40) respondents, and the lowest age is 36 years old and above (n=33) which is 9.1 %. This result presumed that youths in the range 18-25 years old were more likely to use food delivery services compared to other range people. In regards to employment status, the highest of the respondents was a student 46.5 % consisting of (n=168) respondents. While the second highest employment status who are working people has (n=63) respondents which is 45.2 % and the lowest 8.0 % are from not working which is (n=29) respondents only. This is because, most of the students prefer to use food delivery services to ease their daily lifestyle compared to other working people and not working people.

Besides that, for marital status, there were (n=255) single people respondents which are 70.6% followed by married (n=105) respondents with 29.1%. So, from this study, the high marital status is single people that most likely use food delivery services whereas not all married people like to use this service. Next, the last one is the state. The highest state of the respondents is Kota Setar which is a total of (n=198) respondents with 54.8 %. Then, accompanied by Sungai Petani that have 16.3 % were (n=59) respondents only from this state. After that, Baling is (n=29) respondents which is 29% followed by Langkawi and Yan which is (n= 23), and (n=22) respondents and the percent is 6.4%, 6.1%. The last state or area in Kedah is Kulim and Pendang which have the lowest (n=14) and (n= 1)5 respondents only with 3.9% and 4.2 %. To this result, it was that the study more on Kota Setar that using the food delivery service compared to other areas in Kedah

#### 4.3 Descriptive Statistic of Measurement Scale

This section reports the mean score obtained from a descriptive statistic regarding customer perceived food quality, consumer convenience, time-saving, price, and customer satisfaction. The question was arranged according to their value of mean score from the highest to lowest according to their individual construct. Table 2 demonstrated the overall mean score of food quality, consumer convenience, time-saving, price, and customer satisfaction.

**Table 4.3 Overall Mean score of Food Quality, Consumer Convenience, Time-saving, Price, and Customer Satisfaction**

Variable	N	Min.	Max.	Mean	Std. Deviation
Food Quality	360	2.00	5.00	3.8826	.47932
Consumer Convenience	360	2.80	4.80	3.8706	.46734
Time-Saving	360	3.00	5.00	3.9514	.51041
Price	360	2.75	5.00	3.9361	.48882
Customer Satisfaction	360	2.75	5.00	3.9576	.49310
Valid N (listwise)	360				

The table 4.3 shown descriptive statistic mean score food quality, consumer convenience, time-saving, price and customers satisfaction. According to each question's unique design, the questions were ranked from highest to lowest based on their mean scores.



#### 4.4 Pearson Correlation Coefficient

Pearson Correlation Coefficient is the one strength for the correlations between two variables is statistically determined and often known as Pearson's R. In other words, it serves as a gauge for the interdependence of two variables. The most popular technique for analyzing numerical variables is the Pearson correlation approach, which assigns a value between 0 and 1, with 1 denoting total positive correlation and 0 denoting total negative correlation. According to the following interpretation, a correlation value of 0.5 between two variables denotes a significant and favorable association between them.

**Table 4: Pearson Correlation Coefficient Correlations**

		Food Quality	Consumer Convenience	Time Saving	Price	Customer Satisfaction
Food Quality	Pearson	1	.801**	.802**	.797**	.806**
	Correlation		.000	.000	.000	.000
	Sig. (2-tailed)					
Consumer Convenience	N	360	360	360	360	360
	Pearson	.801**	1	.911**	.853**	.855**
	Correlation			.000	.000	.000
Time- Saving	Sig. (2-tailed)	.000	.000	.000	.000	.000
	N	360	360	360	360	360
	Pearson	.802**	.911**	1	.886**	.888**
Price	Correlation					
	Sig. (2-tailed)	.000	.000	.000	1	.868**
	N	360	360	360	360	360
Customer Satisfaction	Pearson	.806**	.855**	.888**	.868**	1
	Correlation					
	Sig. (2-tailed)	.000	.000	.000	.000	.000
N		360	360	360	360	360

\*\* Correlation is significant at the 0.01 level (2-tailed).

The significance was concluded that, all variable has relationship between them. This is because, this significance shown the lower value .000 compared to 0.001 for Pearson Correlation Coefficient.

#### 4.5 Summary of Hypothesis Testing

Derived from the previous results on statistical analyses, Table 5 summarized the corresponding results on each of the hypothesis.



Table 4.5: Summary of Hypothesis Testing

Hypothesis	Coefficient (t- value)	Result
Hypothesis 1: There is a positive relationship between food quality of food delivery service toward customer satisfaction	.806**	Supported
Hypothesis 2: There is a positive relationship between food quality of food delivery service toward customer satisfaction	.855**	Supported
Hypothesis 3: There is a positive relationship between food quality of food delivery service toward customer satisfaction	.888**	Supported
Hypothesis 4: There is a relationship between price of food delivery service toward customer satisfaction	.868**	Supported

## 5. Discussion

Objective one of the studies wants to investigate the relationship of factors that influence customers' satisfaction with food delivery service during the new norm. Correlation analysis was used to investigate the relationship between food quality and customer satisfaction. Showed the value of  $r = 0.806$  with the significance value of  $p > 0.05$ . Thus, it indicates that food quality was supported. Next, objective two of the study was to know the relationship factor that influences customers' satisfaction with food delivery service during the new norm. The results of the Pearson correlation between consumer convenience and customer satisfaction showed that there is a moderate positive linear relationship between these two variables ( $r = 0.855$ ,  $p < 0.05$ ). Since the variable is significance correlated, thus hypothesis was supported. Then, objective three of the study is shown that there is a significant relationship between time-saving and customer satisfaction positive moderate linear relationship. As the result of Pearson, correlation satisfaction is  $r = 0.888$  with a significance value of  $p < 0.05$ . So, through that, the variable was supported. The last hypothesis is objective four of the study factors that influences customer satisfaction with food delivery service is price. It has shown the value of  $r = 0.868$  that the relationship between price and customer satisfaction and its hypotheses were supported.

The research was looking for factors that influence customer satisfaction with food delivery services. In general, this research can help the researchers to gain a better knowledge of the evolution of acceptability and services for food delivery services that using online in Malaysia. This research will provide some insight into customer satisfaction and can inspire new customers to begin online food delivery services. From the government's insight, this research can influence customers to assess the customer perspective and expectations regarding the use of food delivery services and determine whether the application may be invested for future growth in Malaysia. This research might contribute clearly to the understanding of the factors that influence customer satisfaction, there are some limitations to this research. Firstly, this research analyzes customer satisfaction to use food delivery services and does not specify any services applications that are popular. For example, is, FoodPanda and Grab food. Then, this research only generalizes in Kedah consumer intention to use food delivery services with a range of respondent factor influence was include in the survey from questionnaire google form.



For future studies, it may be useful if respondents obtain information from other grades, such as promotion for using food delivery services, so it can give more experience for other customers to use it. It also suggested that future research could be explored by including moderating or mediating effects of variables such as food delivery advertising and word of mouth in future customers to the intention of application service. Then, this finding research can be applied to any food delivery service application. Its future study also to analyzed demographics such as gender, employment status, marital status, and the state as moderating variables between factors that influence customer satisfaction.

## 6. Conclusion

The study's two objectives have been accomplished successfully both empirically and theoretically. The study presents introductory documentation that investigates the factor that influences customer satisfaction with food delivery services. Its research also can help the theory domain by providing empirical evidence about the connection between food delivery service with food quality, consumer convenience, time-saving, and price. Besides that, the outcome of this research showed that the factor influencing customer satisfaction is significantly relevant and has an oblique influence on the satisfaction of the customer to use this food delivery service. For this reason, the researcher hopes that this study research could help other researchers to provide beneficial information both theoretical and practical from this study. The last one is, that all the questionnaires related with two objectives for successfully completed and been fully achieved.

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# The Main Car-Buying Characteristics of A Young Generation

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**Abstract:** *There is a need to easily see young generation's characteristics when buying a car in order to increase sales of national cars. This document aims to conduct a systematic literature review synthesis method to evaluate the young generation's main car-buying characteristics that focus on the youngers self-worth, the youngers personalities and the youngers preferences. Results of the study would include the main car-buying features of the young generation.*

**Keywords:** the youngers self-worth, the youngers personalities, the youngers preferences

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## 1. Introduction

Given that young people are so important to society's progress, to the environment's protection, and to the economy's development globally, many businesses and academics are working to understand their features. In order to increase their market shares, manufacturers are aggressively pushing out new items that cater to the desires of young people, and the vehicle industry is no exception. At the same time, many academics have attempted to research the relationship between consumer characteristics and car-buying (CB) behavior. The in-depth knowledge of the characteristics of the young generation, from a systematic literature review synthesis method, has, however, only rarely been investigated, despite the fact that understanding the main characteristics of the young generation will help us to promote the sale of vehicle. This study conducted a systematic literature review synthesis method to evaluate the youngers main characteristics that focused on the youngers self-worth (TYSW), the youngers personalities (TYP), and the youngers preferences (TYPR) and presented the literature on TYSW, TYP, and TYPR in order to have a deeper understanding of the young generation's CB behavior. The innovative "Literature Review Synthesis Process"(Ibrahim, R. Mustafa Kamal, 2018) in Masiran, et al. is followed in the literature review study (Masiran, R. Ibrahim, N. Awang, H. & Lim, 2020). This document resulted in a synthesis summary for TYSW, TYP, and TYPR that underwent additional cross-analysis, integration of options, and prioritizing of the synthesized summaries in favor of high likely solutions for CB and associated problems among the young generation.

## 2. The young generation

This section covers TYSW, TYP and TYPR. The objective is the younger generation.

### 2.1 The youngers self-worth

Self-worth(SW) is defined by Merriam-Webster as the conviction that one is a decent person deserving of respect. The environment, economics, and society all have a big impact on TYSW. Researchers have looked into how society, the environment, and the economy affect TYSW. Many researches showed that, in terms of society, online social capital benefits the relationship between



Internet use and self-worth (Zhai, 2021), online social networking sites like these can help the youngers develop a sense of self-worth (Liu & Baumeister, 2016). This is due to the information most origin from the internet the youngers get during the digital age, so the more online social capital they have, the more confident. Regarding the economy, Teng (2017) asserts that materialism can predict the self-worth and body surveillance behavior of young Chinese women. Namely, the SW varies with the area-economy level. In general, the youngers have a stronger consumption desire at higher area-economy level, so we can predict the SW of the youngers through their consumption behavior. As to the environment, McNamara Barry & Nelson (2008) describe how the environment, including religious views and the support and love from friends and families, affect the overall sense of self-worth of developing adults. Although it is hard to change the environment where the youngers live, the manufacturer could focus on emotional experience which more easily focuses than other factors to improve competition when the youngers are purchasing a car.

According to the findings of the preceding study, young people's SW is related to their social way. Also, their consumption behavior can be shaped by consumer beliefs or support to produce positive life outcomes, and their SW is related to area-economy level.

## **2.2. The youngers personalities**

Personality is explained by Merriam-Webster as the aggregate of constant physical and mental traits constituting an individual's identity. Understanding young people's personalities can properly help us forecast their behavior features, and well-designed treatments can modify TYP as well (Hudson, 2021). On the one hand, a host of researchers study how young people will behave through their personality traits. For instance, it has been shown that personality traits play a role in young adults' conspicuous consumption (Barrera & Ponce, 2021), and young people's responses to environmental issues are also related to their personalities (Liem & Martin, 2015). Moreover, Quintelier, (2014) states that the big five personality traits can influence young people's political consumer behavior. In other words, the TYP is a known antecedent of no matter on conspicuous consumption, responses to environmental issues, and political consumer behavior.

On the other hand, social-economic environment, age and education can shape the personalities of young people. Peng & Luo, (2021) state how social and economic growth have affected Chinese college students' personality qualities. Then, it was proved that the moderating effects of age on personality drive behavior towards driving results (Haerani, Parmitasari, Aponno, & Aunalal, 2019), and the role of education level in attitudes positively for young people (Kubrak, 2020).

According to the research mentioned above, young people with different traits would have different consumption patterns. In particular, those with high education level would behave more sustainably, especially those imaginative, inquisitive, and intelligent individuals who are more likely to purchase ethical goods. Additionally, young people's personality changes were more noticeable in regions where GDP development was somewhat faster. Suggesting the car manufacturers see the youngers in the place where GDP development was somewhat faster as an essential potential market, and academics can do more research on the effect of personality on car-buying.



### **2.3. The youngers preferences**

Giving certain people, items, or services advantages over others is referred to as preference. Young people prefer new, environmentally friendly things and are sensitive to price. As said before, personality may determine how young individuals would act, and the action they make is related to preference. (Ehrenberg, Juckes, White, & Walsh, 2008). For example, most Chinese young people like Ridesplitting (Wang, Chen, & Chen, 2019). Ridesplitting is a new and pleasant mode of transportation for young people owing to its ease, low cost, and novelty. Furthermore, it has been demonstrated that young individuals buying electric automobiles in China have objectives to lower PM2.5, indicating that young people favor green and ecologically friendly transport options (Ru, Qin, & Wang, 2019), while household spending has an impact on Japanese young people's automobile ownership and use (Zong, Zhang, & Jiang, 2019).

Overall, the outcome above demonstrates that young people appreciate novelties, particularly novelties in technology. Their tastes are influenced by felt moral responsibility and environmental concerns. Last but not least, household costs have an impact on young people's consumption behavior.

## **3. Discussion on synthesis findings**

This section cross-analyses, integrates possibilities, and prioritizes the synthesized literature review summaries under the thematic theme the younger generation towards high probable solutions for the CB problem and potential field.

### **3.1 The synthesized literature review summaries of TYSW and TYP**

Economic, religious, social, and other factors influence TYSW and TYP. According to the definitions of self-worth and personality, self-worth is a feeling of optimism about their own and affirmation of their own, while personality refers to individual variances in typical thought, feeling, and behavior patterns. From the literature review of TYSW and TYP, it is difficult to clarify the relationship between personality and self-worth, but we can roughly judge that personality is the manifest expression of self-worth, and what they have in common is that they all pay attention to their inner feelings. Thus, from the literature review of TYSW and TYP, we can evaluate the main car-buying characteristic approximately among the young generation. At first, the car they like should be informational, intelligent, and compatible with their personalities. Moreover, the youngers with high education level would like pro-environment cars also.

Therefore, the formation of self-worth is affected by many complex factors and difficult for us to change a person's self-worth. However, the youngers self-worth and personalities both are related to emotional expression, and the youngers have a high desire for personalities shown and pay more attention to emotions. According to the correlation between TYSW and TYP, young people who have positive personalities demonstrate that they value themselves. So, more studies can be done to increase the young people's car-buying experience by concentrating on the youngers' emotions and personalities, which play an essential role in the car-buying experience.

### **3.2 The synthesized literature review summaries of TYSW and TYPR**

Preference is the behavioral expression of self-worth of the young generation. According to the research above, the younger self-worth is affected by many complex factors, and a positive



personality pursuit is a good preference for developing self-worth. Generally, young people's behavior often reflects their personal preferences. So young people's self-worth and personalities can be observed through behavioral performance. Moreover, with the concept of pro-environment growth, they recommend ecological behavior and a green lifestyle, which all affect their behaviors every day. Thus, from the literature review of TYSW and TYPR, we can evaluate the main car-buying characteristics approximately among the young generation. Adding the high technology feature to the car would be attractive to the young generation. Furthermore, they also focus more on the experience related to emotion since the concept of pro-environment and self-worth development among the young generation.

Therefore, the preference is the behavior expression of TYSW. The formation of self-worth is affected by many complex factors and difficult for us to make a judgment, but importantly especially, learning about the TYSW for the manufacturers who want to expand their market share among young people. From the literature review, we can do more research on younger's emotions to intensify their loyalty. Also, businesses can take corresponding marketing measures according to young people's behavior habits since behavioral preferences are direct expressions of self-worth, and they are also easy to observe.

### **3.3 The synthesized literature review summaries of TYPR and TYP**

Preferences are behavioral expressions of personality. Young people have a high desire for personality shown and shown them by behavior, which is good for their emotional and responsibility expression to form a positive effect. For instance, the concept of pro-environment growth causes them to recommend ecological behavior, which will appeal to more young people to protect the environment since the young generation's preferences are affected by peers. Thus, from the literature review of TYPR and TYP, we can evaluate the main car-buying characteristics approximately among the young generation. First of all, the young generation tries to find a car that is suitable for their personality. In addition, any ways can increase the engagement of the young generation to car experience might be added to improve buying emotion.

As preference is a behavioral representation of personalities, young people's personalities may thus be assessed by their behavior to increase the car-buying experience. And the younger generation wishes to maintain their individual characteristics. If their personalities can be effectively expressed in some ways, it will be helpful for the sale of car to the young generation.

### **3.4 The synthesized literature review summaries of TYSW and TYP and TYPR**

Self-worth, personality and preferences are inseparable and difficult to discuss independently because they are closely related and intersect. In other words, their relationship is that self-worth is a person's value, which is formed by many complex factors, while personality is a manifest expression of self-worth, which both pay attention to the inner feelings of the individual. And preferences are behavioral performances of both self-worth and personality. Thus, from the literature review of TYSW, TYPR and TYP, we can evaluate the main car-buying characteristics approximately among the young generation. The inner feeling is a might primary choice when they are making a purchasing decision on a car. The age, personality, education level, price and context so on would have a comprehensive impact on inner feelings, but the research on the integrated



effect of personality and emotion on the CB among the young generation is lacking. For car manufacturers or academics is necessary to do more study on it in order to expedite the CB experience.

As a result, from the literature review of TYSW, TYPR and TYP, we can draw a conclusion that emotion and personality trait which is a manifestation of self-worth in young people play a role in CB, and the youngers' CB characteristics may be observed through their behavior.

#### 4. Conclusion

The aim of this document is to understand the young generation's main CB characteristics and document the results of a systematic literature review synthesis process under the thematic theme of the younger generation.

For the youngers self-worth, the study found young people's self-worth can be affected and shaped by many factors. Furthermore, young people have a high desire for personalities show and personalities are related to education level, GDP and adaptability and so on. And most young people own the same preferences and they recommend ecological behavior and a green lifestyle. A synthesis of the preceding findings implies that a positive personality is a manifestation of excellent self-worth among the youngers, whereas preferences are an expression of behavior concerning their self-worth and personality. So, using the literature reviews of TYSW, TYPR, and TYP, we can roughly assess the key features of the young generation's car-buying behavior. When the young generation is choosing to buy an automobile, their inner sentiments are might a major factor to consider.

Therefore, these findings are essential since they contribute to the background of the younger generation and give retailers evidence to improve the CB experience among the young generation. Further research is recommended to perform a meta-analysis of the literature supporting the proposed theoretical proposition. Additionally, a future study about the integrated effect of personality, emotion and behavior is also proposed to include the findings in the faster CB experience.

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## The Relationship of Gender to Students' Level of Depression

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**Abstract:** *During COVID-19 pandemic, Learning and Teaching from Home has been implemented to every student including university students. After two years, these students are asked to return to campus and study face-to-face or hybrid learning. This may be emotionally disturbing to some of them. This is because they feel comfortable and have already adapted the methods of Learning and Teaching from Home. The aim of this study is to identify the students' level of depression in the transition process of Learning and Teaching from Home to study face-to-face or hybrid learning. Besides, this study also examines whether there is a significant difference in the mean score between gender and the students' level of depression. The instrument used in this study is the Beck Depression Inventory (Second Edition) which was distributed to 110 Diploma level students at Universiti Teknologi MARA (UiTM) Pahang Branch, Jengka Campus. The data was analysed using the Statistical Package for Social Sciences (SPSS) software version 20. The results of the study showed that half of the students experienced a moderate depressive disorder. However, the results found that there was no significant difference in the mean score among male and female students.*

**Keywords:** students, gender, level of depression

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### 1. Introduction

The COVID-19 pandemic has affected various sectors including the education sector. According to the UNESCO Monitoring Report (2021) there are 192 countries that have suspended school and university sessions due to the COVID-19 pandemic. Since the Movement Control Order (MCO) was enforced, the education system in Malaysia has also shifted from traditional classes to Learning and Teaching from Home classes. The transition to this new education system exceeded expectations because it needed the involvement and support of various parties, especially lecturers and students. There are various challenges faced by the students during Learning and Teaching from Home. Among them are data problems, slow internet lines and heavy workloads. However, these problems were successfully faced and overcome by them, they were comfortable and able to accept the learning methods from home. Now, after two years have passed, they are asked to return to campus. They need to switch back from Learning and Teaching from Home to traditional learning, i.e. face to-face or hybrid studying. This situation may disturb the emotions of certain students who are already too comfortable adjusting themselves studying from home. One of the difficulties faced is to identify the level of depression experienced by these students in the transition process of learning from home to face-to-face or hybrid learning.

Depression is one of the mental problems that a person may face without realizing it. The problem is usually caused by a prolonged feeling of sadness, but it is not a feeling of sadness that is normal



and cannot be controlled without any particular reason. The word depression according to Wicks-Nelson & Israel (2013) means the feeling of sadness experienced by an individual. Gurian (2011) states that every individual in this world experiences sad or gloomy feelings at certain times throughout their lives. For most people, these emotional disturbances only occur in a brief period of time. Ingersoll (2019) states that in certain cases, this feeling of depression can continue leading to unwanted consequences such as suicide or more serious mental illness.

Depression can affect numerous aspects of an individual's life whether in terms of thinking, emotions, social or physical. There are several types of depression such as general depression, bipolar depression, dysthymia, postpartum depression, psychotic depression, mucinous affective disorder and others. Subsequently, in this study, depression is seen as a clinical mood disorder. According to Harper & Nelson (2020), clinical depression is a type of mental illness that is categorized as feeling extremely sad. It will cause a person to feel prolonged sadness, fatigue and lack of energy, quick to anger and loss of interest in daily activities. This depression usually lasts for at least two weeks and if treated, the patient will recover. However, if it lasts for months or years without treatment, then it will have a negative impact such as mental illness or suicide. Among the causes of depression are deterioration of physical health, social problems, financial problems or taking certain medications.

Depression can happen to anyone consciously or unconsciously including students. Kauffman's study (2011) shows that depression among students has been a controversial issue for the past few decades. Some students fail to control their emotions when under pressure. One of the pressures faced by students is in learning. The pressure to get excellent academic results not only comes from within themselves, but pressure also comes from family and environment. Two years ago, when COVID-19 hit, face-to-face learning was replaced by Learning and teaching from Home. At that moment, the mind-set of students is aligned to study online from home. But now, they must align their mind-set back to face-to-face learning. They need to continue their studies on campus. The problem is that these students 'grew up' by learning from home, i.e., from high school to university level. Some of them will experience emotional disturbances. They easily feel sad, disappointed and sometimes take inappropriate actions. What about the emotions of these students? To what extent is the level of depression experienced by them. Thus, this paper aims to identify the level of depression experienced by these students during the transition process of learning from home to face-to-face or hybrid learning. This study also examines whether there is a significant difference in the mean score between gender and the students' level of depression. The comparison between male and female students is rarely done, but it is increasingly relevant in today's era where the number of female students is greater than the number of male students.

## 2. Literature Review

Today's students are more likely to suffer from depression than students in the past. Kohn & Frazer (1986) stated that most university students are often faced with depression problems in living life as a result of stress such as the workload given by lecturers, stressful learning situations, adjustment problems, conflict and competition in academic achievement, lack of free time and less time to be with their families. Although there is a depression study done on university students, it is not given much attention. This may be due to society's perception that these students are adults and good at taking care of themselves. The fact is, they are still human, have souls and feelings



that need to be taken care of. They not only experience family problems, financial problems, social problems, but also struggle in academics. According to Alvin Ng (2020), since the outbreak of the COVID-19 pandemic, the level of depression among university students has increased to the point that some have committed suicide.

Nunley's study (2013) states that many studies done in the 1960s and 1970s have proven that depression that exists among children and teenagers is more serious than expected. This is supported by a study done by Petersen et al. (2013) who found that 7% to 33% of students suffer from depression. Turkington & Kaplan (2017) also found that when a teenager reaches the age of 15, one in five of them will experience depression. This clearly shows that depression among students is indeed a problem that should not be taken lightly.

Since the 1970s, depression among students has been known as 'masked' depression (Kauffman, 2011). This concept explains that usually students are not aware of the occurrence of depression among them. Depression among students is usually such as hyperactivity, learning disabilities, skipping school (Kauffman, 2011), fatigue, problems concentrating, health problems and other body problems (Dacey & Kenny, 2007). However, this condition makes it difficult to distinguish 'masked' depression from conduct or behavioral disorder. According to Turkington & Kaplan (2017), depression among students goes undiagnosed and untreated because its symptoms are often compared to other behavioral problems. So, it can be said that studying depression among students is something difficult, but important as Bachanas & Kaslow (2021) states that depression among students needs good attention and intervention.

From earlier studies on depression, it was found that one of the variables that is often used is the gender factor. Many studies have looked at the relationship between depression and gender. However, most of these studies focus on adults only (Wade, Cairney & Prevalin, 2012) and less on students. In fact, according to them, the highlights of studies conducted on depression with gender differences among students are very inconsistent. For example, the results of a study conducted by Bachanas & Kaslow (2021) say that there is no difference in the rate of depression among male and female students.

However, Steinberg (2009) argues that before reaching puberty, depression is more common among male students than female students. On the other hand, depressive disorders occur more often among female students than among male students after puberty. Previous studies have found that female students have higher levels of depression than male students. A study by Dorn et al. (2009) showed that female students have higher levels of fear and anxiety than male students. In fact, two out of every three students who suffer from depressive disorders are female students. Hossinefard, Birashk & Atef (2005) in their study found that the prevalence of depression among students is 8.4%, and there is a significant correlation between some demographic variables such as gender.

Grant et al. (2002) conducted two studies to assess gender differences with depression among students using three concepts of depression, namely mood, syndrome and disorder. The results of the analysis show that the rate of depression disorders is more likely to occur in male students than female students. Mohd Suhaimi & Rozita (2018) found that there is a significant relationship



between the level of depression for male and female students where the mean score for male students is higher than for female students. This study is in line with the study of Zulkefly & Baharudin (2010) and Green et al. (2005) who stated that young men are more risk of depression compared to women.

According to Mohd Suhaimi & Rozita (2018), in the Malaysian context, male students can be said to be more psychologically stressed than female students due to the influence of local culture that sees men as being stronger and not weaker. When it is associated with psychological stress, it is possible that male students prefer to hide rather than share their problems with others. This is also influenced by the masculinity possessed by male students where they want to maintain their ego which is said to be more 'macho' than female students.

### 3. Methodology

This study was conducted using a quantitative research approach. The study population consisted of 110 male and female students of the Third Semester Diploma in Management and Technology from the Faculty of Business and Management at UiTM Pahang Branch, Jengka Campus. A stratified random sampling method was used to collect data from the population. Most respondents are between 19 and 22 years old. The variables of this study are divided into two, the dependent variable is the students' depression level, and the independent variable is gender. The aims of this study are to identify students' depression level and to examine whether there is a significant difference in the mean score between gender and the students' level of depression where the hypothesis testing is denoted by:

H1: There is no significant mean difference between gender and the students' level of depression.

The research instrument is a questionnaire distributed to each respondent via Google Forms, which is divided into two parts. Part A contains questions asking about the students' background such as gender, age and Cumulative Grade Point Average (CGPA). The questions are in nominal form. Part B contains 21 items of the Beck Depression Inventory (Second Edition) (BDI-II) (Beck, Steer & Brown, 1996) in a form of Likert scale of 0 to 3. This BDI-II is a self-report that can be administered easily and quickly by students. It has 21 items that are used to assess the level of depression among normal people as well as clinical patients aged between 13 and 80 years. There are four statements for each item, and they are arranged according to the level of seriousness. The first item represents the symptom of feeling sad, so the choice level is 0 (I do not feel sad), 1 (I feel sad most of the time), 2 (I feel sad all the time) and 3 (I am so sad and unhappy that I cannot take it anymore). The statement for each item is scored in ascending order, which is 0, 1, 2 and 3. The largest total score that can be obtained is 63 and the minimum total score is 0. Then, this total score is categorized into six levels of depression as illustrated in Table 1.

**Table 1: The Six Levels of Depression**

Levels	Scores	Categories
One	0 – 10	Normal
Two	11 – 16	Mild mood disturbance
Three	17 – 20	Borderline clinical depression



Four	21 – 30	Mild depression
Five	31 – 40	Severe depression
Six	41 – 63	Serious depression

If the students' score is between 0 to 10, the students are in a normal state (Level One), followed by a score of 11 to 16 where the students are in a mild mood disturbance (Level Two). However, according to Beck, Steer & Brown (1996), if the cut-off point (mean) is greater than or equal to 17 ( $\text{min} \geq 17$ ), then the students experience a clinical mood disorder. If the students' score is between 17 to 20, they are in a borderline clinical depression (Level Three), followed by a score of 21 to 30 where they faced a mild depression (Level Four), a score of 31 to 40, a severe depression (Level Five) and finally, a score of 41 to 63, a serious depression (Level Six).

The data obtained is analyzed using the Statistical Package for Social Sciences (SPSS) software version 20. Descriptive and inferential statistical analysis such as Cross Tabulation and t-Tests were used to analyze the data quantitatively.

#### 4. Results and Discussions

##### The Respondents' Background

Out of 110 questionnaires distributed, only 104 (94.55%) students answered. According to a study by Krejcie & Morgan (1970), a sample number of eighty people is sufficient in a population of approximately one hundred people. However, only 97 (93.27%) questionnaire forms can be used for further analysis because the remaining 7 (6.73%) forms are not filled out completely by the respondents.

Table 2 shows the students' demographic. The number of male and female students is approximately the same, namely 49 (50.52%) female students and 48 (49.48%) male students respectively. Most of them (96.91%) are between 20 and 22 years old. A total of 47 students (48.45%) obtained a Cumulative Grade Point Average (CGPA) between 3.01 to 3.49.

**Table 2: Demographics of Respondents**

Items		Respondent (Frequency)	Percentage (%)
Sex	Male	48	49.48
	Female	49	50.52
Age	20 to 22 years	94	96.91
	More than 22 years	3	3.09
Cumulative Grade Point Average	2.00 to 2.49	23	23.71
	2.50 to 3.00	17	17.53
	3.01 to 3.49	47	48.45
	3.50 and above	7	7.22
	Others	3	3.09



### The Reliability Analysis

The consistency of the interval items in the questionnaire for this study was tested using the Cronbach's Alpha analysis. According to Hair et al. (2007), each item is reliable if the Cronbach's Alpha coefficient value is greater than 0.6. Table 3 illustrates that the Cronbach's Alpha coefficient obtained from the 21 items of BDI-II is 0.853, which is greater than 0.6. Thus, these items are reliable for further analysis.

**Table 3: The Cronbach's Alpha Coefficient**

	Items	Coefficient Value
BDI-II	21	0.853

### The Total Score of Students According to the Levels of Depression

Table 4 shows the total scores of students by gender for each level of depression. Overall, the total score of the students was 1,690.1 marks. Of this amount, the score of female students is 848.5 marks, while the score of male students is 841.6 marks.

**Table 4: Total Students' Score**

Levels of Depression	Female		Male	
	Respondent (Frequency)	Score (Marks)	Respondent (Frequency)	Score (Marks)
One (0 – 10)	12	212	13	209
Two (11 – 16)	13	422.5	14	416.55
Three (17 – 20)	7	53	5	52
Four (21 – 30)	10	106	9	105.5
Five (31 – 40)	5	44.5	4	45
Six (41 – 63)	2	10.5	3	13.55
Total	49	848.5	48	841.6
Total Score				1,690.1
Cut-off Point (Mean)				17.4237

The mean score obtained in this study is 17.4237, which is above the cut-off point of 17. This finding shows that almost half of the students are experiencing a clinical depression. This result supports Beck, Steer & Brown's (1996) analysis which states that if the mean score exceeds the cut-off point (min  $\geq$  17), then the students experienced a clinical mood disorder.

Compared to several previous studies that used the same BDI-II measurement tool, it was found that there was a significant difference in the mean score. Overall, the mean score obtained in this study is higher (17.4237) compared to the mean score of Baron & Perron (2020) of 10.30, Kaplan et al. (2016) of 8.29, and Connelly & Johnston (2013) of 6.23.

### The Levels of Students' Depression

Table 5 shows the Cross Tabulation of the students' level of depression according to gender.



**Table 5: Cross Tabulation Analysis of Students' Depression Level**

Levels of Depression	Sex		Total	
	Female	Male		
	Respondent (Frequency)	Score (Marks)	Respondent (Frequency)	Score (Marks)
One (0 – 10)	12	13	25	25.7732
Two (11 – 16)	13	14	27	27.8351
Three (17 – 20)	7	5	12	12.3711
Four (21 – 30)	10	9	19	19.5876
Five (31 – 40)	5	4	9	9.2784
Six (41 – 63)	2	3	5	5.1546
Total	49	48	97	100

The table illustrates that a total of 13 female students are at Level Two, which is a mild emotional disturbance, while a total of 12 students are at a normal state (Level One). Seven students are at Level Three (borderline clinical depression), followed by 10 students are at Level Four (moderate clinical depression), five students are at Level Five (severe depression) and another two students are at Level Six (serious depression). This situation is worrying because if seen from the cut-off point (mean) ( $\min \geq 17$ ), that is by adding up the number of students from Level Three to Level Six, it was found that a total of 24 (48.98%) female students experienced a clinical mood disorder.

The study also found that most male students, namely 14 of them are experiencing a mild emotional disturbance (Level Two), while a total of 13 students are at a normal state (Level One). Another five students are at Level Three (borderline clinical depression), followed by nine students are at Level Four, a moderate clinical depression, four students are at Level Five (severe depression) and finally, three of them are at Level Six (serious depression). Again, if seen from the cut-off point (mean) at a score of greater than or equal to 17, a total of 21 (43.75%) male students are experiencing a clinical depression.

Overall, the finding of this study shows that majority of the female and male students are at Level Two (mild mood disturbance), which is 27 (27.84%), while a total of 25 (25.77%) students are at Level One, a normal state. Further, a total of 12 (12.37%) students are at a borderline clinical depression (Level Three), followed by 19.59% (19 students) at a mild level of depression (Level Four), 9.28% (9 students) are at a severe level of depression (Level Five) and finally, 5.16% at a serious level of depression (Level Six). What is worrying is that the analysis of this finding shows that 46.39% students, regardless of gender, are experiencing a clinical depression. This result supports the study done by Albert & Beck (2015), which shows a high percentage rate as much as 33% of students are at the moderate and serious level of depression.

If viewed in terms of the cut-off point (mean), which is greater than or equal to 17 ( $\min \geq 17$ ) by Beck, Steer & Brown (1996), the number of students with clinical depressive disorder in this study is greater compared to previous studies using the same measurement tool, but at a different cut-off point (mean). For instance, the study of Kaplan et al. (2016) showed that as much as 6% students



are experiencing clinical depression with a cut-off point (mean) above the score of 16, Connelly & Johnston (2013) found that 9.75% of the students were at a moderate and serious depression level with a cut-off point (mean) above the score 20, and Marcotte, Alain & Gosselin (2015) recorded 16.7% of students experienced a clinical depression with a cut-off point (mean) above the score of 16.

Therefore, despite using the same measurement tool and compared to previous studies, the findings of this study recorded a high percentage (46.39%) number of students suffering from depression as well as a high cut-off point (mean) score of 17.4237. Perhaps, this is because the researchers conducted the study three weeks before the final examination was held. Subsequently, it can be said that the pressure of completing assignments, in addition preparing for final examinations may have an impact on these students. There are few students who are quarantined in the residential college because they have a close contact with COVID-19 patients. Maybe these factors mentioned contribute to the findings of the study.

### Gender and the Students' Level of Depression

H1: There is no significant mean difference between gender and the students' level of depression. Table 6 illustrates the mean and standard deviation for the overall scores among the male and female students. A t-Test was used to measure whether there was a significant difference between male and female students in the level of depression

Table 6: The t-Tests of Gender and the Students' Level of Depression

Variables	N	Mean	Standard Deviation	Standard Error of Mean
Number of Scores				
Male	48	16.08	9.410	0.968
Female	49	17.97	9.397	0.938

Mean Difference = - 1.89

Levene's Test of Equality of Variance: F = 0.032, P = 0.879

t-Test for Equality of Means

Variance	t-Value	d.f.	Sig. 2 Ends	Mean Differences
Same	- 0.701	180	0.487	- 1.89
Not the Same	- 0.701	179.991	0.487	- 1.89

The analysis from Table 6 found that the mean of female students ( $X = 17.97$ ) is higher than the mean of male students ( $X = 16.08$ ) with a difference of 1.89. At 95% confidence interval. the difference between these two means is not significant ( $t$ -value = - 0.701,  $p$ -value > 0.05). Thus, H1 is accepted. It can be concluded that there is no significant mean difference between gender and the students' depression level.



In contrast, past studies have found that there is a significant difference between female students and male students who suffer from depression. According to a study by Schilor, Bernstein & King (2014), female students are twice as likely to experience depression as male students. Further, a study done by Donnelly (2015) showed a significant difference, which is almost double, occurs among Year Four school students in Northern Ireland. According to Gurian (2011), when reaching the age of 13, female students who experience depression are twice as many as male students. Baron & Perron (2020) also found that female students had higher depression scores than male students. According to Hughes, La Greca & Conoley (2011), at the age of 15, female students whose have depressive symptoms are twice than male students and this persists into adulthood. A study done by Petersen, Sarigani & Kennedy (2011) showed that gender differences among students begin to exist at the age of 13 to 14 years, but a significant difference will exist at the age of 17 to 18 years where the female students will record a higher rate than male students.

However, as discussed, studies on the influence of gender on students' depression are inconsistent. For example, this study found that there is no significant mean difference between gender and the students' depression level. This finding supports several studies conducted by researchers such as Connelly & Johnston (2013), and Wade, Cairney & Pevalin (2017), which obtained the same results that there is no significant difference between male and female students in depression. Like some previous studies, the result of this study is still unable to give a clear picture of the significant difference between gender to students' level of depression. This may be because the study only considered a sample of third semester students from the same faculty and from one university only. Therefore, it is suggested that further studies can be conducted on students from various levels, faculties as well as from different universities to allow the researchers to see the trend of differences more clearly.

## 5. Conclusion

In conclusion, based on the findings of this study, it was found that the number of female and male students are the same, namely 52.38% and 47.62% respectively. 95.24% of them are between 20 and 22 years old. Majority of the students (52.38%) obtained a CGPA between 3.01 to 3.49. Next, the value of Cronbach's Alpha coefficient for the 21 items is 0.853. This coefficient value supports the study done by Hair et al. (20027) whose state that the items are valid for further analysis if the value of Cronbach's Alpha coefficient is more than 0.60. A total of 45 (46.39%) out of 97 students experienced a clinical depression, from a borderline clinical depression to a serious depression with the overall cut-off point (mean) score obtained is 17.4237. Indirectly, this finding shows a very worrying situation because depressive disorder may be hidden problem among students and has not yet received serious attention either from parents, schools or the community. To what extent to which these students are aware that are experiencing depression is yet to identified. Therefore, although this finding may be influenced by examination factors and cannot give a true picture of the students' depression level, nevertheless, this finding should raise awareness to various parties involved about the evolvement of depression among students, whose face various life pressures that cannot be avoided.

Besides, the findings of this study also show that there is no significant relationship between gender and the students' depression level. Both female and male students have an equal risk of experiencing depression. Although female students are more emotional and receive more attention



from previous researchers, the situation of male students should not be ignored so that the comparison made can produce more meaningful and comprehensive findings. Maybe times have changed nowadays where male students are more easily attacked by depression than female students. Therefore, studies on the relationship between gender and depression need to be scientifically refined since feelings and emotions are subjective. Finally, perhaps future studies should focus more on how factors such as academic achievement, family background, eating habits and health affect students' depression levels.

## 6. Acknowledgement

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# The Study on the Potential Efficiency of Enhanced Learning within the Educational Environment

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**Abstract:** *Student performance can be hindered by large class sizes, a lack of participation, and a lack of a sense of identity, all of which can be detrimental to student success. eLearning solutions can give chances to solve these issues by students to participate in self-confidently in their learning activities. Lessons can run as smoothly as possible no matter how many participants are in them and how far they are from their in-person peers thanks to various techniques such as video conferences, eLearning, and collaborative software. These tools can be used by academics who teach a fully remote class or a partially remote class. Educators and students should be more adaptable in these systems since nowadays are increasingly reliant on technology. The purpose of this study is to explain how technology may be utilized to find the efficiency of Technology-Enhanced Learning and how it can be sustained over time. It suggests that when technology is used to scale up access to high quality material, encourage customized instruction, increase opportunities for practice, or raise learning engagement, it may accelerate student learning by as much as possible.*

**Keywords:** Technology-Enhanced Learning, Adaptable, Technology, Learning Engagement

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## 1. Introduction

There are a lot of reasons why technologically enhanced learning is important. Significant not only because it is the generally accepted standard of education today, but also because it has the capacity to improve education, as already indicated. Traditional education is based on decades of classroom experience and training. Certain techniques to teaching that are employed now are very identical to those that were used decades, if not centuries, earlier. As a result of efforts to successfully incorporate new technological breakthroughs into learning and teaching processes, this is a relatively new notion that has emerged. Individuals' drive to manage and shape their own learning grows because of the integration of technology to attain their objectives. Some of these technologies claim to be able to improve the efficiency of existing modes of education, while others claim to be able to develop totally new methods of learning. (Boychev, 2010) (Cullen, 2022)

## 2. Problem Statement

Simply incorporating computers into educational settings does not ensure that Technology Enhanced Learning will be successful. For example, reading the material in an electronic book does not necessarily result in a more in-depth understanding of the subject matter. It's possible that perhaps a picture of a geometric theorem displayed on a computer screen won't provide a deeper



level of comprehension than the conventional illustration found in a printed textbook. Because we mostly link the technological component of Technology Enhanced Learning with modern technological developments, such as digital gadgets, which have been around for a long time, educators lack long experience in integrating technology into education. People are still striving for the most effective way to use hardware and software, and their attempts to do so result in some successful and some unsuccessful attempts. This is the primary result of the situation. (Boychev, 2010) (Criss, 2008)

This study refers to a somewhat different component, namely, how to use technology to improve the usage of technology in education. Most efforts are focused on how to use technology to improve learning, but this speaks to a somewhat different aspect. There is no such thing as the best Technology Enhanced Learning; whichever solution is implemented; it is abundantly clear that it will never be the best. This is due to the fact that the process of learning is highly individual. Even if something is successful for one person, it does not necessarily mean that it will be successful for another. Because of this, it is impossible to determine which choice is best for everyone. (Malipot, 2022) (Boychev, 2010)

### **Natural Learning**

People gain knowledge through observation, practice, and the creation of their own unique experiences. This is the one that is the least artificial, and it is also the one that is most likely to be decided by nature. It has been utilized for hundreds of years, and even now, many people, particularly the young demographic people, find it to be entertaining. Unfortunately, the educational practices of today seek to separate themselves from this reality by utilizing processes that prevent children from being who they naturally are. It is for this reason that it is claimed that during the first two years of their lives, we teach them how to walk and talk, but throughout the subsequent fifteen years, we make them stand still and keep quiet. When it comes to acquiring new knowledge, many individuals like participating in hands-on activities whenever possible and without feeling humiliated; this is the backbone of natural learning. This is most likely due to biological considerations, as research has shown that other primates use very similar tactics when investigating things through hands-on activities. (Lepkowska, 2019)

When instructional material is converted into a program for use on a computer, it is difficult to determine the kinds of hands-on activities that can be carried out with the help of the program. When compared to viewing a physical thing, using a keyboard, mouse, or joystick does not provide the same level of sensory feedback. It is fortunate that today's consumer electronics can display three-dimensional virtual worlds in real time. This feature looks to be one that can "substitute" for the action of twiddling an object with one's hands. Students are able to study the environment in the same manner that they would in real life if the necessary interface is provided for them in the educational setting that can be created in a virtual world. The user is able to modify the scene by adding, removing, and replacing cubes, as well as rotating it to view it from a variety of perspectives. (Criss, 2008)

The use of an application like this for educational reasons could be considered to be a form of Technology Enhanced Learning; however, does it actually deliver any educational value beyond the convenience it provides? (Boychev, 2010)



### **3. Literature Review**

#### **Introduction**

In a traditional paper textbook, a topic or subject is typically presented from a particular perspective, usually the one that the document's results of this study is the most appropriate for the nature of the content. However, by linking data and evidence from different disciplines and researching a subject from different perspectives, the efficiency of understanding can be improved. The most effective way for people to learn is to observe, repeat, and invent something on their own. It is the most natural method, and it is most likely the most efficient method that has been determined. It has been around for countless generations and continues to be extremely popular, particularly among children and young adults. Unfortunately, modern education makes an effort to distance itself from this by implementing procedures that prevent children from being themselves in their natural state. Many people prefer to engage in hands-on activities while learning something new, if at all possible and without feeling overwhelmed; this is the foundation of natural development for many individuals. (Boychev, 2010) (Cullen, 2022)

The fact of the matter is that in today's modern workplace, life without any form of technological assistance would be quite difficult. For this reason, teaching the students to use technology as early as possible is highly recommended. It could be argued that knowing how to use a computer is more valuable than other skills often taught in education. For one, it needs to catch up to what is already anticipated, and two, it has the potential to make the educational system better. Tools like video conferencing software, learning management systems, and collaborative tools help teachers maintain order and ensure that no student, regardless of location, is at a disadvantage to their in-person classmates when teaching a fully or partially remote class. Both teachers and students need to be flexible to succeed in these types of technologically advanced classrooms. (Cullen, 2022)

#### **Learning Opportunities**

A wide range of digital technologies and technological solutions are referred to as technology advancement in educational settings, and they include both software and hardware. There has been a great deal of study about how technological advancements have opened up a multitude of new possibilities. While there are numerous claims that technology alone has not resulted in any new or unexpected advancements in education, there is also widespread agreement that the process itself must be purposeful in order for learning to take place. This seems to be accurate. Despite the great range of educational possibilities and educational goals that technology affords, there is a pressing need to focus on technologies for inclusive education. The vast availability and low cost-effectiveness of technology can be used to the advantage of education. This opens up a wide variety of chances for educational institutions to improve the learning experience of their students by increasing or creating new learning opportunities. Virtual reality, augmented reality, and mobile learning are examples of how technology is becoming more integrated into modern teaching methods. Due to the popular view that the time-honored teaching technique of "see one, do one, teach one" is no longer appropriate, this new trend has gained traction in the educational community. (Cullen, 2022) (Daniela, 2021) (Boychev, 2010)

#### **Technology-based Learning Environment**

Technology-based learning environments can provide an alternative means of teaching in settings that are more genuine to the subject matter being taught. One of the arguments against the



educational system as it is today is that students are rarely put in circumstances in which they must generate or modify information. This does not qualify for a position in the information economy at all. Individuals who have received specialized training in a discipline are better equipped to make contributions to that discipline, which is one of the purposes of such training. Universities are at ease when it comes to imparting expert information; nevertheless, the ability to grow practitioner knowledge and the knowledge itself are not natural components of university curricula. This is despite the fact that the knowledge economy demands both. It has been suggested by a number of people, that educational institutions should enter this field as early as the undergraduate level rather than waiting until they offer postgraduate or post-experience programs in the business world. The development of expertise in the skills required for knowledge negotiation is therefore required for adequate preparation. This involves expanding the abilities of inquiry, critique, evaluation, and debate beyond the understanding of ideas themselves and into the generation and representation of new information that comes from being a practitioner in a field. (Rufaidah, 2021)

For instance, taking chemistry will prepare at least a portion of students for the role of professional chemist, which is another way of saying that it will prepare them for admittance into a community of practice. It is consequently essential to have an understanding of what it is that chemists actually do. However, the traditional field trip will always be sporadic, whereas a virtual field trip, which is simulated through technology, could achieve at least some of the same motivation and understanding. The same point is valid for science in general, where learners need to experience authentic environments for the study of science, both to pique their interest and to improve their understanding. As a consequence of this, Technology-Enhanced Learning makes it possible to communicate and study domain content in novel ways, in addition to facilitating the development of domain-related skills and competencies. Research into Technology-Enhanced Learning can be quite useful for this same reason. It needs to have a strong emphasis on educational goals, but it also needs to act as a catalyst for rethinking the ways in which those goals are incorporated into curricular creation. Because so little is understood about how professionals actually produce knowledge, the academic discipline of science and technology studies may end up playing a significant part in this process. In addition, the sociocultural approach to Technology-Enhanced Learning offers a viewpoint on learning that is founded on human social practice; this viewpoint serves as the basis for building future applications of new technical instruments and provides a perspective on learning that is rooted in human social practice. (Rufaidah, 2021) (Laurillard, 2009)

The context for the execution of Technology Enhanced Learning research is an education system that is in the process of transforming but is not moving quickly enough. Learners are being prepared for a world in which technology is increasing the speed of innovation and change, but they are being prepared by an education system that is not oriented toward rapid change in the way that it is governed or conducted. Technology Enhanced Learning systems have the potential to assist education in adjusting to a world that is undergoing rapid change as a direct result of advances made in technology. (Laurillard, 2009)

### **Engagement and Teaching Strategies**

This is a fresh take on the age-old practice of teaching, which has traditionally consisted of a more personal exchange between a teacher and their charges. It is believed by a diverse group of



stakeholders that they have a function to play in the structure of a contemporary educational setting. Furthermore, it is expected of teachers that they play their part in a team, an institution, and, beyond the institution, a community. The instructor now has a responsibility to provide their own expertise of teaching and learning while also planning to expand on the knowledge that others have already provided. (Laurillard, 2009)

Whenever a professional teacher in a face-to-face classroom situation is presented with a class of struggling individuals, he or she will discover ways to explain things differently to students on the spot and reinforce/repeat essential points as needed throughout the course of a lesson. Out-of-class talks with students can be easily conducted by teachers, who can then customize their explanations and support to meet their specific needs. The fast development of higher education in established surrounding in some countries, on the other hand, has resulted in a loss of uniqueness among students at all levels of study. Every one of within the small group of students in an upper - secondary school classroom cannot be served by a single classroom instructor, and it becomes even more challenging for lecturers in higher education when they have courses with more than 100-200 students in attendance. It is far more difficult to inspire students using traditional learning materials and to deliver personalized instruction when the tutor is located at a significant distance from the students. As opposed to traditional classroom learning, online learning offers a greater variety of learning opportunities that are not available in a regular classroom setting, which makes it an attractive option for many students. Involving students and boosting their learning has been proven to be extremely effective when using rich multimedia platforms, immersive simulation environments, and gamification. (Malipot, 2022) (Laurillard, 2009)

### **The impact**

Future educators may benefit from an appreciation of the reasons why the efficient integration of Technology-Enhanced Learning tools and applications can alter learning and teaching. Learners now engage with their environments in novel ways mainly to the usage of digital technology in a one-on-one classroom setting. (TEL) settings, such as flipped classrooms and blended learning, can initiate a shift from traditional teacher-centered to non-traditional student-centered learning. (Ismil, 2020)

Children's and adults' social interactions, gaming habits, and many other behaviors have been revolutionized by digital devices outside of the classroom. Gamifications are a term for this trend. Technology-enhanced learning tools have revolutionized playmaker interaction in the gaming environment. As digital technology has advanced, people's gaming preferences have shifted away from more conventional forms, such as board games. Thanks to advances in TEL, video games can now be used as an educational tool. When games are created with learning in mind, they allow players to push themselves to the edge of their comfort zone as they progress. Ideally, educational video games would provide students with situations in which they may use the cognitive abilities they are acquiring by modifying their approach to a problem in response to novel circumstances. Students learned more in game-based settings than they would have in more conventional or non-game-based settings. Unlike more traditional methods of education, educational video games can rapidly analyze progress and provide individual feedback on performance. Unconventional features of gaming include a shift in emphasis from the instructor to the game itself as the major



source of learning, analysis, interaction, and evaluation. (B.Clark, Tanner-Smith, & Killingsworth, 2016) (Holmes & Gee, 2016)

#### **4. Research Methodology**

In accordance with the preceding description, qualitative research methodologies are employed in this study. This study's discussion will be presented descriptively utilizing words and sentences. The study's findings were derived via a logical analysis of the evidence and data employed. Secondary data gathered from books and scientific journals of academics or practitioners, data from official websites of the government or specific organizations, news journals obtained from the mass media, and other data obtained from relevant documents were used to complete this research. In other words, no direct observations are made in the field, and no contact is made with the subject of the study.

#### **5. Conclusion and Future Studies**

Many other industries have been impacted by technological advancements, but the educational system and the ways in which students learn have been significantly less affected by these advancements. We feel that technology's limited influence is mostly attributable to the fact that it is being used to replace analog tools without adequate consideration being given to the technology's comparative merits. Rather than relying on the "chalk and talk" classroom technique, these advantages include the potential to scale up standardized teaching, promote instructional strategies, provide more practice time, and increase student engagement levels. Education systems that use technology to enhance the job of educators and to improve the quality and amount of educational content will see increased success with students, by creating awareness and motivational attribution. The COVID-19 report also emphasizes the importance of education technology investments in today's environment, which is predicted to see the emergence of pandemics and the effects of climate change, among other things. Institutions are not always able to provide in-person education. (Ganimian, Vegas, & Hess, 2020)

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# Utilizing Traditional Japanese Mathematics, *Wasan*, as an Aid for Programming Education: A Preliminary Study

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**Abstract:** *Following the global trend toward mandatory programming education, Japan also made programming education mandatory in elementary schools in 2020. According to Japanese government teaching guidelines, children should be encouraged to develop problem-finding and -solving skills through learning activities that allow them to acquire the logical thinking skills necessary to make the computer perform their intended process based on hands-on programming experiences. In junior high schools, programming education has already been mandatory since 2021, and in high schools, it also become mandatory in 2022 in Japan. However, programming learning materials are inadequate in both quantity and quality aspects, thus the enhancement of these materials has become an urgent priority. On the other hand, the Subcommittee on Mathematics Education of the Science Council of Japan (2020) pointed out that the concept of algorithms, which is the foundation of programming education, can be fostered through mathematics education in elementary, junior high, and high schools, and recommended enhancing mathematics education as part of general education. In this study, therefore, we developed prototype programming teaching materials using traditional Japanese mathematics, wasan, as its theme and conducted an interview survey with a student who used the materials. The purpose of our study is to examine the possibility of utilizing wasan as an aid for programming education.*

**Keywords:** *wasan, programming, Jinkoki, educational aid, teaching materials*

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## 1. Introduction

Following the global trend in programming education, Japan decided to start teaching programming in elementary schools in 2020, but its implementation has only just begun. In this fumbling situation, a survey on the use of programming education tools based on data collected on the website, Programming Education Portal Focused on Elementary Schools, was conducted and revealed that Scratch and Viscuit together accounted for about 55% of all visual programming languages as of April 13, 2021 (Viscuit development room, 2021). In addition, as for the information and communications technology (ICT) development status toward the fulfillment of the Global and Innovation Gateway for All (GIGA) School Program that the Japanese government initiated, 1,748 (96.5%) of all local governments were expected to complete the delivery of computers to schools by the end of 2020, indicating that the ICT development is steadily progressing (Information Education and Foreign Language Education Division, Elementary and Secondary Education Bureau, Ministry of Education, Culture, Sports, Science and Technology, 2021).



In addition, Yoshida (2021) analyzed data collected from the above-mentioned website, Programming Education Portal Focused on Elementary Schools, and reported the percentages for different implementation types. According to the report, the largest percentage (28%) of the schools were offering “introductory” classes. Regarding school subjects in which programming learning was integrated, mathematics, periods for integrated studies, and science accounted for 20%, 15%, and 12% of the total, respectively. The reason for this can be inferred from the fact that mathematics originated from a computer-assisted calculation tool. As for the periods for integrated studies and science, this result may be attributed to the fact that the New Courses of Study (government teaching guidelines) offered examples of learning activities associated with programming, especially for mathematics, science, and periods for integrated studies. These examples include drawing regular polygons in mathematics and learning about tools that use the properties and workings of electricity in science, through which students can learn about programming. In addition, the government teaching guidelines specified that in the periods for integrated studies, the programming experience should be appropriately positioned through the inquiry-based learning process.

Furthermore, the Subcommittee on Informatics Education of the Science Council of Japan (2020) proposed that students should gain basic programming experience in elementary schools, progress to logical thinking and code building in junior high schools, and learn problem-solving, systems, and other practical aspects of programming in high schools.

On the other hand, in 2020, the Subcommittee on Mathematics Education of the Science Council of Japan released its recommendation entitled “Urgent Recommendations for the Smooth Implementation of Mathematics Education under the New Courses of Study: Focusing on Improving the Effectiveness of Statistics Education”. In this document, they pointed out that elementary, junior high, and high school mathematics education should foster the concept of algorithms, which represents calculation methods and procedures for problem-solving and serves as a foundation for programming education. Thus, they seek to enhance mathematics education as part of general education.

Under these circumstances, no framework for programming education that connects elementary, junior high, high schools, and even universities has yet been established, and this remains an urgent issue. Considering these circumstances, this study focuses on Japan’s outstanding wasan culture and aims to integrate it with programming education for primary to higher education.

Traditional Japanese mathematics, which was developed uniquely before the Meiji era (1868-1912) in Japan, has been referred to as “*wasan*”. Especially during the Edo era (1603-1867), wasan evolved by leaps and bounds but fell into decline with the introduction of Western mathematics at the beginning of the Meiji era. However, wasan covers a wide range of mathematical areas, from everyday arithmetic to higher-level mathematics, and the ways of thinking associated with it are considered to be relevant even at the present time. Various studies and educational practices have been conducted on the application of wasan specifically in elementary school mathematics. For example, a study titled “Utilization of Wasan in Elementary School Mathematics” demonstrated wasan’s historic value as well as its attractiveness as teaching material to be used in elementary school mathematics classes (Central Educational Research Institute, 2011).



On the contrary, there have been few studies conducted on connecting wasan and programming. However, in a study titled “A Study of *Wasan* from the Perspective of Information Technology Education” (Kikuchi & Ide, 2008), it was pointed out that, as a foundation for computer and information education in schools, students must understand how the fundamental part of information processing develops for not only text, numbers, and images, but also geometrical shapes. Moreover, they suggested that, by integrating the history of *wasan* with the history of computers and earlier information devices, educators will become able to gain a big-picture perspective and shape school education that reaches the roots of today’s information environment.

This study, therefore, aims to examine the possibility of using wasan-based teaching materials as an aid for programming education. First, we selected suitable themes for beginner-level programming from *Jinkoki* (Yoshida, Oya, annotate, 1977), one of the *wasan* books. Second, we developed prototype teaching materials and tested them in a programming class at a university. Third, we conducted an interview survey with a student and discussed the findings. For measuring students’ motivation levels, we used an objective evaluation method for computer programming education—the systematical information education method (SIEM) assessment standard developed by Dohi, Miyakawa, & Konno (2004; 2006).

## 2. Literature Review

### History and Outline of *Wasan*

Shimodaira (1988) conducted a literature review on the history of wasan, while referring to its definition. He also discussed topics such as *wasan*’s mathematical clarification, *sangaku* (mathematical tablets), wasan as native Japanese mathematics, and mathematics before the Edo era (1603-1868).

Murata (2001) referred to *wasan* as “indigenous Japanese mathematics” which is the most original cultural creation that the Japanese have ever developed. However, he further explained that it was not a creation from scratch, but rather a creation from acquiring mathematical knowledge from abroad over three periods: classical Chinese mathematics in the 6th to 9th centuries, contemporary Chinese mathematics in the 15th to 16th centuries, and European mathematics since the mid-19th century.

Furthermore, Heffer (2008) pointed out the differences between wasan and Western mathematics. First, the subjects treated in *wasan* can be broadly divided into three categories: arithmetic/algebra, geometry, and recreational problems. Typical arithmetic problems include merchant problems, as we also know from Renaissance arithmetic. However, within *wasan*, they are primarily related to the use of the soroban (Japanese abacus). Calculation with Hindu-Arabic numerals was not generally known before the 1880s. He noted that he has seen the soroban still in use in today’s high-tech Japan.

### Jinkoki

Kawamoto (1968) regarded *Jinkoki* as a primary-level mathematics textbook. *Jinkoki* was a popular mathematics book not only during the Edo era but also after the beginning of the Meiji era (1868-1912), and there were many similar books, said to be several hundred in number.



Kawamoto's study focused on the characteristics of Jinkoki as a primary-level mathematics textbook. According to the paper, Jinkoki was published in 1627 by a Kadokura family member, Mitsuyoshi Yoshida (1598-1612) who was inspired by Suanfa tongzong (Cheng, 1592). Mitsuyoshi was 29 years old when the first edition of this book was published in 1627, and the book was enlarged and revised more than a dozen times before his death in 1672. It has been pointed out that the reason why Jinkoki was highly valued even by later generations was greatly attributed to his continuous efforts to make the contents more complete by constantly revising them.

### ***Wasan*'s Significance at the Present Time**

Yamaji and Yamada (2003) proposed teaching materials for comprehensive learning that used *wasan*, and conducted a high school mathematics seminar. They noted that *wasan* follows the inductive reasoning method for drawing conclusions through calculations using actual numerical values and a step-by-step approach. They developed teaching materials based on yakushi-zan (calculation to find the number of go stones) and aburawake-zan (calculation to divide oil into bottles) from Jinkoki, and verified that these would be effective as teaching materials for fostering mathematical views and mathematical ways of thinking. They also noted that the inductive reasoning method can help clarify the direction of problem-solving and provide insight into the conclusions.

Arai (2017) discussed the historical aspects of mathematics education from the perspective of the relationship between economic education and mathematics. First, he pointed out that mathematics is necessary for economic education, but many students are not very good at it. According to Arai's study, behind this situation, there are problems associated with the current mathematics education system, as well as in the university entrance examination system. However, from the Edo era to the pre-war period, fairly advanced economics-related mathematical learning was included in mathematics education. He then examined the reasons why mathematics education in Japan has become less associated with economics from a historical perspective. Finally, through his findings, he provided a prospect of mathematical literacy necessary for modern economic education, from day-to-day life themes to economics.

## **3. Methodology**

### **University Course Overview**

The following is an overview of the university course targeted in this study. The course title was 'C Programming Language I', which was an elective course for second-year students of the Faculty of Business Administration. This two-credit course, consisting of 15 sessions in the first semester, ran over 15 weeks from April to July 2022, with each session being 90 minutes long. Five students attended the course. No teaching assistants were assigned, and a single faculty member was in charge. Due to the impact of COVID-19, only two students attended in-person class sessions, and the rest attended online via Zoom. The programming language used in this course was C#.

The *wasan*-based teaching materials were used in the following sessions (Table 1).



Table 1: Class Sessions in Which *Wasan*-based Teaching Materials Were Used

Session	<i>Wasan</i> -based Teaching Materials	Summary
4	<i>Nusubito-zan</i>	The solution method was implemented using conditional judgments and repetitive processing using the “while” statement.
5	<i>Tawara-sugi-zan</i>	Various solution methods are implemented: “while” statement version (from bottom to top approach, from top to bottom approach) and “for” statement version (from bottom to top approach, from top to bottom approach).
6	<i>Nezumi-zan</i>	The solution method can be implemented with an algorithm similar to <i>tawara-sugi-zan</i> .

### ***Wasan*-based Teaching Materials**

Three themes were selected from Jinkoki, which included logics suitable for acquiring programming techniques, such as conditional judgments and repetitive processing. In this study, we created teaching materials based on the contents of Jinkoki (Yoshida, Oya, annotate, 1977).

#### **a. *Nusubito-zan* (calculation to find the number of thieves)**

There is a mathematical problem titled “Knowing the Number of Silk Fabric Rolls and Thieves” in Jinkoki. The story is as follows:

“I hear a group of thieves talking about something under a bridge. It seems like they are trying to divide the silk fabric rolls that they stole. However, when eight rolls are given to each person, they are seven rolls short, and when seven rolls are given to each person, they have eight rolls left over, leaving the thieves in a bind.

Now, how many thieves and silk rolls are there?”

Then, the answer is given as follows: “Adding the eight and seven rolls brings the total to fifteen. This is the number of thieves”. However, there is no explanation of how to solve this problem in Jinkoki.

First, we let the students come up with their own solutions, and then showed them a process flow as follows and asked them to create a program.

1. Set the number of thieves to be zero.
2. Repeat the following process until the equation ‘number of thieves  $\times 8 - 7 =$  number of thieves  $\times 7 + 8$ ’ holds.
3. Increase the number of thieves by one.
4. End the repetition when equation 2 holds.
5. Display the answer, terminate the program.

#### **b. *Tawara-sugi-zan* (calculation to find the number of rice straw bales)**

This mathematical problem is titled “About Calculation of Rice Straw Bales” in Jinkoki. The story is as follows:



“When rice straw bales are stacked as shown in Figure 1, how many bales are there in total?”

The stacking method shown in the figure is called “sugi-nari (cedar tree shape)”. It is believed to be derived from the triangular shape of the cedar tree with a pointy top. In the original story, the bottom row has 13 bales, making a total of 91 bales.

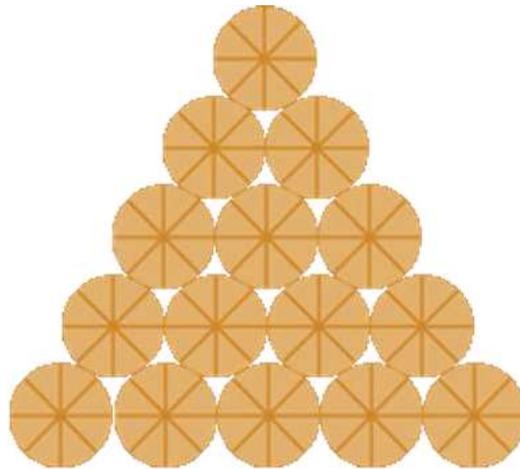


Figure 1: Illustration for tawara-sugi-zan

First, we let the students come up with their own solutions, and then showed them a process flow as follows and asked them to create a program.

1. Set the total number of bales to be zero.
2. Set the number of each row to 13.
3. Repeat the process until the number of each row reaches one, and end when it reaches zero. That is, repeat until the number becomes less than one.
4. Calculate partial sums “total bales  $\leftarrow$  total bales + number of bales in each row”.
5. Decrease the number of bales by one.
6. End the repetition when equation 3 holds.
7. Display the answer and terminate the program.

**c. *Nezumi-zan* (calculation to find the number of mice)**

This mathematical problem is titled “About Calculation of Mice” in Jinkoki. The story is as follows:

“In January, there is a pair of mice that give birth to 12 offspring, which together with the parents makes a total of 14; in February, the parent mice and their offspring give birth to 12 offspring each, which together with the parents makes a total of 98. In this way, when parents, children, grandchildren, and great-grandchildren give birth once a month, there will be 27,682,574,402 mice in December.”



Because the concept is similar to the *tawara-sugi-zan*, we did not show the process flow, but let each student complete the program on his/her own.

### Interview Survey Overview

In the final session using the *wasan*-based teaching materials, we conducted a questionnaire to ask if students would like to participate in an interview survey regarding the programming sessions. As a result, one student (a male second-year student at the university, hereafter referred to as the participant) gave his consent, and thus a research collaborator who was not in charge of the course (a faculty member at the same university who did not specialize in programming education) conducted a semi-structured 90-minute interview with the participant in late May 2022.

Before conducting the semi-structured interview, our research collaborator first explained the interview contents to the participant and informed him that he could suspend the interview at his will; the interview would be recorded and a transcript would be made; the answers and personal information obtained from the interview would be kept strictly confidential and destroyed immediately after the study was completed. The participant's consent was then obtained once again. The interview included questions about the personal background in learning programming (1, 2, and 3 in Table 2), as well as questions based on "class structure", "initiative", "participating willingness", and "motivation", which are factors of the SIEM assessment standard developed by Dohi, Miyakawa & Konno (2006) (5, 6, and 10 in Table 2). The order of the questions was switched according to the participant's narrative flow, and supplemental questions were also included. A total of 13 questions and topics were formulated, as shown in Table 2.

**Table 2: Questions and Topics Asked in the Interview Format of Papers**

Items	Questions or Topics(*) in the Interview
1	Thoughts on and experience with programming before attending the course
2	Thoughts on university programming classes
3	Current learning and motivation for programming
4	Impact on information gathering and study contents (Supplemental)
5	Overall comments on the class that incorporated <i>wasan</i>
6	Spontaneous efforts associated with the class that incorporated <i>wasan</i>
7	Comments on the contents used for <i>nusubito-zan</i> and <i>tawara-sugi-zan</i> (Supplemental)
8	Comments on the contents used for <i>nezumi-zan</i> (Supplemental)
9	Reflection on the class based on the answers to 1 through 8 (Supplemental)
10	Change in willingness and motivation to participate in classes that incorporate <i>wasan</i>
11	Possibility of utilization of the idea that integrates <i>wasan</i> with programming (Supplemental)
12	*Notes regarding the schedule of the study
13	*Closing the interview and acknowledging the participant



During the interview, Microsoft Office PowerPoint and Windows voice recorder were operated on a laptop computer (ASUS, with Windows 11) for reflecting on teaching materials used in the class, and for recording the conversation, respectively.

### Analysis Method

First, a transcript was prepared based on the recording of the conversation in the interview. Next, while referring to the modified grounded theory approach (M-GTA) developed by Kinoshita (2007), we sorted out the contents of the transcript, the overall context, and the relevance of the topics, and then generated categories that serve as framework concepts. Finally, we created a storyline and a result diagram that shows relationships between categories.

## 4. Results

### Categories

Categories were generated using the participant's narrative and responses to the interview questions in the transcript (items 1 to 4 are shown in Table 3, and items 5 to 13 are shown in Table 4). Although the participant's narrative included topics about classes other than 'C Programming Language I', those were excluded from the analysis.

**Table 3: Narrative Contents and Categories About the Participant's Personal Background Related to Programming**

Examples of Narrative Contents (Numbers in Parentheses are the Item Number in Table 2)	Categories
"When I entered high school, I also wanted to do programming [...] my teacher in high school was from this university, and she told me that this university offers programming classes, so I decided to come here." (1)	Interest in programming
"I attended programming classes at my high school before I entered this university, so I already had some experience with it." (1)	Programming knowledge
"I am sure that I will go into the IT industry, but [...] I don't want to separate my work from my free time, but I want to have a lifestyle that I can share between the two. I want to do this in the future, so yes, it's like I can travel from place to place." (4)	Awareness of the future utilizing programming skills
"You know, I often watch videos about programming. But I often hear words like 'react-frame-component' or something like that in those videos." (2)	Gathering relevant information in preparation for employment in the IT industry
"There's a website called GitHub." (2) "(For intermediate and above levels) I can find books in school libraries, you know." (2)	Information on advanced contents
"I've been watching videos on YouTube, and I always hear that being a programmer is a job where you study all the time, so I thought, maybe I should start learning that stuff now." (4)	Information on careers and lifestyles
"(On the topic of the programming industry) Do you know 5channel? It's kind of, you know, a bulletin board site. [...] so, as a programmer, well, there's a lot of, you know, hardships" (4)	Information on the IT industry as well as experts' opinions
"(Reasons for taking a class that teaches already-known contents) I thought that if I were to write (programs) for my job, C# that is derived from Java might be used, you know. I took this course to see and learn about the differences in programming style, so slight differences in codes." (3)	Studying in preparation for employment in the IT industry



“When I receive a project [...] when I see source code, I want to have a certain level of understanding so that I can grasp things at a glance. [...] but, after all, when I look at source code, there are usually a lot of terms I don’t know. So, I suppose I haven’t done the learning process to that extent after all.” (2)	Understanding of own proficiency level and prospects for the future
“I think that C# and Java are a bit confusing, if they are mixed, it’s even more difficult. I think. In the case of Python, indentation [...] determines the range, and in Java and C#, brackets determine the range, so after all, I am a little mixed up about how to write things.” (3)	Linking already-known contents to unknown contents
“I know this much, but from here, I don’t know how I should move forward, and how I can keep studying. It’s not clear to me. Information is there [...] but what I want to know is pretty high up, and I haven’t studied what’s in between, so I don’t know what I’m supposed to do.” (2)	A sense of impasse in learning
“I was looking at people who develop things on their own [...] basically, there’s a lot of anxiety, so I thought, for me, I have to study and learn in an accelerated environment.” (4)	Feeling anxious and impatient about his future and current proficiency level
“I know the class is pretty introductory, but when it comes to jobs [...] there are certain words and techniques that are only used in the industry, and I’d love to learn things like that.” (2)	A desire for the current classes to move beyond the basics and increase the application possibilities to his career

**Table 4: Narrative Contents and Categories About the Participant’s Learning and Thoughts Gained Through the Class that Incorporated Wasan**

Examples of Narrative Contents (Numbers in Parentheses are the Item Number in Table 2)	Categories
“I thought that going through with an example first [...] rebuilding it from scratch by myself was just like a scaled-down version of what I would do at work. [...] at work, too, there is an upstream process, and the coder is given a specification document and based on that, they actually create something, you know” (5)	Similarities between the feature of using <i>wasan</i> -based examples and system development
“ <i>Nusubito-zan</i> was something that was already made to some extent and could be rewritten a little bit, anyway, there were not many case works presented until now [...] this was used in the past, and converting it into a program is something [...] I thought it would be quite an easy thing to do [...] even for beginners.”	Facilitated understanding through interconverting mathematical equation structure and code
“When I thought about where to set variables and what kind of equation I should create [...] the teacher gave us some structure (while pointing to the area diagram of the <i>nusubito-zan</i> ) [...] I wondered if I should set this part as a variable. [...] About the <i>nusubito-zan</i> , without that diagram, I probably would have just copied the answer.” (7)	Facilitated understanding through visual images
“(While dragging on a certain part—the teaching material of <i>nezumi-zan</i> ) I thought a lot [...] which part of the text could be used as a variable [...] I couldn’t figure it out on my own. [...] (while showing the portfolio on his laptop) not this part, but when I looked at this text together with the other part, I realized, oh, so that’s what it means” (8)	Facilitated understanding through confirming coding examples and writing the process in natural language
“(Regarding typing the code) I was wondering if we could make it even simpler, or if this process is actually unnecessary, or if this is a minor process. Maybe we could shorten it [...] make it easier for other development, I think about these kinds of things.” (6)	Improving the code and try writing the process in natural language



<p>“Together with people who are taking the same course [...] instead of making a program entirely from scratch, if each person takes responsibility for a different part, and we put them together, but if the combination goes wrong and, you know, an error occurs, then we have to discuss it (in the same thread) [...] doing things like this can be similar to a job.” (6)</p>	<p>Clarification of the original desire to learn programming</p>
<p>“When it comes to arrays, I can use these surprisingly well [...] but without using arrays [...] and there is no information on how to create the code [...] I have to think for a long time [...] rather than specializing in one area [...] I also think it is better to work on wide-ranging areas.” (9)</p>	<p>Awareness of the challenges in programming mastery</p>
<p>“After all, in the basic part [...] I realized that there are some things I’m not good at, and since I couldn’t figure out this <i>nezumi-zan</i>, [...] I thought maybe I should study this area properly.” (9)</p>	<p>Awareness of the unknown learning contents in basics</p>
<p>“Instead of teaching everything in class, it would be better to give some clues and make us think by ourselves, or something like that, for me [...] I would like to do some independent research [...] work on things that I can’t do just with the textbook.” (10)</p>	<p>A desire for insightful learning through multiple step-by-step clues</p>
<p>“At the beginning, give a few clues, and then, well, but I think it would be good if students who can already do it can start working on their own from the very beginning.” (12)</p>	<p>A desire for learning according to the different proficiency level of each student</p>
<p>“For someone who doesn’t know anything at all, (while operating his laptop), rather than writing code [...] it’s really good to start with the process before writing the source code, I think.” (11)</p>	<p>A desire for learning to understand programs’ mechanisms and specifications</p>
<p>“What about making the mathematical problems story-like? For example, there are a certain number of bales from the <i>tawara-sugi-zan</i>, and the thief from <i>nusubito-zan</i> stole them, and so on, and, you know, it would be more interesting if we program it in such a way that it can only be solved if there are multiple bales” (13)</p>	<p>A desire for collaborative learning and group work activities through complex tasks</p>

### Relationships Between Categories

With respect to relationships between categories, a result chart was created (Figure 2) while taking into account the narrative from the interview and the questions that were formulated in terms of the SIEM assessment standard. The numbers indicated with each category are the same as the item numbers in Table 2.

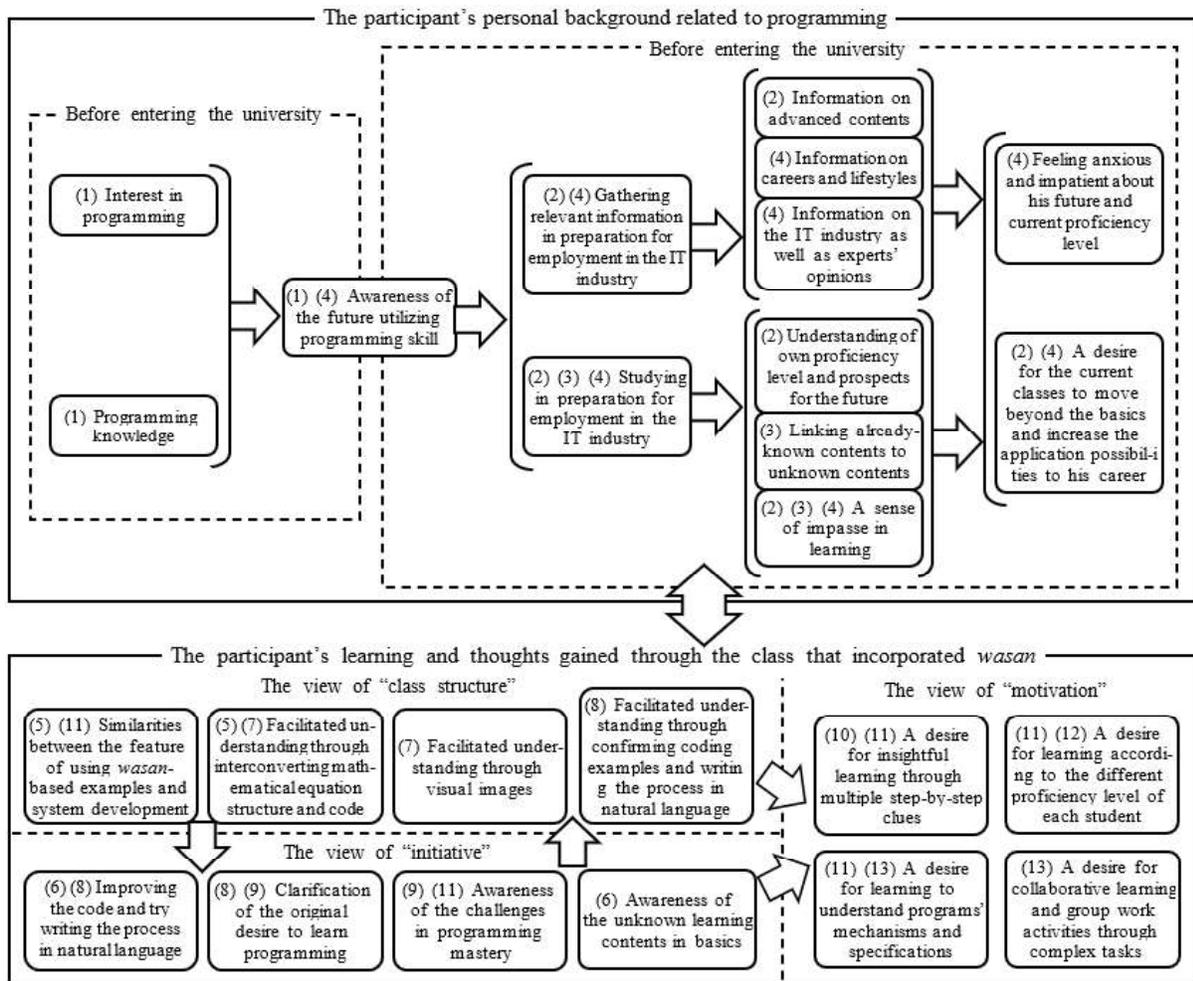


Figure 2: Relationships Between Extracted Categories and the Interview Items

### Storyline

After generating categories, the following storyline was created using all of these categories. (Hereafter, the underlined parts are the names of the generated categories).

The participant learned how to use computers when he was in elementary school and has been interested in programming and retaining programming knowledge since he was a high school student. These experiences raised his awareness of the future utilizing programming skills, such as careers in the IT industry and ICT-based lifestyles, and the career guidance that he received during his high school years led him to enroll in a university where he could learn programming. After entering the university, he started gathering relevant information in preparation for employment in the IT industry and acquired information on advanced contents; information on careers and lifestyles; information on the IT industry as well as experts' opinions. But when he went through intermediate and higher levels of programming study, which he had not yet mastered, he started to feel anxious and impatient about his future and current proficiency level. In parallel, he continued studying in preparation for employment in the IT industry, and he became able to link already-known contents to unknown contents through various classes related to programming,



and his understanding of his own proficiency level and prospects for the future have progressed. Nevertheless, he felt that it would not be easy to achieve his goal of mastering advanced level contents and making use of them in the future, accompanied by a sense of impasse in learning, because he did not know how to learn things before reaching the advanced level. In this way, he developed a desire for the current classes to move beyond the basics and increase the application possibilities to his career, such as handling more difficult contents besides assignments, as well as offering opportunities to learn directly from the IT industry.

Under these circumstances, he acquired the following new perspectives and approaches to programming through 'C Programming Language I' classroom practice using wasan-based teaching materials.

He was favorably impressed with the class. He recognized that the wasan-based teaching materials were about understanding examples and constructing solutions from scratch using calculations, which he perceived as a scaled-down version of IT industry work, and found similarities between the feature of using wasan-based examples and system development. He also recognized that the teaching materials included contents that helped his own insight to reproduce wasan in the form of code, because he experienced facilitated understanding through interconverting mathematical equation structure and code; through visual images; and through confirming coding examples and writing the process in natural language. In addition, he also worked outside of class time to improve the code and try writing the process in natural language, keeping collaborative work in mind for future system development. In this learning process, clarification of the original desire to learn programming was made. In addition, he obtained awareness of the challenges in programming mastery as well as awareness of the unknown learning contents in basics, which deepened his understanding of his ideal proficiency level and future-oriented learning.

He also linked the above-mentioned learning using wasan-based teaching materials to the learning that had taken place before he took the class, expressing the following desires for future use and advancement of wasan-based teaching materials: a desire for insightful learning through multiple step-by-step clues; a desire for learning according to the different proficiency levels of each student; a desire for learning to understand programs' mechanisms and specifications fundamentally rather than just writing code; a desire for collaborative learning and group work activities through complex tasks by combining multiple wasan-based teaching materials.

## **5. Discussions**

Based on the relationships between categories found as a result of the interview, as well as excerpts from the storyline, we examined the possibility of utilizing wasan as an aid for programming education.

First of all, the participant has been involved in programming education in general before and after entering university, and thus the premise of this study is that the participant has been deeply involved with programming in his life and has a strong programming-oriented goal for the future. In previous studies that investigated effective methods for programming education, Hofuku (2013) identified areas that tend to be difficult for learners to understand and suggested the importance of small-step instruction that takes these areas into account, and Komatsu (2015) proposed the use of



games and teaching methods that fuel positive emotions in learners. However, these methods are designed to eliminate learning barriers among beginners (Nishida, Ida, & Uchida, 2022), and it is presumed that for the participant in this study, these issues have already been solved. Thus, it should be noted that this study examined the responses to wasan-based teaching materials in the case of a non-beginner level, which has rarely been examined in previous studies in Japan.

With regard to “participating willingness”, one of the factors of the SIEM assessment standard, we were unable to obtain clear participant statements from the interview. The reason for this may be that the participant has been very proactive in programming classes and this interview compared to the other students, and participation itself was perceived as a matter of course. As for “interactivity”, another factor of the SIEM assessment standard, we did not directly examine this because this class was our first attempt at utilizing wasan-based teaching materials as an educational aid.

Next, the following three points were identified as responses of the non-beginner participant to the wasan-based teaching materials.

The first point is that the participant made a comparison between the conventional programming education he previously experienced and the programming education using wasan-based teaching materials, and received different impressions. In the interview, we asked questions based on “class structure”, one of the factors of the SIEM assessment standard, and obtained the narrative that reflected the following subscales in particular: “level of chance for success”, “level of familiarity”, “level of understanding”, and “level of curiosity arousal”. The participant had a certain level of understanding of how programs work, and especially from the viewpoint of similarities between the feature of using wasan-based examples and system development, he said “it was interesting” and “it was better than just being taught how they work”. In addition, his understanding of the learning content was deepened through the use of wasan-based examples associated with day-to-day life; through the correspondence of mathematical processing with process writing in natural language; and through the presentation of visual images. Given this narrative, it is possible that students with programming experience and career aspirations link their past knowledge/information to what they are currently learning, and increase their interest in the class itself in addition to the programming through their new experience with the fusion of wasan and programming.

The second point is that the participant reflected on his level of proficiency, the contents to be learned, and his future job vision, and gained multiple insights from different perspectives from his previous learning. When we asked questions based on “initiative”, a factor of the SIEM assessment standard, we obtained the narrative that reflected all subscales as follows: “level of usefulness for the future”, “level of effort to improve”, “level of self-control”, and “level of self-goal clarity”. The participant’s motivation to learn programming was high even before entering the course, and as he acquired more knowledge and information, he recognized the gap between his ideal and reality, felt anxious and impatient about his future and current proficiency level and to solve these issues, a desire for the current classes to move beyond the basics and increase application possibilities to his career arose. However, after going through the programming process involving concrete methods such as nusubito-zan and nezumi-zan, the participant began



to spend time improving the code and try writing the process in a natural language outside of class time and became more aware of his future. Regarding the areas that he had already learned, he said “there are some aspects that I am not good at” and “I want to work on specialized things, but [...] it is always good to work on the basics extensively,” and he found the significance of relearning the basics. Considering the participant’s narrative, it seems that the learning contents using wasan can be applied to classroom practices that aim to “Scaffolding Metacognition (Hirashima, 2006),” which promotes visualization and externalization of the learner’s programming mastery.

The third point is that, based on the above-mentioned two initiatives, the participant developed more concrete ideas about the advancement of programming education using wasan-based teaching materials. When we asked questions based on “motivation”, a factor of the SIEM assessment standard, we obtained the narrative that reflected the following subscales: “level of importance”, “level of current awareness”, and “level of expectation”. The participant continued his narrative in response to our supplemental questions and made a clarification of the original desire to learn programming. He was referring to his desire for the current classes to move beyond the basics and increase application possibilities to his career, which he had held before taking the course and which was beneficial to him, but he also made a specific suggestion for classes in which learners with diverse proficiency levels could actively participate together. It is noteworthy that the authors, who are educators as well as researchers, did not have a clear intention about following participants’ suggestions: learning according to different proficiency levels of each student and collaborative learning and group work activities through complex tasks. By clarifying the learners’ perspectives on teaching materials and classes, it is assumed that the importance of student-teacher and student-student “interactivity”, one of the factors of the SIEM assessment standard, was demonstrated once again.

According to our findings above, it is considered that classroom practices using wasan-based teaching materials can: 1) link programming learners’ conventional learning and proficiency level to further advanced learning; 2) have an impact on metacognition; 3) be used not only for beginners but also for learners who have already mastered the basics.

## 6. Conclusion

In this study, we developed prototype programming teaching materials using wasan as its theme and examined the possibilities of using them as an educational aid for programming. For this purpose, we selected themes suitable for beginner-level programming from Jinkoki and conducted hands-on practice in a programming class at a university. We then analyzed the results of the interview survey conducted with a participant, mainly from the perspective of improving motivation in programming education.

Our analysis results suggested that wasan-based teaching materials for programming could foster new perspectives other than the ones obtained from the conventional mathematics learning experience.

Future challenges include the selection of wasan-based teaching materials appropriate to the developmental stages of the students and the creation of the teaching materials corresponding to each developmental stage. In addition, more cases need to be studied. Furthermore, classroom



practices that also incorporate “interactivity”, a factor of the SIEM assessment standard, and student responses to these need to be examined.

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# **Kertas Konsep Kajian Pembangunan Kerangka Amalan Kreativiti Pengajaran Guru Lukisan Kejuruteraan (AKPG-LK)** *(Concept Paper for the Study of the Development a Framework for Teaching Creativity for Engineering Drawing Teachers (AKPG-LK))*

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**Abstrak:** *Kertas konsep ini adalah merujuk kepada kajian yang sedang dijalankan oleh penyelidik dalam mengkaji serta membina sebuah Kerangka Amalan Kreativiti Pengajaran Guru Lukisan Kejuruteraan (AKPG-LK). Kajian ini menggunakan kaedah bercampur penerokaan berjujukan (Eksploratory Sequential Mixed Method) iaitu melibatkan kaedah kualitatif dan kuantitatif. Kaedah temubual digunakan untuk meneroka konstruk dan subkonstruk amalan kreativiti Pengajaran guru dikalangan pakar diperingkat fasa kualitatif. Manakala kaedah Fuzzy Delphi digunakan untuk mendapatkan kesepakatan dan konsensus pakar terhadap konstruk dan dimensi konstruk. Responden yang terpilih adalah dikalangan Guru Cemerlang Lukisan Kejuruteraan (LK) dan guru-guru mata pelajaran LK di Sekolah Menengah Teknik (SMT) seluruh Malaysia. Kajian rintis turut dilakukan untuk menguji kesahan dan kebolehpercayaan item instrumen sebagai persediaan untuk kajian sebenar. Pendekatan Model Pengukuran Rasch melalui perisian Winsteps digunakan untuk menguji analisis kesahan dan kebolehpercayaan item dan responden serta indeks pengasingan item, polariti item, kesesuaian item dan korelasi item untuk memastikan item yang dibina diterima, diperbaiki atau digugurkan. Seterusnya untuk kajian sebenar perisian Winsteps Analisis Komponen Utama (PCA) digunakan untuk memastikan Kerangka yang dibangunkan adalah sah dan bersifat unidimensi. Disamping itu pembangunan kerangka diperkukuhkan melalui Item Content Validity Index (I-CVI) yang akan dilakukan oleh pakar yang dilantik secara teknikal untuk menyemak dan mengesahkan kandungan kerangka yang dibangunkan. Diharapkan melalui pembinaan Kerangka AKPG- LK dapat dijadikan panduan dan rujukan kepada pada pendidik agar sentiasa bersedia dan melakukan perubahan dalam memastikan pengajaran menjadi lebih kreatif, menarik dan berkesan.*

**Kata Kunci:** Amalan Kreativiti, Pengajaran Guru, Lukisan Kejuruteraan

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## **1. Pendahuluan**

Guru merupakan individu yang perlu sentiasa bersedia dan terbuka untuk menerima sebarang cabaran dalam perubahan semasa. Justeru itu, cabaran transformasi sistem pendidikan pada masa kini menuntut perubahan dalam aspek Pengajaran dan Pembelajaran (PdP) seiring dengan pendidikan dalam era revolusi industri 4.0 (Hanisah & Hamzah, 2021). Pendemik Covid-19 juga mengkehendaki guru menjadi lebih kreatif dan mempelbagaikan kaedah dan mengupayakan pelbagai sumber serta bahan yang bersesuaian dengan PdP (Zawiah, 2020; Henry & Mahamod, 2021). Sehubungan itu dalam mendepani transformasi dunia pendidikan pada hari ini memerlukan



guru tidak terikat dengan satu cara tertentu dalam penyampaian malahan memerlukan perancangan dan pemikiran diluar kotak pemikiran biasa yang lebih berkesan (Yusoff, 2016). Justeru itu, bagi memenuhi keperluan revolusi industri 4.0 dalam era digital abad ke-21, guru juga berperanan penting dalam melahirkan modal insan yang berpengetahuan, berintegriti, berfikir secara kreatif dan inovatif (Jaggil & Suhaimi, 2018).

Menurut Rohaila et al., (2019), keperluan anjakan paradigma, ketrampilan dan ilmu pengetahuan diperlukan untuk menghadapi transformasi pendidikan pada abad ini. Oleh yang demikian, guru haruslah bijak mengubah sikap dan amalan sendiri untuk menghadapi sebarang perubahan seiring dengan transformasi sistem pendidikan semasa (Henry & Mahamod, 2021). Manakala Leifler (2020), turut menyatakan proses pengajaran yang mengutamakan kreativiti dalam pengajaran dapat mengembangkan keseluruhan potensi pelajar secara kognitif, afektif dan psikomotor. Oleh yang demikian, tuntutan terhadap perubahan paradigma dalam pengajaran seorang guru sangat diperlukan dalam memastikan keberkesanan dalam penyampaian dan pengajaran guru (Barker & McDonald, 2021).

Sehubungan itu, keberkesanan pengajaran guru merupakan perkara terpenting untuk mentransformasikan pendidikan seterusnya meningkatkan keberhasilan murid (Abu et al., 2014; KPM, 2011; Nazirah, 2017). Kenyataan ini adalah seiring dengan dapatan kajian Normiati & Abdul Said (2019) iaitu terdapat pengaruh yang signifikan antara kejayaan murid terhadap kualiti pengajaran guru iaitu kualiti penyampaian pengajaran seseorang guru sangat penting dalam menentukan kejayaan seseorang pelajar. Dapatan ini adalah selari dengan kajian Shah, (2018) dan Rohaila et al., (2019) yang turut mendapati, kejayaan seseorang murid bukanlah bergantung kepada sekolah yang dihadiri tetapi bergantung kepada kreativiti dan keberkesanan penyampaian pengajaran guru didalamnya. Seiring dengan kajian Wong (2016) turut mendapati guru menjadi individu yang bertanggungjawab sebagai pemudahcara, pakar rujuk, penilai seterusnya berperanan sebagai pendidik mahupun fasilitator. Oleh yang demikian amalan pengajaran guru yang berkesan dewasa ini bukan sahaja meliputi perancangan pengajaran semata-mata, malahan meliputi kreativiti semasa proses pengajaran dan pembelajaran guru (Zaki et al., 2013; Aizat et al., 2018).

## **2. Pernyataan Masalah**

Amalan Kreativiti Pengajaran guru merupakan satu keperluan dalam memastikan PdP berjalan dengan menarik dan berkesan (Ibrahim & Mohamed, 2021). Disamping itu amalan kreativiti dalam Pengajaran guru memainkan berperanan penting untuk menarik minat dan fokus murid agar memberikan sepenuhnya tumpuan serta melibatkan diri secara aktif terhadap aktiviti yang terlibat dalam PdP (Badrul & Nasruddin, 2016; Henry & Mahamod, 2021; Nygaard et al., 2010). Berdasarkan daripada latar belakang masalah, kajian awalan yang dijalankan serta merujuk kepada kajian-kajian terdahulu mendapati bahawa amalan kreativiti pengajaran guru adalah berada ditahap sederhana dan memerlukan kajian secara khusus khususnya untuk mata pelajaran LK.

Antara isu-isu yang dikenalpasti adalah masih terdapat guru yang menghadapi masalah kefahaman terhadap amalan kreativiti iaitu berada pada tahap sederhana serta memerlukan perhatian (Henry & Mahamod, 2021; Huang & Hj Iksan, 2019; Yunos, 2015). Manakala kajian Raja Abdullah &



Daud (2018), turut mendapati masalah kurangnya pendedahan terhadap aspek kreativiti dalam pengajaran dan pemikiran kritikal turut menjadi antara punca kurangnya kefahaman guru terhadap amalan kreativiti. Lantaran itu ianya menyebabkan guru-guru kurang menggunakan pendekatan dan strategi pengajaran yang kreatif dalam pengajaran (Anuar & Nelson, 2015; Mariani, 2016; Murray & Male, 2005). Selain dari isu kekangan masa melaksanakan amalan kreativiti dalam pengajaran, kurangnya kemahiran dan penggunaan Teknologi Maklumat dan Komunikasi (TMK) turut menjadi penghalang terhadap pengajaran kreatif guru (Rohaila et al., 2019; Ruhizan et al., 2012) seterusnya menjadi masalah dalam mendepani perubahan sistem pendidikan pada hari ini (Azrin et al., 2021).

Proses PdP yang semakin hambar yang disebabkan oleh kegagalan guru mengaplikasikan pelbagai kaedah pengajaran yang kreatif menjadi antara penghalang dan membataskan pengajaran kreatif (Awi & Zulkifli, 2021). Hal ini akan memberikan kesan terhadap tuntutan matlamat KSSM LK itu sendiri ke arah mempersiapkan murid yang berkemampuan menjana idea-idea kreatif serta bijak membuat keputusan, berinovasi serta berkeupayaan dan berdaya saing secara global (KPM, 2018). Akhir sekali bagi mengatasi isu berkaitan kurangnya kefahaman kreativiti dan penggunaan pelbagai strategi, kaedah dan teknik pengajaran kreatif memerlukan sebuah panduan khas yang boleh digunakan oleh guru LK sebagai rujukan dalam merancang dan melaksanakan amalan kreativiti dalam pengajaran LK. Kajian awalan yang dijalankan juga menunjukkan persetujuan terhadap keperluan sebuah kerangka yang mengandungi konstruk amalan kreativiti pengajaran guru LK secara khusus. Kerangka yang dibina adalah bertujuan memastikan amalan kreativiti dapat diterapkan dalam diri seseorang guru LK ke arah PdP yang lebih berkesan.

### 3. Kajian Literatur

Kreativiti amat diperlukan untuk menghadapi dan menyelesaikan masalah kehidupan. Hal ini adalah berikutan, untuk menjamin kelangsungan dalam kehidupan, seseorang manusia perlu menjadi kreatif atau berfikiran kreatif. Menurut Yusoff (2016), dalam konteks pendidikan, proses PdP merupakan satu proses penyelesaian masalah yang memerlukan tindakan serta perhatian secara menyeluruh. Manakala, untuk mencapai kelangsungan pencapaian matlamat dan objektif PdP disekolah, guru perlu menjadi lebih kreatif (Badrul & Nasruddin, 2016). Seterusnya pemikiran kreatif mampu menghasilkan kreativiti seterusnya dapat membantu guru memastikan keberkesanan dalam pengajarannya (Leifler, 2020; Yong & Biraimah, 1996). Hal ini adalah kerana, proses PdP adalah dikelilingi oleh pelbagai kekangan dan permasalahan yang dapat mengganggu proses penyampaian pengajaran itu sendiri (Nasir & Mansor, 2021). Sehubungan itu, guru-guru perlulah menyedari bahawa kreativiti memainkan peranan penting dalam menyelesaikan masalah dalam PdP.

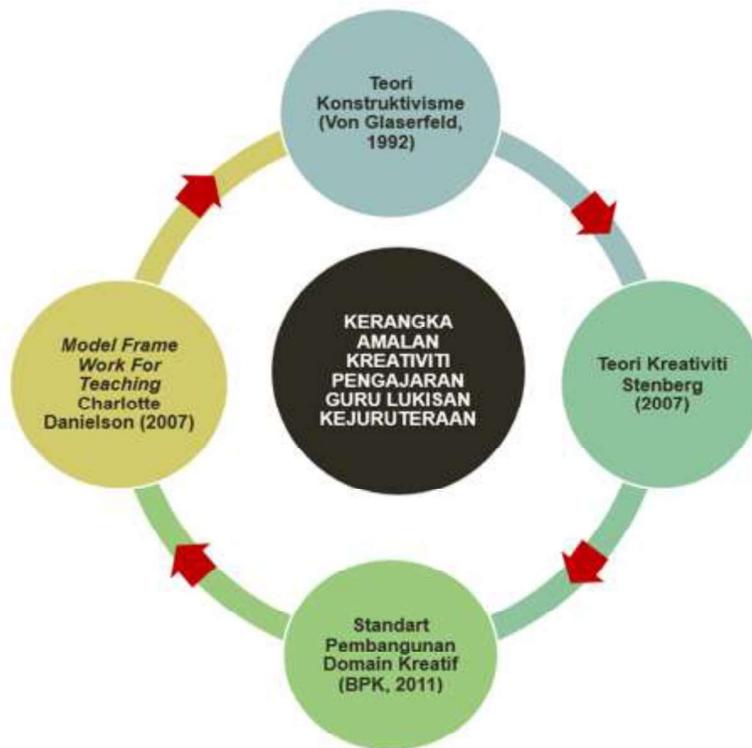
Kreativiti turut dilihat sebagai satu keperluan yang perlu difahami, dipelajari, dikuasai dan diamalkan dalam penyampaian pengajaran yang berkesan. Kreativiti juga sukar dipisahkan dari kecerdasan fikiran dan kepintaran individu. Hal ini adalah kerana ianya membantu menganalisa kemungkinan yang terdapat proses pengajaran untuk menghasilkan penyelesaian masalah yang berkesan. Menurut Henry dan Mahamod (2021) dalam memacu dan meningkatkan pemikiran serta daya saing murid, guru perlu menggunakan strategi dan pendekatan pengajaran kreatif disamping mempelbagaikan sumber dan bahan pengajaran yang bersesuaian. Justeru itu kegagalan mengaplikasikan kefahaman kreatif turut menjadi punca kepada kegagalan mengamalkan



keaktiviti dalam pengajaran (Yusoff, 2016). Seterusnya, Awi dan Zulkifli (2021) turut menyatakan kurangnya kefahaman terhadap kreativiti menjadi penyebab guru gagal menggunakan kaedah dan strategi pengajaran yang tidak sesuai dan efektif.

Pelbagai gambaran berkaitan ciri-ciri personaliti guru yang kreatif antaranya disukai oleh pelajar agar mudah menerima dan memberi sokongan terhadap proses PdP serta memudahkan pengurusan di sekolah dan bilik darjah. Batey et al., (2010) dan Shah (2018) turut mendapati personaliti guru yang baik akan menarik perhatian para pelajar, manakala ciri-ciri kreatif yang dipunyai oleh guru turut mempengaruhi pembelajaran pelajar di dalam bilik darjah. Walaupun terdapat senarai ciri-ciri atau karektor individu berpersonaliti kreatif, ianya menunjukkan terdapat beberapa karektor yang bertindan antara satu sama lain. Namun begitu terdapat juga beberapa karektor yang unik telah disenaraikan berkaitan personaliti kreatif (Yusoff, 2016). Walaubagaimanapun tiada seorang pun yang menyenaraikan karektor individu berpersonaliti kreatif secara tepat (Batey et al., 2010; Kelly et al., 2008). Manakala senarai karektor ciri-ciri individu berpersonaliti kreatif yang telah disenaraikan oleh Hargreaves (2003) sering digunakan dalam banyak kajian amalan kreativiti. Sementara itu, kajian Prahbu et al., (2008) dan Mariani (2016) pula memberi gambaran bahawa individu berpersonaliti kreatif menunjukkan keinginan tinggi serta agresif dalam mencapai sesuatu tujuan. Sehubungan itu keperluan dan senarai ciri-ciri individu berpersonaliti kreatif dilihat lebih bersifat dinamik bergantung kepada matlamat dan tujuan.

Dalam kajian ini, kerangka teori yang digunakan ini ditunjukkan dalam Rajah 1 dengan merujuk kepada Teori Kreativiti Sternberg, (2006) dan Teori Konstruktivisme Von Glaserfeld, (1992). Disamping itu, untuk memantapkan kerangka teori kajian Amalan Kreativiti Pengajaran Guru LK, Standart Pembangunan Domain Kreatif, BPK (2011) dipilih dan diperkukuhkan oleh Model Framework For Teaching oleh Charlotte Danielson (2007) sebagai panduan disamping data dapatan meta analisis terhadap pembacaan kajian-kajian. historical purchase activities that they do and also the estimated needs of the production process.



Rajah 1: Kerangka Teori Kajian

Bahagian Pembangunan Kurikulum, KPM (2011), telah memperkenalkan Standard Pengajaran Pembangunan Domain Kreativiti bertujuan memberikan penjelasan kepada guru untuk memahami dan melaksanakan proses PdP dalam mencapai matlamat yang ditentukan. Ianya digubal berdasarkan tanggapan berikut; (i) matlamat yang ditetapkan memerlukan perubahan secara sistematik; (ii) penguasaan dan perkara yang diperolehi pelajar di pengaruhi cara bagaimana mereka diajar; (iii) kreativiti boleh dipelajari dan dibangunkan; dan (iv) pemahaman pelajar dapat dibangunkan dengan aktif secara individu atau melalui proses sosial. Terdapat lima Standard pengajaran domain kreatif yang disusun adalah terdiri seperti berikut; merancang PdP, membimbing dan menjadi fasilitator pembelajaran, melaksanakan pentaksiran secara berterusan, membangun komuniti kreatif dan mengurus persekitaran pembelajaran. Walaubagaimanapun standart pengajaran ini memerlukan kebijaksanaan guru untuk disesuaikan dengan perkembangan dan transformasi pendidikan serta ledakan globalisasi dunia melalui pendekatan pelaksanaan pembelajaran Abad ke-21 yang diperkenalkan oleh KPM pada tahun 2014.

Seterusnya Teori Kreativiti Sternberg (2006) telah dipilih sebagai rujukan dan panduan dalam mendasari kajian ini. Pemilihan teori ini adalah kerana bersifat ilmiah berdasarkan penyelidikan dan telah meletakkan enam pembolehubah yang menjadi syarat berkreativiti serta penting dalam menentukan kreativiti iaitu kecerdasan, pengetahuan, gaya berfikir, personaliti, motivasi dan keadaan persekitaran. Teori ini juga turut menekankan keperluan kecerdasan dan pengetahuan dalam menentukan seseorang itu berkebolehan melahirkan idea yang asli dari pendekatan yang biasa. Akibat kurangnya pengetahuan akan menyebabkan seseorang itu kekurangan idea dalam menghasilkan sesuatu hasil yang kreatif. Selain itu, pengetahuan latar belakang sesuatu subjek juga merupakan isu kepada kreativiti. Penghasilan idea-idea baru adalah gabungan idea, fakta dan



lain-lain maklumat disamping pengetahuan lepas untuk melihat sesuatu perkara itu secara mendalam.

Untuk memantapkan pembangunan kerangka Amalan Kreativiti Pengajaran guru, Teori Konstruktivisme Von Glasersfeld (1992) telah dipilih kerana ianya memberi penekanan terhadap proses kognitif individu berdasarkan pengalaman, pengaruh sosial dan maklumat fisiologi. Disamping itu teori ini juga turut mementingkan pembinaan ilmu secara terus melalui PdP serta mencari makna dalam pendidikan (Soh, 2015). Corazza et al., (2021) turut menyatakan proses pembelajaran menggunakan teori konstruktivisme adalah secara aktif, dinamik dan berkembang serta mampu menghimpunkan keseluruhan pengalaman seterusnya memberikan makna terhadap kehidupan seseorang. Sehubungan itu, proses PdP menggunakan teori ini memerlukan keberanian guru menghadapi perubahan, berperanan aktif dan kreatif dalam pembelajaran berpusatkan murid serta guru bukan sahaja bertindak sebagai pendidik malahan sebagai fasilitator dalam menyelia dan memantau aktiviti murid. Seterusnya Sang (2010), turut menyatakan kaedah tradisional pengajaran berpusatkan guru dan kaedah syarahan, hafalan serta mengingat adalah tidak relevan dalam teori konstruktivisme. Justeru itu, model PdP yang bersesuaian adalah secara inkuiri, melalui pembelajaran secara koperatif dan kolaboratif.

Untuk memperkukuh lagi kerangka kajian ini, Model Framework For Teaching oleh (Danielson, 2007) telah menyenaraikan empat domain utama dalam pengajaran guru iaitu meliputi, perancangan pengajaran, pengurusan kelas, strategi pengajaran dan tanggungjawab profesional. Daripada empat domain pengajaran efektif yang disenaraikan ianya adalah bersifat lebih komprehensif dan lengkap meliputi aspek pentaksiran murid, hasil pembelajaran dan komuniti profesional yang menjadi perkara penting dalam pendidikan abad ke-21. Disamping itu seseorang guru yang kreatif dan efektif dalam pengajarannya sentiasa berusaha untuk meningkatkan profesionalisma dalam perguruan dengan memperkasakan pengurusan diri, pengajaran, murid dan komuniti mereka (Lai, 2015). Oleh yang demikian tindakan profesional serta amalan kreatif dalam setiap tindakan dan pengajaran guru merupakan suatu yang perlu dipraktikkan dalam memastikan keberkesanan PdP.

Sehubungan itu, kaedah pengajaran merupakan tatacara atau bagaimana seseorang mengurus dan mengorganisasikan serta melaksanakan proses PdP dengan kreatif dan berkesan (Masnan et al., 2019). Ianya juga merupakan usaha dan tindakan guru secara tersusun dan bersistematik untuk mencapai keberkesanan PdP disamping mencapai objektif jangka pendek dan jangka panjang (Seng & Othman, 2018; Godfrey et al., 2019). Disamping itu tindakan balas dan kerjasama antara guru dan murid untuk mencapai objektif PdP memerlukan perancangan kaedah pengajaran yang sistematik (Yahaya et al., 1999). Merujuk kepada KSSM Mata pelajaran LK (2018) menjelaskan strategi PdP yang berkesan adalah bertujuan untuk menjadi peranan penting dalam memenuhi keperluan kepelbagaian latarbelakang dan kebolehan murid agar menjadi lebih seronok dan menarik. Perlaksanaan PdP LK haruslah merujuk kepada Standart Pembelajaran berdasarkan Pembelajaran Abad ke-21 (PAK-21).



### 3. Objektif Kajian

Objektif kajian yang ingin dicapai adalah seperti berikut:

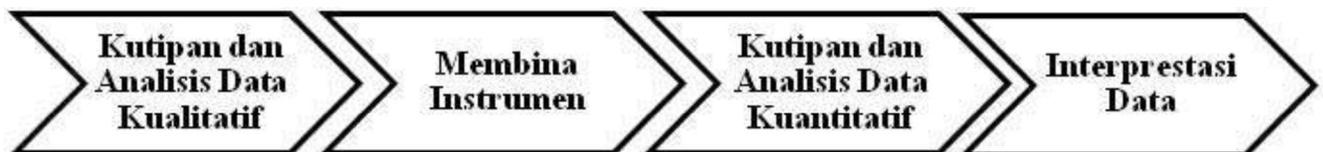
- i. Mengenal pasti konstruk dan subkonstruk Amalan Kreativiti Pengajaran Guru Lukisan Kejuruteraan
- ii. Menentukan konstruk dan subkonstruk Amalan Kreativiti Pengajaran Guru Lukisan Kejuruteraan.
- iii. Membina sebuah Kerangka Amalan Kreativiti Pengajaran Guru Lukisan Kejuruteraan Sekolah Menengah Teknik di Malaysia.

### 4. Metodologi Kajian

Menurut Ghazali dan Sufean (2021), metodologi kajian yang baik dapat perlu dalam memastikan sesuatu objektif boleh dicapai berdasarkan kepada data yang sah dan dipercayai. Dalam bahagian ini penyelidik akan menghurai dan membincangkan rekabentuk secara terperinci, populasi dan sampel kajian, instrumen kajian yang digunakan, prosedur pungutan, pemprosesan dan penganalisan data.

#### 5.1 Rekabentuk Kajian

Rekabentuk kajian yang sistematik dan berstruktur terhadap perancangan yang disediakan dalam sesebuah kajian dapat menjawab dengan tepat persoalan kajian yang ditetapkan (Ridhuan & Nurulrabihah, 2021). Bertepatan dengan kenyataan Linacre (2010) yang menyatakan, rekabentuk kajian merupakan prosedur dan langkah yang dirancang untuk mencapai sesuatu matlamat kajian. Untuk menyempurnakan kajian ini, kaedah bercampur penerokaan berjujukan (Exploratory Sequential Mixed Method) akan digunakan. Menurut Creswell (2014) terdapat dua kaedah yang terlibat iaitu kaedah kualitatif yang bertujuan untuk meneroka dan menentukan elemen-elemen amalan kreativiti pengajaran guru LK. Seterusnya kaedah kuantitatif digunakan dalam kajian ini adalah bertujuan untuk mendapatkan data sokongan untuk mengenal pasti dimensi konstruk dan elemen amalan Kreativiti dalam Pengajaran Guru LK agar dapat dijadikan rujukan dalam meneruskan fasa kuantitatif. Rajah 2 menunjukkan Kaedah Gabungan Penerokaan Berjujukan (Exploratory Sequential Mixed Method Design) Adaptasi daripada Creswell dan Creswell (2018).



Rajah 2: Kajian Kaedah Gabungan Penerokaan Berjujukan (Exploratory Sequential Mixed Method Design) Adaptasi daripada Creswell dan Creswell (2018)

#### 5.2 Pembentukan Konstruk dan subkonstruk

Kaedah kualitatif digunakan dalam pembentukan dan membangunkan konstruk dan subkonstruk seterusnya mengesahkan konstruk dan subkonstruk AKPG-LK. Senarai Konstruk dan subkonstruk awal juga diperolehi berdasarkan proses analisis dokumen merujuk kupasan kajian literatur beserta proses integrasi model dan teori-teori yang berkaitan. Disamping itu, konstruk juga diperolehi berdasarkan temu bual secara mendalam terhadap pakar-pakar iaitu guru-guru cemerlang LK dan



pensyarah Universiti Fakulti Pendidikan Universiti Awam yang menawarkan kursus pendidikan. Menurut Kvale dan Brinkmann (2008), kaedah temubual merupakan kaedah kualitatif untuk mendapatkan maklumat secara diskriptif. Seterusnya Patton (1990) turut berpendapat, kaedah temubual dapat memberikan maklumat secara mendalam yang tidak boleh diperhatikan melalui pemerhatian seperti pemikiran, pendapat dan pengalaman. Melalui proses temubual yang dijalankan, maklumat yang diperolehi daripada pakar-pakar yang terpilih dapat digunakan untuk membina dan mentafsir konstruk item seterusnya menilai amalan kreativiti pengajaran guru dalam situasi sebenar (Ridhuan & Nurulrahmah, 2021).

Dapatan temubual separa struktur dianalisis elemen-elemen AKPG-LK seterusnya membolehkan pembinaan soalan susulan berdasarkan jawapan yang diberikan bertujuan untuk mendapatkan maklumbalas, pengesahan dan maklumat yang lebih jelas dan terperinci (Gay & Airasian, 2003) disamping menjimatkan kos dan masa (Cohen et al., 2005). Dalam kajian. Seterusnya kaedah Fuzzy Delphi digunakan bertujuan mendapatkan pendapat dan kesepakatan (konsensus) pakar dalam menentukan sesuatu perkara yang diukur (Ridhuan & Nurulrahmah, 2021).

Setelah konstruk dan subkonstruk dikenalpasti, pengkaji akan membuat pemilihan rekabentuk item yang sesuai diguna pakai pada setiap konstruk. Instrumen berbentuk soal selidik digunakan untuk kajian rintis dan kajian sebenar. Soalan adalah berformat penilaian berbentuk item persepsi oleh guru dalam menilai amalan kreativiti pengajaran sendiri guru LK. Penggunaan soalan menggunakan skala likert lima mata iaitu 1 = Sangat Tidak Setuju (STS), 2 = Tidak Setuju (TS), 3 = Kurang Setuju (KS), 4 = Setuju (S) dan 5 = Sangat Setuju (ST). bertepatan dengan Bond dan Fox (2007), skala yang digunakan dapat menunjukkan tahap sokongan persetujuan merujuk kepada maklumbalas dan persepsi responden terhadap soalan yang diberikan. Pembinaan item soal selidik adalah merujuk kepada McIntire dan Miller (2007) dan berdasarkan rujukan literatur yang bersesuaian dengan dimensi konstruk yang diperolehi.

### **5.3 Kesahan Muka dan Kandungan**

Untuk memastikan kandungan item yang disediakan bersesuaian dan menepati matlamat kajian, proses kesahan muka dan kandungan dilakukan terhadap instrumen kajian. Pada peringkat ini kesahan muka dilakukan terlebih dahulu dan diikuti pengesahan kandungan. Menurut Azman (2012), kesahan muka dilakukan adalah bertujuan untuk melihat sejauh mana instrumen yang dibina mampu mengukur sesuatu yang hendak diukur. Manakala kesahan kandungan dilaksanakan dengan melibatkan panel-panel yang dapat membuat pertimbangan terhadap kebolehan instrumen mencapai piawaian yang ditetapkan. Semakan ini adalah sangat diperlukan untuk memastikan kejelasan kandungan soalan adalah bertepatan dengan konstruk (Kline, 2005). Sehubungan itu dua orang pakar berkaitan bidang LK dikalangan Pensyarah Universiti Awam diperlukan untuk melengkapkan proses tersebut.

### **5.4 Kajian Rintis**

Kajian rintis akan dijalankan kepada kumpulan guru yang mengajar mata pelajaran GKT di sekolah menengah harian biasa yang berpengalaman mengajar LK. Menurut Azman (2012) dan Fauzi (2017) kajian rintis adalah bertujuan untuk meningkatkan kualiti item disamping kejelasan dalam mentafsir data. Kajian rintis akan dilaksanakan ke atas 30 orang guru Grafik Komunikasi Teknikal (GKT). Kesemua responden yang terlibat dalam kajian rintis tidak akan terpilih dalam



kajian sebenar. Memandang situasi semasa akibat pandemik Covid-19 yang membimbangkan, menyebabkan kaedah pungutan data dilakukan dengan kaedah memindahkan soalan soal selidik kepada aplikasi google form yang membolehkan responden menjawab pada bila-bila masa. Hasil dapatan kajian kuantitatif, kajian rintis akan dianalisis berdasarkan Model Pengukuran Rasch menggunakan Perisian Winstep. Pada peringkat kajian rintis, pemeriksaan kefungisian item akan dilakukan dengan mengambil kira aspek; (i) kebolehpercayaan dan pengasingan item-responden ; (ii) mengesan polarity item untuk mengukur konstruk berdasarkan PT-Measure Corr; (iii) kesesuaian Fit Item untuk mengukur kesesuaian konstruk; dan (iv) nilai kolerasi residual terpiawai untuk menentukan item bersandar.

### **5.5 Kajian Sebenar**

Untuk melaksanakan kajian sebenar, penyelidik melakukan beberapa persediaan termasuklah memastikan instrumen yang disediakan dalam bentuk soal selidik mencukupi serta dapat ditakbir kepada responden berdasarkan bilangan sampel yang telah dikenalpasti. Kesalahan dan kesilapan aspek ejaan dan ayat perlu dipastikan dari awal lagi bagi mengelakan sebarang masalah dalam proses mendapatkan data kajian sebenar. pada peringkat kajian sebenar, instrumen soal selidik yang telah diperakui kesahan dan kebolehpercayaan akan ditakbir kepada 49 orang guru mata pelajaran LK di Sekolah Menengah Teknik seluruh Malaysia. Seterusnya untuk mengesahkan Kerangka AKPG-LK Ujian Analisis Komponen Utama (PCA) dan I-CVI (Item Content Validity Index) dari kalangan pakar digunakan untuk memastikan kerangka yang dibina adalah sah dan juga bersifat unidimensi.

### **5.6 Pembinaan Kerangka Amalan Kreativiti Pengajaran Guru Lukisan Kejuruteraan (AKPG-LK)**

Kajian Pembinaan Kerangka Amalan Kreativiti Pengajaran guru adalah kajian berbentuk deskriptif dan inferensi untuk membentuk kerangka AKPG-LK. Dalam membangunkan kerangka ini, pengkaji menggunakan perisian Winstep melalui pendekatan Model Pengukuran Rasch. Untuk tujuan pengesahan konstruk dan dimensi konstruk yang diperolehi, pendekatan Model Pengukuran Rasch dengan melakukan Analisis Komponen Utama (Principle Component Analysis, PCA) pada nilai residual akan digunakan. Sebelum melaksanakan ujian PCA, terlebih dahulu pengkaji membuat semakan terhadap item yang digunakan untuk memastikan nilai PTMEA CORR di dalam julat yang positif dan tidak terdapat item yang bertindan dari aspek maksud dan ciri yang dilihat berdasarkan nilai korelasi setiap item. Proses melaksanakan PCA adalah meliputi pemeriksaan item terhadap (i) peratus varians mentah dijelaskan oleh pengukuran (Raw Variance Explained by Measures); (ii) peratus varians tidak dijelaskan dalam kontras pertama (Unexplained Variance In 1st Contrast); dan (iii) nilai eigen varians tidak dijelaskan dalam kontras pertama. Hasil daripada analisis yang dilakukan melalui PCA ini, maka konstruk dan dimensi konstruk Amalan Kreativiti Pengajaran Guru LK dapat disahkan dan seterusnya Kerangka AKPG-LK dapat dihasilkan. Selain itu untuk memantapkan kesahan Kerangka AKPG-LK, Item Content Validity Index (I-CVI) akan dilakukan oleh pakar yang dilantik secara teknikal untuk menyemak dan mengesahkan kandungan kerangka yang dibangunkan.

### **5.7 Populasi dan Sampel Kajian**

Menurut Majid (2005), populasi didefinisikan sebagai sekumpulan individu yang mempunyai persamaan ciri dan tujuan kajian dijalankan. Manakala, sampel pula adalah kumpulan kecil yang



terpilih bagi mewakili sesebuah populasi. Pemilihan sampel kajian ini adalah melibatkan penggunaan persampelan bertujuan dan terbahagi kepada sampel kualitatif dan kuantitatif. Pemilihan sampel kajian untuk kualitatif melibatkan sampel untuk proses tembual dan Fuzzy Delphi. Proses temubual melibatkan 7 orang pakar berkaitan bidang LK iaitu dikalangan Guru Cemerlang LK. Manakala untuk sampel proses Fuzzy Delphi melibatkan 14 orang Pakar yang terdiri daripada panel pakar temubual dikalangan 2 orang pensyarah Universiti Awam yang berkaitan bidang Teknikal dan Vokasional, 2 orang pegawai BPLTV- KPM dan 10 orang Guru LK yang mempunyai pengalaman melebihi 10 tahun mengajar LK. Lokasi kajian adalah melibatkan Sekolah Menengah Teknik (SMT) seluruh Malaysia yang menawarkan mata pelajaran LK. Kajian Kuantitatif juga menggunakan kaedah persampelan bertujuan iaitu melibatkan 49 orang responden yang terdiri daripada guru yang mengajar LK disebulan buah SMT Seluruh Malaysia. Lokasi kajian yang dipilih adalah disebabkan sampel yang digunakan dapat memenuhi keperluan dan tuntutan kehendak kajian seterusnya menggambarkan populasi dan bertepatan dengan objektif serta menjawab persoalan kajian ini.

## **6. Jangkaan Dapatan Kajian**

Diharapkan kajian yang dijalankan akan mengenalpasti apakah konstruk dan subkonstruk Amalan Kreativiti Pengajaran Guru LK yang sah. Seterusnya dapatan tersebut juga dapat digunakan untuk membangunkan sebuah Kerangka Amalan Kreativiti Pengajaran Guru Lukisan Kejuruteraan yang telah disahkan dan bersifat unidimensi menggunakan prosedur yang tepat dan baik. Akhir sekali pengkaji berharap agar kajian pembangunan Kerangka AKPG-LK ini dapat dijadikan rujukan dan panduan kepada semua guru Lukisan Kejuruteraan dalam memastikan pengajaran dan pembelajaran guru menjadi lebih bermakna dan berkesan.

## **7. Rumusan**

Dapat disimpulkan bahawa amalan kreativiti dalam proses PdP sangat diperlukan dalam memastikan keberkesanan PdP. Keberkesanan pengajaran guru adalah sangat bergantung kepada usaha dan sikap guru dalam mengamalkan kreativiti dalam pengajarannya (Lai, 2015). Disamping itu, persediaan, pelaksanaan dan pentaksiran PdP yang dijalankan secara terancang dan sistematik (Hanisah & Hamzah, 2021). Justeru itu, guru-guru LK haruslah berpersonaliti kreatif, mempunyai kefahaman tentang kreativiti, memahami serta mempelbagaikan kaedah pengajaran yang kreatif dan bersedia menghadapi pelbagai perubahan dalam menyahut cabaran serta transformasi dunia pendidikan pada hari ini. Oleh yang demikian, guru-guru LK perlu sentiasa berusaha mengamalkan dan meningkatkan kreativiti mereka agar dapat mengoptimumkan pencapaian dan keberkesanan pengajaran mereka. Bertepatan dengan itu, telah menjadi tanggungjawab kepada semua guru memahami dan melaksanakan amalan pengajaran kreatif seterusnya mampu melahirkan modal insan yang berpengetahuan, berintegriti, berfikir secara kreatif, inovatif serta berupaya memenuhi keperluan revolusi industri 4.0 dalam era digital Abad ke-21 (Jaggil & Taat, 2018).



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## Pembinaan Kerangka Konseptual Kajian Mengenai Rangka Kerja Pembangunan Ilmu Metakognitif Untuk Work-Based Learning (WBL) Politeknik Malaysia

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**Abstrak:** *TVET merupakan pendekatan pembelajaran yang mempersiapkan diri seseorang pelajar dengan ilmu dan kemahiran yang sangat berkaitan dengan pekerjaan yang bakal diceburi. Proses pendidikan selain pendidikan umum yang melibatkan pembelajaran dalam bidang berkaitan teknologi dan sains, latihan kemahiran praktikal, serta sikap, pemahaman dan pengetahuan tentang pekerjaan dalam pelbagai sektor ekonomi dan kehidupan sosial. Justeru, Work Based Learning (WBL) merupakan satu kaedah pembelajaran yang menggabungkan dua medium pembelajaran iaitu pembelajaran teori di institusi dan pembelajaran kemahiran di industri yang bertujuan untuk melahirkan graduan yang mempunyai pengetahuan dan kemahiran bidang yang tinggi. Program yang menggunakan kaedah ini telah berkembang apabila politeknik meneruskan penawaran program menggunakan kaedah WBL dalam program Ijazah Sarjana Muda Teknologi kejuruteraan Elektronik (Elektronik Perubatan) dengan kepujian (BEU). Kolaborasi pintar antara Politeknik Sultan Salahudin Abdul Aziz Shah (PSA) bersama tiga (3) konsesi hospital dan beberapa syarikat berkaitan. kajian menunjukkan melalui proses pelaksanaan yang jelas dan penilaian yang mantap membolehkan pelajar mendapat pengetahuan, kemahiran dan tingkah laku yang cemerlang Artikel ini bertujuan untuk membincangkan kerangka teori kajian berkaitan pembangunan ilmu metakognatif untuk WBL politeknik Malaysia.*

**Kata Kunci:** , BEU, rangka kerja metakognitif, kolaborasi

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### 1. Introduction

Work-Based Learning (WBL) merupakan satu kaedah pembelajaran yang menggabungkan pembelajaran teori dan amali secara serentak agar pelajar yang menjalani kursus yang membabitkan WBL boleh memperoleh kemahiran insaniah yang diperlukan majikan pada masa kini (Normah, 2019). Kemahiran insaniah yang diamalkan dalam WBL di industri juga lebih tertumpu kepada pengalaman yang dimiliki oleh pembimbing di industri. Banyak negara telah menggunakan kaedah ini untuk meningkatkan tahap kemahiran pelajar bidang seperti negara Eropah dan Amerika Syarikat. Jabatan Pengajian Politeknik dan Kolej Komuniti Komuniti (JPPKK) telah mengadakan Dialog Industri yang pertama pada September 2006 (Department of Polytechnic Education, 2017). Hasil dari dialog ini, kerjasama antara institusi pendidikan dan industri secara aktif dan dinamik adalah perlu bagi meningkatkan bilangan tenaga kerja yang berkeelayakan, berpengetahuan dan berkemahiran tinggi.



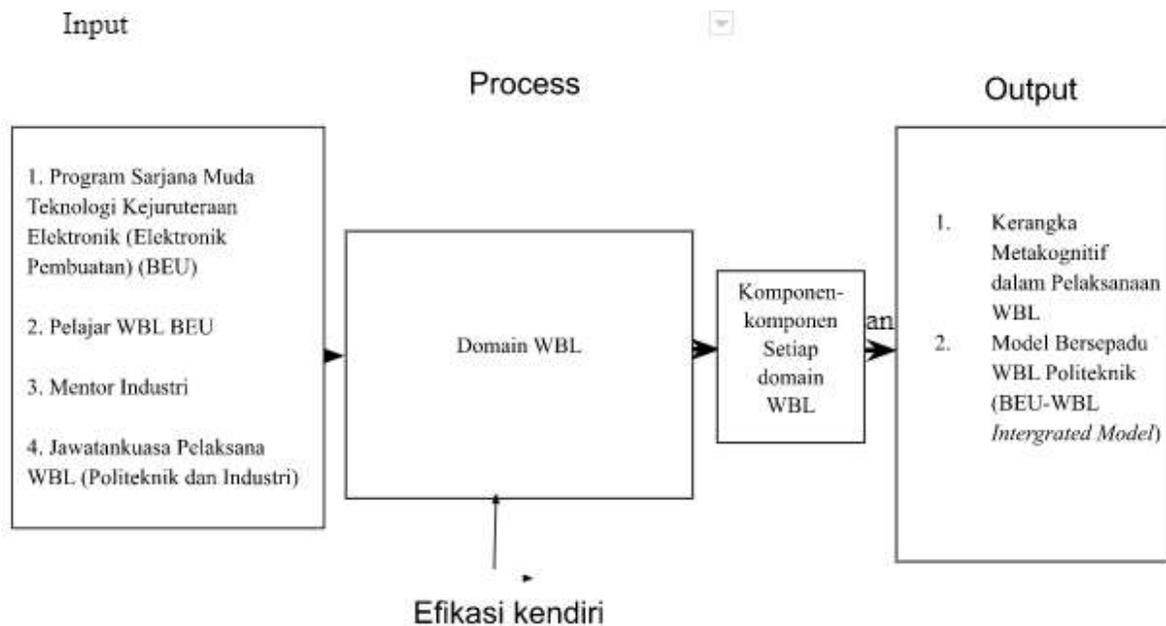
Walaubagaimana pun ia baru diperkenalkan di negara Malaysia sekitar awal 2000. Kaedah Pembelajaran Berasaskan Kerja (PBK) mula diperkenalkan pada tahun 2007 dalam program Diploma Kolej Komuniti dan pelaksanaan ini telah dihentikan, namun diteruskan dalam program Diploma Lanjutan Politeknik pada tahun 2010 dengan istilah Work based Learning (WBL) (Zunuwanas, 2017). Program pengajian secara WBL dimulakan pada tahun 2007 di beberapa kolej komuniti terpilih bagi pengajian peringkat diploma. Manakala politeknik Sultan Salahudin Abdul Aziz Shah adalah politeknik pertama menjalankan program pengajian secara WBL pada tahun 2008 pada peringkat diploma lanjutan (Department of Polytechnic Education, 2017). Model WBL sedia ada tidak banyak menumpu kepada gaya pembelajaran yang bercirikan individu yang boleh menjurus kepada pembelajaran yang berkesan dan kritis di tempat kerja (Raelin, 1997). Justeru, pelaksanaan WBL di politeknik telah membuktikan tahap pencapaian yang cemerlang terhadap tiga (3) elemen: pengetahuan, kemahiran dan kemahiran insaniah dalam bidang pengkhususan sejajar dengan strategistrategi metacognitif. Menurut (flavell, 1979), (Mhouthi, 2017), (Jung, 2019) dan (klerk, 2018) metacognitif adalah strategistrategi pembelajaran yang teradun yang membangunkan rubrik penilaian dan seterusnya menghasilkan kemahiran metacognitif. Elemen pembelajaran berasaskan kerja lapangan sebenar sangat membantu dalam meningkatkan kepada kebolehapasaran graduan bidang di dalam industrinya.

Secara umumnya WBL adalah satu kaedah pembelajaran yang berterusan dalam pembangunan tenaga kerja. WBL adalah program kerjasama institusi dan industri dalam mewujudkan peluang - peluang pembelajaran yang baru di tempat kerja (Lemanski, 2011). Kajian juga telah mengenalpastimengenal pasti tiga elemen utama yang melibatkan pembelajaran WBL iaitu Pembelajaran melalui kerja, belajar untuk bekerja dan belajar di tempat kerja (Brennan, 1996). Konsep WBL ialah gabungan latihan tempat kerja dengan pembelajaran berasaskan kelas bertujuan mengurangkan ketidakpadanan kemahiran dengan menyediakan pelajar dengan kemahiran dan pengalaman praktikal dalam bidang pengkhususan.

KalaborasiKolaborasi bersama industri memainkan peranan penting dalam menyumbang keperluan kerja kepada pelajar. WBL adalah pendekatan pembelajaran yang merangkumi pengalaman kerja di mana pelajar perlu melalui proses pembelajaran di institusi dan mendapatkan pengalaman dan kemahiran dalam industri yang berkaitan mengikut apa yang diperlukan dalam persekitaran kerja. Ini membolehkan pelajar untuk menyesuaikan diri dengan peralihan dari institusi pendidikan ke industri untuk bekerja dan mendedahkan pelajar kepada realiti persekitaran kerja yang membolehkan mereka membuat pilihan kerjaya yang terbaik (Brennan, 1996). Program pengajian yang dijalankan secara WBL dilihat berbeza dari kaedah pengajian biasa kerana ia menggabungkan pengajian secara konvensional dan pembelajaran di persekitaran kerja di mana secara langsung menghasilkan pengalaman sebenar ditempat kerja (Seufert, 2000). Manakala (Shaipul, 2021 & Zulkifli, 2020) membincangkan model-model politeknik yang telah dilaksanakan berdasarkan model politeknik WBL 2014. Model WBL Arizona pula menekankan kepada perhubungan antara institusi pendidikan dan industri, dari segi pelaksanaan yang menitikberatkan kepada aktiviti dan sumber. Penelitian daripada model-model WBL yang dibincangkan didapati penumpuan yang diberikan adalah mengenalpastimengenal pasti ciri-ciri, kaedah atau elemen dan kolaborasi industri.



Perlaksanaan WBL di PSA bagi program BEU mempunyai kemandirian dari segi pengalaman dan kemahiran pelajar yang lepas. Ini kerana pelajar program ijazah merupakan pelajar lepasan diploma politeknik yang telah melalui latihan Industri (LI) selama satu (1) semester. Seterusnya pelajar akan melalui WBL selama dua (2) semester. Oleh itu, pengalaman pelajar diindustri dengan tempoh yang dilalui membolehkan pelajar meningkatkan pengetahuan, kemahiran dan kemahiran insaniah dengan lebih berkeyakinan. Senario model pengalaman kemahiran bersama industri digambarkan seperti Rajah 1. Justeru, pengalaman pengetahuan dan kemahiran yang pelajar perolehi amat berguna dan sangat diperlukan oleh pihak industri. Penguatan pengetahuan dan kemahiran semasa diploma sangat membantu pelajar dalam kesediaan menjalani WBL diperingkat ijazah. Kajian ini berkonsepkan kepada input, proses dan output. Di mana input akan memfokuskan kepada kurikulum BEU, pelaksanaan WBL di industri, pengalaman mentor dan pihak pengurusan industri dan institusi. Manakala proses pula cuba untuk melihat faktor-faktor yang amat mempengaruhi domain WBL berdasarkan komponen-komponen setiap domain WBL. Ia disokong pula melalui efikasi sendiri. Justeru memaparkan lagi kejayaan pelaksanaan WBL berdasarkan ilmu metakognitif. Untuk output pula, pengkaji akan cuba melaksanakan analisis bagi membentuk satu kerangka metakognitif dalam pelaksanaan WBL dan model bersepadu WBL politeknik.



Rajah 1: Kerangka Konseptual Kajian

## 2. Metodologi

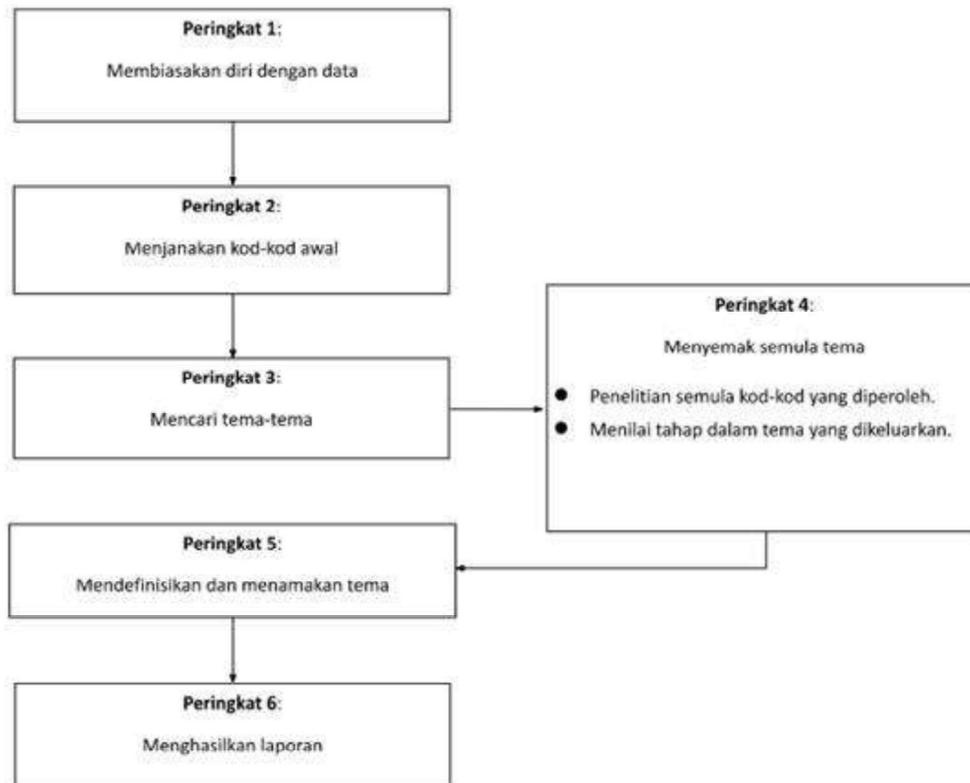
Kajian ini dijalankan adalah untuk menghasilkan kerangka pelaksanaan WBL. Kerangka pelaksanaan WBL diperolehi dari proses pemantauan. Pemantauan WBL sebanyak enam (6) kali dilaksanakan sepanjang pelajar berada di industri. Semasa penyeliaan oleh pensyarah pemantau, penilaian pelajar dinilai menggunakan borang penilaian oleh mentor dan juga penilaian sendiri oleh pelajar. Manakala pengesahan elemen-elemen penilaian oleh mentor dan pelajar semasa WBL adalah melalui analisa dibuat oleh pensyarah pemantau setiap kali selesai pemantauan.



Kaedah kuantitatif digunakan untuk menganalisis data penyeliaan WBL seramai 90 pelajar dengan 3 sesi pengajian dengan yang menjalani WBL dan 45 mentor yang telah dilantik sebagai mentor industri. Manakala kaedah kualitatif dilaksanakan dengan menjalankan sesi temubual bersama tiga orang pakar WBL akademik dan empat orang pakar WBL industri. Protokol temubual telah dibangunkan melalui pakar WBL. Penyelidik telah melaksanakan analisis temubual dengan membentuk tema dan subtema bagi mendapat persetujuan pakar.

Penulis Kerangka konsep kajian telah dirangka bertujuan adalah untuk menunjukkan proses penerokaan domain dan elemen yang terlibat dalam kajian ini. Berdasarkan domain pelaksanaan WBL seperti yang telah ditetapkan oleh Jawatankuasa Pelaksana WBL Politeknik telah menjadi pemboleh ubah bersandar (DV), dan elemen yang dikenal pasti melalui tinjauan dan penerokaan adalah sebagai pemboleh ubah tidak bersandar (IV) oleh penyelidik dalam membantu meningkatkan keberkesanan pelaksanaan WBL. Kerangka konsep kajian ini adalah merupakan gabungan keseluruhan proses yang dilaksanakan dalam kajian seperti yang jelaskan secara konsep oleh (Merican, 2006). Seterusnya pemboleh ubah moderator sebagai pemboleh ubah yang memanipulasi kesan hubungan IV ke atas DV. Rajah 2 menunjukkan kerangka konsep kajian yang telah dijalankan.

Pada bahagian masukan bagi kerangka konsep kajian ini, melibatkan pihak pelajar serta alumni Program Sarjana Muda Teknologi Kejuruteraan Elektronik (Elektronik Perubatan) yang terlibat dalam WBL, Jawatankuasa Pelaksanaan WBL Politeknik, dan mentor dari industri. Manakala dalam bahagian proses, pemboleh ubah bersandar yang terlibat dalam kajian adalah pengetahuan, kemahiran dan kemahiran insaniah. Proses kerangka kajian ini merujuk kepada teori Gallup Internasional dan tech talent berkaitan domain bagi bakat bekerja di industri (Gallup, 2017; Rehman, 2018). Seterusnya, komponen-komponen bagi setiap domain WBL ini adalah merupakan komponen bagi setiap domain yang dikenal pasti yang mana komponen ini akan diperolehi melalui penerokaan melalui analisis dokumen dan kajian temu bual bersama pakar-pakar industri. Rajah 2 memperihalkan kesemua domain bakat yang telah dikenal pasti dalam kajian ini adalah bagi mengkaji pencapaian pelaksanaan pengurusan dan penguasaan pelajar menguasai ilmu, kebolehan praktikal serta sahsiah yang memenuhi hasil pembelajaran program dan bakat keboleherjaan graduan yang diperlukan oleh industri.



Rajah 2: Metodologi pembangunan metakognitif WBL politeknik

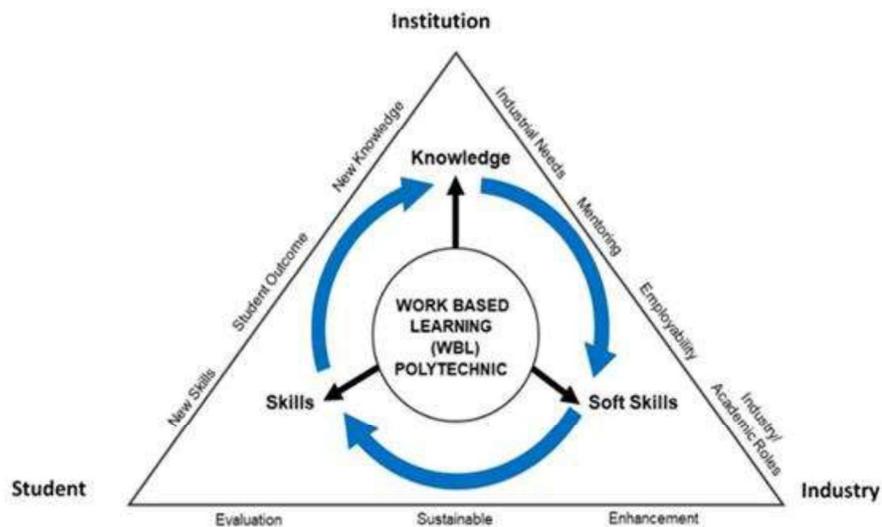
Pada bahagian keluaran, hasil dapatan kajian ini telah dapat membangunkan kerangka konseptual berdasarkan pembuktian meta-kognitif dalam pelaksanaan WBL. Merujuk pada pembuktian metakognitif serta penerokaan terhadap elemen bagi setiap domain WBL, satu Model Bersepadu WBL Politeknik telah dibangunkan yang dinamakan sebagai BEU-WBL Intergrated Model, di mana model ini menyumbang kepada melahirkan kecemerlangan bakat bekerja dalam kalangan graduan selari dengan Pelan Pembangunan Pendidikan Malaysia (PPPM 2015-2025), iaitu melahirkan graduan TVET berkualiti. Secara langsung BEU-WBL Intergrated Model yang telah dihasilkan, boleh dijadikan panduan dan rujukan kepada Institusi TVET lain dalam melaksanakan WBL bagi program akademik mod industri mereka ke arah mencapai place and train, future ready curriculum, graduate ready to work, dan dynamic TVET curriculum.

Terdapat pemboleh ubah moderator yang telah dikenal pasti mempengaruhi hubungan pelajar WBL dengan pengetahuan, kemahiran dan kemahiran insaniah pelajar. Pelajar secara psikologi didapati pada peringkat awal merasakan keupayaan diri telah mencapai tahap yang dikehendaki, namun setelah melalui latihan sebenar keyakinan semakin berkurangan terhadap pengetahuan, kemahiran dan kemahiran insaniah yang dikuasai (Bandura & Albert, 2010). Ini adalah kerana efikasi sendiri berkaitan dengan prestasi kerja dan tugas yang kompleks yang dilalui mempengaruhi psikologi pelajar.



#### 4. Perbincangan dan Kesimpulan

Keseluruhan kajian pembangunan ilmu metakognitif untuk WBL politeknik telah diterjemahkan melalui rajah 3 yang dikenali sebagai BEU-WBL model. Model yang telah dihasilkan ini adalah gabungan tiga (3) domain utama iaitu institusi, industri dan pelajar. Penyelidik telah berjayaan menghasilkan model ini melalui pelbagai rujukan kepakaran yang telah mengabungjalin pengalaman, pengetahuan dan kemahiran masing-masing. Sumbangan yang telah diberikan oleh pakar akademik, pakar industri dan pihak pelaksanaan dalam sesi temubual telah merumuskan perkara utama dalam ilmu metakognitif pelaksanaan WBL politeknik.



**Rajah 3 : BEU-WBL Model**

Hasil kajian telah memaparkan tiga (3) domain yang setiapnya menyumbang kepada elemen-elemen utama. Domain pertama (1), Pelajar memperihalkan pengetahuan, keberhasilan pelajar dan pendedahan kemahiran baharu. Manakala domain kedua (2) pula Institusi memperlihatkan keperluan industri, kepakaran mentor, kebolehpasaran dan peranan industri. Seterusnya domain ketiga (3) industri menjurus kepada penambahbaikan, mampan dan penilaian yang berterusan, justeru melestarikan pembelajaran berkonsepkan WBL. Elemen-elemen yang telah digariskan ini akan menghasilkan satu ilmu metakognitif yang kukuh bagi mendokong pengetahuan, kemahiran dan kemahiran insaniah yang mantap dalam BEU-WBL model. Maka terbentuklah hasil akhir proses pengajian program Ijazah Sarjana Muda Teknologi Kejuruteraan Elektronik (Elektronik Perubatan) yang bersepadan dengan kehendak dan keperluan industri berasaskan bidang elektronik perubatan

#### Penghargaan

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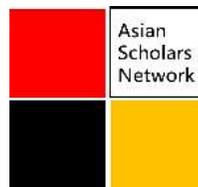
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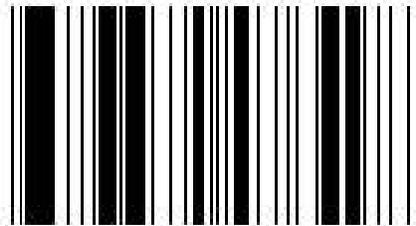


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