APJYS
ASIA PACIFIC JOURNAL OF YOUTH STUDIES

ASIA PACIFIC JOURNAL OF YOUTH STUDIES

An Open-Access, Peer Reviewed International Scholarly Journal That Publishes Research, Policy and Practice Based Articles on Issues Concerning Youth and Young Adults

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ABOUT THE JOURNAL

The Asia-Pacific Journal of Youth Studies (formerly known as the Malaysian Journal of Youth Studies) has been the official scientific journal of Institute for Youth Research (IYRES), Malaysia Ministry of Youth and Sports'. The Asia-Pacific Journal of Youth Studies is an open-access, international scholarly journal that publishes research, policy, and practice–based articles on issues concerning youth and young adults.

The journal has an interdisciplinary profile that aims to be of relevance to researchers, students, practitioners and policy-makers. The journal encourages submission of papers from all countries and contexts, with a special emphasis on youth residing in the Asia-Pacific region. All papers are subject to editorial screening and double-blind peer review. For research-based manuscripts, we welcome articles from both quantitative and qualitative traditions.

- **The journal is published two times a year in June and November.**
- The journal welcomes manuscripts between **5000 and 8000 words** written in either **English or Malay.** We also publish specially-themed issues devoted to special topics that are of particular interest to the field (upon request), book reviews and literature reviews.
- **There is no submission charge or article processing charge (APC).**

AIM AND SCOPE

Relevant topics include a wide array of issues including individual level factors, program evaluations, case studies and best practices, as well as policies affecting young people's lives and development. Critical studies of issues pertaining to youth from underserved and marginalized groups are particularly welcome. We invite papers that define youth in a manner consistent with a predominantly Asian social construction, which typically ranges from early adolescence to young adults in their 30's. We are interested in the social, contextual, and political factors that influence healthy and harmful youth development.

The journal includes studies from diverse disciplines including:

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- Economics/Entrepreneurship
- Education and Training
- Environmental Studies
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EMPOWERING B40 YOUTH IN PENINSULAR MALAYSIA: RISK LITERACY FACTORS AND WELL-BEING

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ABSTRACT

The prevalence of drug abuse, self-injury, and juvenile delinquency highlights the concerning social risks faced by young people today. Hence, educating this group on risks or risk literacy is crucial. Risk literacy is perceiving risks to make rational decisions for healthier well-being. This study aims to determine risk literacy factors influencing the well-being of B40 youth. To achieve the study's objective, data was gathered from a survey involving 423 youths from the low-income group (B40) in Peninsular Malaysia. A two-stage sampling technique was employed, and data were analysed using partial least squares structural equation modelling (PLS-SEM). The study shows that thoughtful decision-making and effective risk communication are the main predictors of youth well-being. Being a risk-literate youth is essential to reduce the risk of poor decisions. The study's findings, which have the potential to significantly impact policy formulation, are crucial for assisting this group in escaping poverty. This, in turn, can enhance their overall well-being.

Keywords: Decision-Making, Risk Literacy, Risk Communication, Youth, Well-Being.

INTRODUCTION

Youths are often associated with risky activities. Individuals in this group are easily influenced by peers and social media, which can lead to increased exposure to risky behaviour such as suicide, drug abuse, and bullying. These negative behaviours can certainly affect their well-being. However, it is important to note that risk-taking, when managed properly, can also lead to positive outcomes, such as the development of talents and identities. The main issue is that these young people often fail to seriously consider the risks involved when engaging in an activity. This lack of consideration may be due to a lack of knowledge, experience, and physical and psychological maturity (Zinn, 2019). Therefore, risk education is crucial for them to become risk literate and make informed decisions about their actions (Graham et al., 2018). In other words, risk literacy should be a significant concern among youth, as a better understanding of risks can lead to improved well-being and a hopeful future.

Knowledge of risk helps diminish the likelihood of unpleasant life experiences derailing youth development (Loke & Mohd-Zaharim, 2019). Therefore, the ability to comprehend risks should be a skill every youth masters. Many factors influence risk-taking decisions. One of them is social influence (Knoll et al., 2015). According to Blakemore and Mills (2014), social risk is relatively essential in the decision-making process among the youth. In particular, social risk exposure refers to personal activities, lifestyle, or environment, which can increase the likelihood of youth being involved in adverse outcomes of decisions (Blakemore, 2018).

Every decision taken at a young age may result in long-term effects. Therefore, the ability of the youth to identify and understand risks is crucial to avoid taking unnecessary or excessive risks. Only a few studies have been conducted to examine the engagement of youth in risk-taking associated with adverse outcomes. Azmawati et al. (2015), for example, studied the prevalence of risk-taking behaviour and its associated factors among urban and rural adolescents in Malaysia. Their study found that family conflict and an unfavourable environment would lead adolescents to engage in risky behaviour. Kadir et al. (2017) stressed that prevention and intervention programs must be carried out to produce high-quality human capital, which is very important for a country's development. Therefore, there is an urgent need to examine the risk literacy issue among the youth.

Unfortunately, there are only a few studies on how risk literacy affects youth well-being in Malaysia. Most research focuses on specific risky behaviours, like alcohol consumption, suicide, and juvenile delinquency, rather than the broader concept of risk literacy (Ibrahim et al., 2019; Kadir et al., 2017; Lim et al., 2017). Some studies have focused on looking at risky behaviours among Malaysian youth from low-income (B40) families. For example, a study by Ezhar et al. (2008) found that youths from low-income neighbourhoods were heavily involved in social issues like loitering, late-night activities, substance abuse, and smoking. Ismail et al. (2022) conducted a nationwide survey and found significant differences in drug use between different income groups. Ibrahim et al. (2019) explored how religious and existential well-being, along with family and friend support, can protect against suicidal thoughts among adolescents from low-income families, identifying socio-economic status as a key risk factor.

Youth well-being can be affected by numerous risk factors, such as education, family structure, living environment, and access to resources. The impact of these risk factors is particularly pronounced among B40 youth. Due to financial constraints, poor living conditions, and other limited resources, they are more likely to develop lower self-esteem and insecurity. Consequently, this can lead to them engaging in risky behaviour. Therefore, understanding risk literacy factors is essential for fostering healthy development and helping the youth reach their full potential. While youths may be aware of the risks of risky activities, emotional influences often hinder their ability to evaluate these risks and make informed decisions (Steinberg, 2008). This further emphasises the need for a more comprehensive understanding of the risk literacy factors and well-being among B40 youth. This study examines the risk literacy factors influencing the well-being of B40 youth in Peninsular Malaysia.

LITERATURE REVIEW

The youth have a significant impact on national development as they have the ability to stimulate the country's economy. The United Nations (2018) reported that youth are the fastest-growing population, constituting 16 per cent of the world population. However, youth's risky behaviour has become a big issue and a burden to society. The relentless influence of social media, movies, and peer pressure has led many youths to be involved in harmful risk-taking activities such as drug use, crime, and road accidents (Kadir et al., 2014; Salameh et al., 2014). Salameh et al. (2014) investigated how risk perception, attractiveness, and motives for risk behaviour influenced the behaviour of Lebanese university students. They discovered a correlation between social desirability and waterpipe smoking, cigarette dependence, and problematic alcohol drinking. Therefore, it is crucial to address this trend promptly to prevent serious long-term adverse

effects on youth's well-being. In Malaysia, the principal law that governs youth activities and development is the Youth Societies and Youth Development Act 2007 (Youth Societies, 2007). Specifically, this act promotes and facilitates youth development through education, research, and human resources management.

The development of risk literacy in young people is essential for establishing a secure environment where they can effectively handle uncertainties, manage risks, and make wise choices. More importantly, it significantly impacts youth well-being, offering a hopeful future where they can think forward, engage, and contribute to society. Páez-Gallego et al. (2020) studied the relationship between the psychological well-being of adolescent students and their decision-making style in Madrid, Spain. Their findings revealed that greater use of adaptive decision-making strategies correlates significantly with greater psychological well-being. Hence, it shows the importance of risk literacy in making good decisions.

However, it is common for the younger generations in the B40 community to be exposed to risky behaviour and make wise decisions because of their surroundings. Youths from a low-income group typically have dysfunctional family situations and exhibit severe socio-emotional behavioural problems. (Bánovčinová & Levická, 2016). Social risks are closely related to unemployment, increased health disparities, an exacerbation of financial instability, lack of educational attainment, and isolation (Navicke, 2014; Taylor-Robinson & Gosling, 2011). According to Ghani (2017), most B40 families have various problems, eventually exposing them to social risk. Therefore, knowledge of risks must be inculcated to control the youth's social risk exposures.

Previous research has identified several factors contributing to increased risky behaviours among youth, with significant implications for well-being. For instance, Nataraja Moorthy et al. (2019) investigated the causes and profiles of gangsterism in Malaysia. Their study's findings revealed that family background and environmental conditions are significant factors in the development of gang-related behaviours. This understanding is crucial as gangsterism poses a substantial risk to the well-being of youth in low-income areas. Shong et al. (2019) studied the impact of poverty on delinquent behaviour and development in young offenders aged 13 to 17 from Sekolah Tunas Bakti in Kuala Lumpur. They found that miserable family conditions, academic failure, and association with delinquent peers were closely linked to delinquent behaviour and development. Hence, it highlights the potential impact of poverty on youth well-being.

Similarly, Yi et al. (2017) conducted a cross-sectional study across several Southeast Asian countries, including Malaysia, to explore illicit drug use among university students. Their findings showed that residing in a lower-middle-income country was associated with a higher risk of drug abuse. The risk indeed applied to both frequent and occasional drug use. These findings reiterated the impact of social and economic factors on youth well-being. The factors included poverty, social and cultural norms, drug abuse, and limited education and employment opportunities. In the same vein, Peltzer et al. (2017) examined suicidal ideation and attempts among university students in Cambodia, Indonesia, Malaysia, Myanmar, Thailand, and Vietnam. They found that poor academic performance, mental health issues, and adverse childhood experiences increase risk. Therefore, targeted suicide prevention strategies should focus on these vulnerable groups to improve their well-being.

In conclusion, youth is a critical period of life. A period of transition from childhood to adulthood that needs protection and significant attention. In the current scenario, youth face more challenging risk-taking activities and options; thus, attaining the desired well-being can also be difficult. According to Dodge et al. (2012, p.230), well-being is the "balance point between an individual's resource pool and the challenges faced". Youth well-being depends greatly on the family environment, friends' and companions' behaviours, and societal influence in which they spend their lives (Abdullah, 2014). Existing literature suggests that youth well-being is demonstrated through four domains: social relationships, health status, safety and security, and education and skills. According to Zaremohzzabieh et al. (2019), social relationships refer to an interaction that has a personal meaning between youth and family members, friends, neighbours, and the community. Health status is described as the physical and mental health of youth, such as wellness, management of stress, and seeking social support (Evans & Prilleltensky, 2007). Safety and security refer to a secure environment free from violence (Greco & Polli, 2021). Education and skills denote the talents and abilities of the youth to realize their potential in life, either through academics or other opportunities (Cronin et al., 2018).

RESEARCH METHODOLOGY

Hypotheses Development

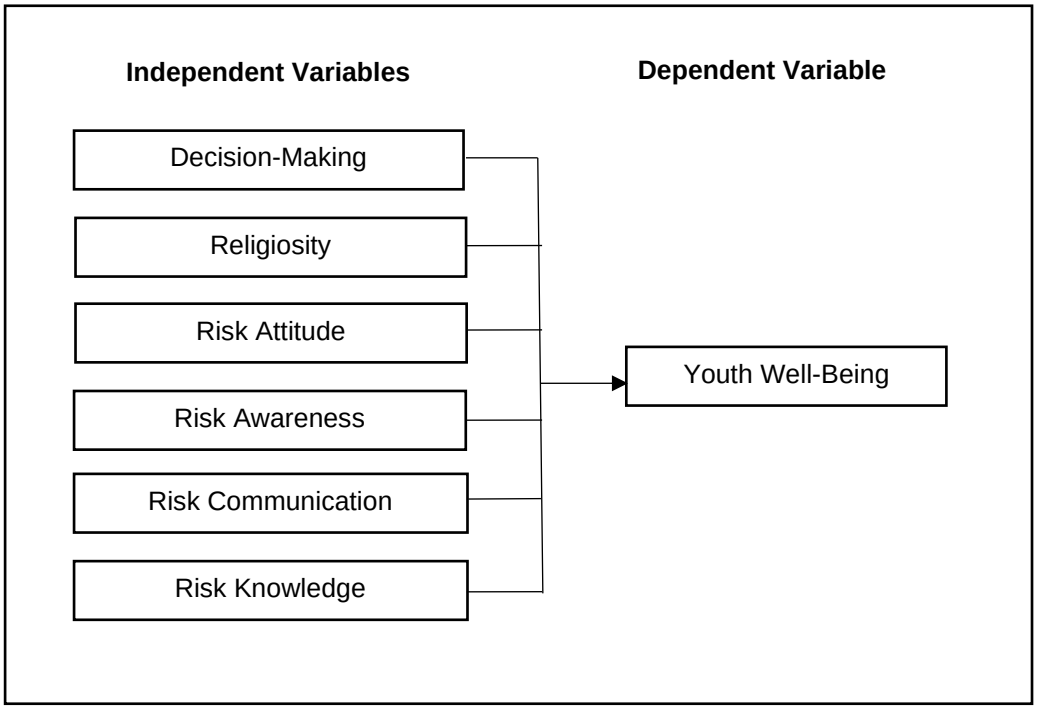

Figure 1. Conceptual Framework

Figure 1 presents the conceptual framework developed from the extant literature specifically to address the study's gap and attain its objective. Accordingly, the following hypotheses are developed based on findings from past studies.

Decision-Making and Youth Well-Being

Decision-making is an integral process for every human being. Loke and Mohd-Zaharim (2019) asserted that decision-making skills are essential to minimising daily risk behaviours. Likewise, Páez-Gallego et al. (2020), who analysed the relationship between the psychological well-being of adolescent students and their decision-making, found significant and positive correlations between adaptive decision-making strategies and all the psychological well-being variables. Thus, the following hypothesis is constructed for the study.

H_1: Decision-making is positively related to youth well-being.

Religiosity and Youth Well-Being

Religiosity is perceived as a protective factor that plays a significant role in dealing with life hardships. According to Sulaiman et al. (2021), religiosity refers to individuals' commitment towards fulfilling rules and guidance and following the rituals and values of religion. Studies have shown that a high level of religiosity is associated with positive outcomes of youth development, including positive family relationships, lower rates of risky behaviour, and lower levels of psychological problems, such as suicide and subjective well-being (Fekih-Romdhane et al., 2020; Kim et al., 2020). Accordingly, the hypothesis is:

H_2: Religiosity is positively related to youth well-being.

Risk Attitude and Youth Well-Being

Their perceived knowledge determines an individual's risk attitude and influences their intentions in judging events that may have positive or negative outcomes (Hillson & Murray-Webster, 2007). Monson (2019) and Kuldas et al. (2014) found that young people are often inclined to take risks without fully understanding the consequences, primarily due to insufficient knowledge and low levels of maturity. Additionally, Saurabh and Nandan (2018) explored the connections between financial knowledge, socialisation, risk attitude, and financial well-being. Their study demonstrated that risk attitude serves as a mediator between socialisation and financial well-being. Hence, this study postulates the following hypothesis.

H_3: Risk attitude is positively related to youth well-being.

Risk Awareness and Youth Well-Being

Risk awareness means being conscious of risks and proactively mitigating their negative outcomes. It can also be defined as the enhancement and understanding of how risk prevails and impacts lives (Steptoe & Wardle, 2001). Schilder et al. (2016) investigated the effect of a school-based intervention on online risk awareness and behaviour among primary school children in Belgium. Their findings indicated that increased online risk awareness is associated with less risky behaviour online. Accordingly, this study posits the following hypothesis.

H_4: Risk awareness is positively related to youth well-being.

Risk Communication and Youth Well-Being

Risk communication relates to providing reliable information about potential hazards that can affect one's well-being (Fischhoff, 1995). Good risk

communication starts with positive relationships and social interactions between youth, parents, peers, neighbourhood, and society. Fischhoff and Scheufele (2013) asserted that risk communication is a two-way exchange of benefits, risks, and other costs to enable individuals at risk to make informed decisions. Therefore, building on their work, the following hypothesis is developed.

H_5: Risk communication is positively related to youth well-being.

Risk Knowledge and Youth Well-Being

Risk knowledge can be obtained by attending risk education programs and life experiences (Ahern et al., 2016). Proper education enables individuals to understand the risks involved (Balogh et al., 2013). Before that, Shoveller and Johnson (2006) asserted that youth were expected to apply facts, knowledge, and attitudes about risky behaviour in everyday practices. According to a study by Majelantle et al. (2014), youth with limited knowledge about AIDS/HIV transmission and prevention are less likely to hold positive attitudes. Thus, based on past findings, this study formulates the following hypothesis.

H_6: Risk knowledge is positively related to youth well-being.

Sample Selection and Instrumentation

The study's population comprises youth residing in Peninsular Malaysia. Based on 2019 data released by the Department of Statistics, the youth population in Peninsular Malaysia is around 6.43 million (Department of Statistics Malaysia, 2019). Applying the Youth Societies and Youth Development (Amendment) Act 2019 definition, youth are between 15 and 30 years old. This study aims to examine the impact of the risk literacy factors on the well-being of B40 youth. Four categories of B40 households are B1 (household income below RM2,500), B2 (RM2,501–RM3170), B3 (RM3,171–RM3,970), and B4 (RM3,971–RM4,850) (Department of Statistics Malaysia, 2019). It is reported in the Household Income and Basic Amenities Survey 2019 that the B40 group comprised 2.91 million households in Malaysia.

Data collection was carried out through a two-stage sampling technique. For the first stage, a cluster sampling technique was used to select the youth from B40 households across 13 states in Peninsular Malaysia. For the second stage, youth aged between 15 and 30 were selected based on a convenience sampling approach and availability. The survey was carried out from August 2020 to October 2020. Due to the Movement Control Order (MCO) during the COVID-19 pandemic, data were collected using a combination of online and physical surveys available in Bahasa Malaysia and English. For physical surveys, the enumerators were hired to distribute the surveys to potential respondents in

public areas. For the online surveys, the respondents received a URL link via WhatsApp and social media platforms to answer the questionnaires on SurveyMonkey. For ethical considerations, respondents were informed that the information gathered would solely be used for research purposes. They were also told that the participation was voluntary. They could withdraw from answering the questionnaire at any stage. No reason was required, and no penalty would be charged. Initially, 453 questionnaires were returned from online and physical surveys. However, 30 questionnaires had to be discarded because the respondents answered less than 70 per cent of the questions.

The study questionnaire was adapted from previous research (refer to Table 1). It utilised a five-point Likert scale (ranging from 1 = strongly disagree to 5 = strongly agree) to assess the youth's level of knowledge. It consisted of four main sections: demographics (9 items), risk literacy factors (37 items), and youth well-being (13 items). The questionnaire then underwent expert validation by four experts to ensure its validity. Specifically, they evaluated the questionnaire's measurement properties and identified ambiguous or ununderstandable items. Then, the questionnaire was improved based on their feedback. In addition to that, we assessed the measurement model by examining the loadings, average variance extracted (AVE), and composite reliability (CR). The study employs six independent variables: risk awareness, risk knowledge, risk attitude, risk communication, decision-making, religiosity, and youth well-being. The dependent variable is youth well-being. Items were developed deductively based on the operationalisation of each variable, as summarised in Table 1.

Table 1. Operationalisation of Variables

Variable	Operationalisation	Indicator	Sources
Decision making	A process of making choices of the best possible option among all other alternative options based on a set of criteria or factors.	Quality and quantity of information Risk-taking behaviour	Tuinstra et al. (2000)
Religiosity	A degree to which an individual follows and practices the rituals and values taught in the religion.	Believe in God Participation of religious activities	Joseph & DiDuca (2007)
Risk attitude	A preferred state of mind about those uncertainties that could have a positive or negative effect on objectives.	Attitude towards uncertainty Behavioural responses to risks	Patton et al. (1995)
Risk awareness	An individual's recognition and understanding of potential risks associated with a particular situation, activity, or decision.	Perceived susceptibility Risk perception	Netswera (2002)

Risk communication	A process of exchanging information and opinions among individuals, organizations, and communities about potential risks associated with a particular situation, activity, or decision	Communication with peers Communication with parents Communication with community	Aspy et al. (2007), Lev-Wiesel et al. (2013), Gordon-Hollingsworth et al. (2016)
Risk knowledge	An individual's understanding and awareness of potential risks, hazards, and uncertainties associated with a particular situation, activity, or decision.	Ability to identify risk Understanding of risk factors Breadth of knowledge	Ahern et al. (2016)
Youth well-being	A state of health, happiness, and positive development of young people, ranging from ages 15 to 30 years old.	Health status Social relationship Spiritual well-being Safety and security Education and skills	Zaremohzzabieh et al. (2019)

The measurement for the risk awareness construct was evaluated using five items adapted from Netswera (2002). For example, “I care less about consequences of my behaviours” and “I am aware of the immediate consequences of involving in risky behaviour.” The decision-making construct consisted of six items from Tuinstra et al. (2000). For instance, “I like to think about the consequences of a decision before I make it” and “I tend to drift into decisions without thinking about them.”

Risk knowledge was evaluated using four items adapted from Ahern et al. (2016). For instance, “I understand that risky behaviours have harmful effects on society” and “I understand that risky behaviours have negative consequences and potential threats to one’s life.” Religiosity was evaluated using seven items (e.g., “Religion helps me carry on a better life,” “I am certain that God is aware of everything I do”), which were all adapted from Joseph and DiDuca (2007). In addition, a total of eight items were used to measure risk attitude (e.g., “I consider myself a risk-taker,” “I often underestimate the risks of particular actions or behaviours”) adapted from Patton et al. (1995).

The risk communication construct consisted of seven items, of which three items were adapted from Aspy et al. (2007), two from Lev-Wiesel et al. (2013), and another two from Gordon-Hollingsworth et al. (2016). Among the items under the risk communication construct are "I have a friend I can talk to", "I always talk to my parents about my problems", and "I have a neighbour who gives me good advice". The measurement for 13 items of youth well-being employed in this study was adapted from Zaremohzzabieh et al. (2019). It consisted of four dimensions, namely social relationship (e.g., "My family always has a great time together"), health status (e.g., "I can manage stress effectively"), spiritual well-being (e.g., "I believe that there is a solution for every problem"),

safety and security (e.g., "I live in a safe neighbourhood"), and education and skills (e.g., "I am motivated to pursue the highest level of education").

FINDINGS

Table 2 presents the demographic profiles of the respondents, including their gender, age, ethnicity, religion, location, education level, household income, and employment status. The final respondents were 423, as 30 incomplete questionnaires were excluded from the 453 returned questionnaires. Notably, females dominate the respondent pool, making up 69.0% of the participants. The age distribution highlights a dynamic age sample, with over half (53.9%) falling between 20 and 25 years old, while 30.7% are in the 15–19 age range, and 15.4% are aged 26–30. In terms of ethnic composition, Malays are the majority at 68.8%, and a similar trend is seen with religious affiliation, as 69.7% identify as Muslim.

Table 2. Demographic Profiles

Demographics	Categories	Frequency	Percentage (%)
Gender	Male	131	31.0
	Female	292	69.0
Age	15–19 years old	130	30.7
	20–25 years old	228	53.9
	26–30 years old	65	15.4
Ethnicity	Malay	291	68.8
	Chinese	97	22.9
	Indian	33	7.8
	Other	2	0.5
Religion	Islam	295	69.7
	Christianity	27	6.4
	Hindu	78	18.4
	Buddhism	21	5.0
	Other	2	0.5
Locality	Urban	245	57.9
	Rural	178	42.1
Education level	Primary school	3	0.7
	Secondary school	143	33.8
	STPM	33	7.8
	Diploma	62	14.7
	Bachelor's degree	167	39.5
	Master's degree	13	3.1
	Other	2	0.5
Monthly income	Less than RM2500	187	44.2
	RM2,501–RM3170	65	15.4
	RM3,171–RM3,970	41	9.7
	RM3,971–RM4,850	130	30.8
Employment status	Student	102	24.1
	Self-employed	17	4.0
	Employed	270	63.8
	Between jobs	18	4.3
	Unemployed	16	3.8

States	Perlis	27	6.4
	Kedah	60	14.2
	Penang	29	6.9
	Perak	34	8.0
	Selangor	78	18.4
	Malacca	14	3.3
	Negeri Sembilan	17	4.0
	Johor	25	5.9
	Kelantan	29	6.9
	Terengganu	32	7.6
	Pahang	23	5.4
	Wilayah Persekutuan Kuala	46	10.9
	Lumpur	9	2.1
	Putrajaya		

Urban areas also slightly outnumber rural ones, with 57.9% of respondents hailing from cities compared to 42.1% from the countryside. When it comes to education, a broad spectrum is observed. The largest group has a Bachelor's degree (39.5%), followed by those who completed secondary school (33.8%). Financially, a substantial 44.2% of respondents belong to the first B40 income bracket, earning less than RM2,500 per month. Employment figures show a strong workforce presence, with 63.8% of participants holding jobs. Geographically, the respondents are primarily from Selangor (18.4%), Kedah (14.2%), and Wilayah Persekutuan Kuala Lumpur (10.2%).

Following Ramayah et al. (2018), the measurement model was assessed by examining the loadings, average variance extracted (AVE), and composite reliability (CR) (see Figure 2). Table 3 shows that all the indicator loadings are above 0.45, and the composite reliability (CR) values ranged from 0.799 to 0.956. In addition, it also reveals that the rho-A result ranged from 0.758 to 0.952, and the AVE ranged from 0.408 to 0.785. Thus, these results denote a satisfactory reliability value. Nevertheless, the AVE for youth well-being is below the recommended level of 0.5. However, although the AVE is less than 0.5, the convergent validity of this construct is considered adequate when the CR is higher than 0.6 (Fornell & Larcker, 1981). The values of rho-A and CR of all seven constructs are well above the recommended level, confirming that all constructs' reliability and internal consistency are acceptable (Henseler, 2017). In addressing the issues of multicollinearity, variance inflation factors (VIF) score for all the exogenous constructs (decision-making, religiosity, risk attitude, risk awareness, risk communication and risk knowledge) ranged from 1.308 to 1.791 (lower than the threshold value of 3.33) which suggested that the study's data are free of multicollinearity concerns (Kock, 2015).

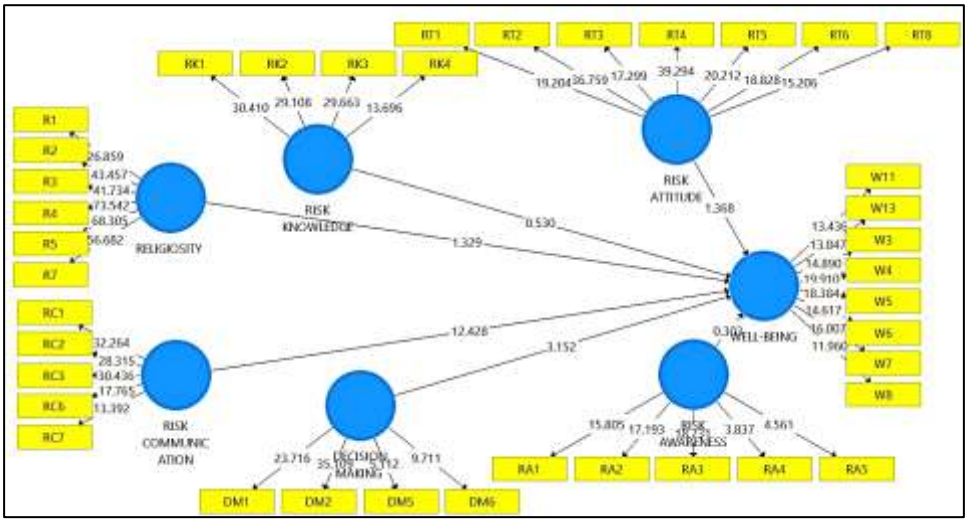

Figure 2. SmartPLS3 Structural Model

Table 3: Reliability and Validity Assessment Based on PLS-SEM Results

Construct	rho_A	Composite reliability (CR)	Average variance extracted (AVE)	VIF values Well-being
Decision-making	0.758	0.799	0.509	1.392
Religiosity	0.952	0.956	0.785	1.41
Risk attitude	0.941	0.912	0.598	1.323
Risk awareness	0.88	0.871	0.586	1.791
Risk communication	0.8	0.854	0.542	1.308
Risk knowledge	0.881	0.911	0.721	1.566
Youth well-being	0.793	0.846	0.408	

The heterotrait-monotrait ratio (HTMT) suggested by Henseler et al. (2015) was employed to assess the discriminant validity. The bootstrapping approach with 5,000 subsamples was applied to test the hypothesised path coefficients' significance, strength, and direction. As shown in Table 4, all constructs' ratio correlation achieved the cut-off ratio of 0.85, demonstrating sufficient discriminant validity.

Table 4. Heterotrait-Monotrait Ratio (HTMT)

	Decision-making	Religiosity	Risk attitude	Risk awareness	Risk communication	Risk knowledge
Decision-making						
Religiosity	0.48					
Risk attitude	0.353	0.252				
Risk awareness	0.458	0.407	0.67			
Risk communication	0.471	0.453	0.23	0.26		
Risk knowledge	0.428	0.433	0.308	0.617	0.339	
Youth well-being	0.511	0.402	0.263	0.283	0.81	0.275

Figure 2 showcases the structural model, while Table 5 presents the path coefficients, standard errors, t-values, and p-values for the structural model. These values are derived from a robust bootstrapping procedure with 5,000 resamples, which underlines the research findings' reliability. The results reveal that decision-making significantly impacts youth well-being ($\beta = 0.169$, $p < 0.01$), thus confirming hypothesis H_1. Similarly, risk communication also positively influences youth well-being ($\beta = 0.55$, $p < 0.01$), supporting hypothesis H_5. However, the data indicate that hypotheses H_2, H_3, H_4, and H_6 are not supported (refer to Table 6).

Table 5. Summary of Path Coefficient

Construct	Standard beta	Standard error	*t* value	*p* value
Decision-making	0.169	0.053	3.152	0.002
Religiosity	0.069	0.052	1.329	0.184
Risk attitude	0.066	0.048	1.368	0.171
Risk awareness	-0.016	0.054	0.303	0.762
Risk communication	0.55	0.044	12.428	0.000
Risk knowledge	-0.025	0.047	0.53	0.596

* Significant at p <0.1*, p < 0.05. ** Significant at p < 0.001***

Table 6. Summary of Constructs' Associations and Hypothesis Testing

Hypothesis	Relationship	Significance	Influence (f^2 – effect size)	Remarks
H_1	Decision-making is positively related to youth well-being.	Significant	0.037	Supported
H_2	Religiosity is positively related to youth well-being.	Not significant	0.06	Not Supported
H_3	Risk attitude is positively related to youth well-being.	Not significant	0.06	Not Supported
H_4	Risk awareness is positively related to youth well-being.	Not significant	0.00	Not Supported
H_5	Risk communication is positively related to youth well-being.	Significant	0.424	Supported
H_6	Risk knowledge is positively related to youth well-being.	Not significant	0.001	Not Supported

Generally, values of 0.67, 0.33, and 0.19 indicate strong, moderate, and weak R^2 values, respectively (Chin, 1998). Therefore, this study's R^2 value of 0.455 is considered moderate and acceptable. This means that 45.5 per cent of the variance can be explained by decision-making, religiosity, risk attitude, risk awareness, risk communication, and risk knowledge towards youth well-being. Regarding effect sizes (f^2), Ringle et al. (2018) advocated that f^2 scores of 0.02, 0.15, and 0.35 signified small, medium, and large effects size of an exogenous

on the endogenous variables. Table 6 showed that decision-making (f^2 = 0.037), religiosity (f^2 =0.06), risk attitude (f^2 =0.06), risk awareness (f^2 =0.00), and risk knowledge (f^2 = 0.001) had a small effect size on youth well-being. Meanwhile, the f^2 scores of the construct (risk communication) greatly influence youth well-being.

DISCUSSION

Results show that decision-making significantly affects youth well-being; H_1 is supported. The result infers that youth who can make thoughtful decisions can positively impact their well-being. Consistent with past research, better-informed decision-making is positively associated with psychological well-being among autistic adolescents (Hosozawa et al., 2020). This finding reflects the importance of making thorough decisions. Today's choices can impact their physical, emotional, and social health in the long run. Thus, developing practical decision-making skills is vital in enhancing youth's well-being.

H_2 is not supported, inferring that religiosity does not influence youth well-being. A plausible reason for this result is that diverse beliefs and a wide range of social, cultural, and personal factors mediate the impact. Besides H_2, H_3 is also not supported. It reveals an insignificant result, suggesting that risk attitude does not affect youth well-being. Despite this finding, it is worth noting that attitude towards risk can be positive and negative. This attitude can influence their choices, consequently affecting their well-being. H_4 and H_6 are the other two hypotheses that are supported. Accordingly, risk awareness and risk knowledge do not significantly affect youth well-being. A plausible explanation is that youth often take risks without being fully aware of the consequences of their action. On top of that, they may need to be better equipped with the required knowledge.

The effect of risk communication on youth well-being is significant, thus confirming H_5. This suggests that young people who communicate effectively with their parents, peers, and neighbours are better equipped to make choices that positively influence their well-being. With supportive influences from family, friends, and the community, youth can weigh the benefits and drawbacks of their decisions. This finding aligns with the results of previous studies (Lenhart & Madden, 2007; Wolff & Crockett, 2011). Effective risk communication for youth should use various platforms, such as social media, peer networks, and school programs. These avenues can effectively reach young people, ensuring they have access to the information necessary for making informed decisions.

To summarise, this study highlights two key factors influencing youth well-being: the ability to make optimal decisions and the capacity to communicate effectively. Being risk literate will help them to make deliberate decisions and

communicate effectively about associated risks. By understanding and assessing risks, youths can navigate challenges more effectively, making informed choices that avoid potential pitfalls. For instance, knowing how to evaluate monetary decisions can reduce vulnerabilities and improve financial stability. Effective communication skills further empower them to seek support, advocate for their needs, and build strong networks. Hence, it fosters resilience and opens doors to more opportunities. Overall, risk literacy equips poor youth with the tools to manage their circumstances proactively, ultimately contributing to improved life outcomes and well-being.

CONCLUSION

Being a youth is a pivotal stage in life, marked by intense growth and transformation. During this period, individuals face numerous challenges and decisions that can significantly impact their future. The choices made during these formative years often carry long-lasting consequences. They shape immediate experiences and influence one's path well into adulthood. In other words, what they do or decide today can have a lifelong impact. Therefore, they must carefully weigh the risks and potential outcomes of their decisions. These choices can echo throughout their lives, moulding their future opportunities and well-being. Therefore, it is crucial to address the urgency of this matter.

In conclusion, fostering risk literacy is crucial for mitigating the adverse impacts of risky behaviours. The study's findings indicate that deliberative decision-making and effective risk communication empower youth to assess risks responsibly. Consequently, it leads them to make informed choices. Accordingly, they exhibit positive behaviour. As a result, they can improve their overall well-being. However, it is essential to note that this study has some limitations. The main limitation of this study is that it took place during movement control order (MCO). Therefore, there were restrictions on the data-gathering methods. Although physical surveys were also done, online surveys became the primary approach. Moreover, the study focused exclusively on B40 youth in Peninsular Malaysia. Thus, generalising the findings for all Malaysian youth is not appropriate.

Despite its limitations, this study’s insights are valuable and instrumental in informing targeted policy interventions. For instance, to enhance their risk literacy, targeted programmes and policy interventions should focus on integrating the two significant risk factors into educational curricula. Schools and universities may include critical thinking and problem-solving skills in their syllabus to assist students in assessing risks more effectively. Collaboration among schools, families, and community organizations is essential for educating

the youth about life risk management. By prioritizing these approaches, we can empower them to make informed choices that enhance their overall well-being. Therefore, the significance of this research cannot be overstated. Future research should build upon these findings by developing a comprehensive risk literacy model. This model can potentially address social risk exposure and bolster resilience among youth. Thereby further promoting their well-being, particularly in times of uncertainty.

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RELATIONSHIP BETWEEN SOCIAL MEDIA SCREEN TIME AND QUALITY OF LIFE AMONG UNDERGRADUATE STUDENTS DURING PANDEMIC COVID19 IN KUALA LUMPUR

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ABSTRACT

Social media can be used as a channel for communication with family members. A strong dependence on the Internet may result from excessive screen time, which can then affect people's mental health and well-being. It has been suggested that adolescent social media use is associated with decreased mental health. One of the key components that affects a person's quality of life is their mental health in the aspects of anxiety and depression levels. This cross-sectional study aimed to measure and analyse the relationship between social media screen time and quality of life among undergraduate biomedical sciences students. In Kuala Lumpur, this study's online survey was carried out. A validated questionnaire about social media use and quality of life was used to conduct this online survey. The study involved 182 respondents. WhatsApp was the most popular communication platform, with 62.6%, followed by Twitter with 12.6%. 52.7% use social media for social and entertainment purposes. There was no significant mean difference in social media usage and screen time between gender, year of study, income, and residency (p>0.05). There was no significant interaction between gender and year of study for social media usage duration (F=1.465, p>0.05). There was no significant correlation between the level of social media with quality of life(p>0.05). Meanwhile, using binary logistic regression analysis, there was no significant relationship between level of screen time with all domains of quality of

life. Meanwhile, there is a significant relationship between the level of screen time and the year of study OR=3.67(2nd year) and OR=3.14 (4th year) when compared to the first year (p<0.05). In conclusion, the results suggested there was a significant relationship between social media usage and with year of study. The results suggest that higher education should consider promoting the effective usage of social media using the social media platform as most students nowadays find information on social media.

***Keywords*: *Anxiety; depression; social media; screen time; quality of life; undergraduates*.**

INTRODUCTION

The Internet has widened social networking, given access to a variety of knowledge, and enhanced psychological health Whereas in, social media has emerged as a medium for people to interact and communicate while maintaining contact with their family and friends Also, in order to prevent disease transmission and limit the outbreak caused by the coronavirus disease (COVID-19), the majority of nations have implemented social restriction and partial and total lockdowns (Arend et al. 2021; Jalani et al. 2022). The routine arrangement of schools at all levels, including universities, has been altered by the pandemic lockdown. Face-to-face academic sessions need to be suspended in favour of online classes because to the long-term lockdown and social distancing practices.

According to previous researcher, the COVID-19 challenge has significantly increased students' screen time. This screen time includes time spent watching television and using the internet on a regular basis. Also, physical activity and physical education have been curtailed. The survey also discovered a high incidence of total screen time among students during the week. These findings were alarming because previous researcher found that screen time duration has a significant inverse association with total quality of life, which encompasses a wide range of life domains such as physical health, psychological well-being, social relationships, and the environment (Motamed-Gorji et al. 2019; Colley et al. 2020).

Excessive screen use may have an adverse impact on a student's psychological well-being during pandemic lockdown. In individuals with high levels of depression, anxiety, and stress, limiting social interaction was associated with more screen use and poorer mental health (Ozamiz-Etxebarria et al. 2020). Researcher discovered that low physical activity and excessive screen time are related to poor sleep quality in Chinese college students (Ma et al. 2020). A Spanish study discovered that total screen time among teenagers was inversely associated with levels of moderate to vigorous physical activity (MVPA) in boys (Wong et al. 2017). Furthermore, adolescents who engage in a variety of physical activities on a regular basis to keep themselves occupied have better academic achievement and less behavioural issues. This study's findings show that less screen time, adequate sleep, and frequent physical activities are associated with an improvement in quality of life (Din et., al. 2020).

LITERATURE REVIEW

The concept of quality of life (QoL) among college students is complex and influenced by a range of demographic variables, such as age, gender, and income. Knowing how these elements interact to impact students' quality of life (QoL) can aid in creating focused interventions that promote their wellbeing. According to earlier research, a major source of stress for many college students is money. Research indicates that students hailing from economically disadvantaged backgrounds tend to exhibit elevated levels of stress and anxiety, thereby adversely affecting their quality of life (Hussain et., al. 2013; Cheah et al. 2021) Income affects students' access to extracurricular activities, healthful food, and educational resources essential for maintaining a high standard of living.

There are well-established disparities between genders in terms of mental health among college students. When it comes to their quality of life, women are more likely than men to report having higher levels of anxiety and depression (Sulaiman et al. 2013; Jaafar et al. 2021). Gender-specific stressors, academic expectations, and societal pressures could all be to blame for this. According to previous study (Sheng et al. 2022), women tend to have stronger social support networks than men, which can reduce stress and enhance quality of life. However there can be differences in the effectiveness of these social interactions and how much stress relief they provide (Schiffrin & Nelson 2010; Khodabakhsh et al. 2021).

In terms of the year, younger university students, especially those who are coming straight out of high school, have particular difficulties like getting used to having more independence and responsibility. Their quality of life may be impacted by this stressful transitional phase. Higher QoL is frequently reported by older students, who may have more life experience and more refined coping mechanisms. According to previous study, older students generally have stronger time management abilities and a more distinct sense of purpose, both of which enhance wellbeing (Chen et al. 2014; Hanawi et al. 2022)

Social media now plays a crucial role in college students' life’s, impacting their well-being, academic achievement, and social interactions. Based on variables like age, gender, and income, students' use of social media varies greatly. Current research on how these demographic factors affect university students' use of social media is summarised in this review of the literature (Amin et al. 2016).

Higher-income students typically have better access to digital devices and high-speed internet, which makes using social media platforms more varied and consistent. Students with lesser incomes, on the other hand, might encounter access issues that affect how they use social media. How much

money students have affects how they use social media. While lower-income students may use social media primarily for entertainment and social interaction, higher-income students are more likely to use it for networking and educational purposes (Thompson & Lougheed 2012; Ishak et al. 2021)

Gender differences can be seen in the platforms that different genders prefer to use on social media. According to the previous study, men are more likely to use platforms like Reddit and YouTube that emphasize information and content sharing, while women are more likely to use visual and communication-focused platforms like Instagram, Pinterest, and Snapchat. While men are more likely to use social media for entertainment and information gathering, women frequently use it for emotional support and social connection (Lahiry et al. 2019).

Social media has the potential to foster connections, yet it can also lead to feelings of isolation. This research can explore how the quality and nature of online interactions affect students' real-life relationships, contributing to a broader understanding of social dynamics in the digital age. This study can empower students to make informed choices about their social media habits. By understanding the effects of their screen time on quality of life, undergraduates can adopt healthier usage patterns that promote well-being.

Research Objectives

1.To measure the percentage of the type of gadget preferred among student.

2.To determine the association of the level of social media screen time according to gender, year of study and household income.

3.To determine the predictor of the level of social media screen time with quality of life, gender, year of study and income.

METHODOLOGY

In this cross-sectional study, 182 undergraduate Biomedical Science students from Kuala Lumpur participated. The overall sample size was determined using a 5% margin of error and a 95% confidence level, and 182 students were chosen. Consequently, about 45 students from each year (year 1, year 2, year 3, and year 4) with the age range from 20 until 25 were chosen. A stratified random sampling approach was used to select participants. The stratified sampling was done according to year of study. Then the respondent were selected randomly using random table based on the list name. The inclusion criteria were that the students participated in this research had at least one of the following electronic devices: a smartphone, tablet, laptop, or PC. Students diagnosed with mental

illness and those who applied to defer their studies during the semester were excluded.

Questionnaires

The questionnaires were created using Google Forms. Section A is provided to gather demographic information about the participants. Gender, year of study, family structure, household income, type of residence all included. In this study, Part B comprises the Social Media Use Questionnaire. The final component, Section C, features the World Health Organization's five-point Likert scale question related to Quality of Life. (Whoqol 1998; Goes et al. 2021).

Social Media Screen time assessment

The Social Media Screen Time evaluation for assessing individual social media usage habits. The instrument is made up of 33 components divided into four indicators. With a Cronbach's alpha of 0.857, this survey has satisfactory internal consistency. Four categories made up the 33 questions on the survey form. A space for online informed consent was included in the questionnaire (Q1). To provide basic academic information, 1st Section (Q2-Q6) sociodemographic data were also gathered (Q7-Q8). Section 2 evaluated the social media screen time pattern of use (Q9-Q15), which included frequency considering the length of time spent on social media, the average expenditure of a social media subscription or the usage of the internet, as well as the length of time spent on social media and. Section 3 assessed "self-perceived academic impact" or the evaluation of good and negative academic impacts, as well as withdrawal pattern (Q25–Q28 Part 4 (Q29-Q33) inquired of the effects on their social, physical, and mental well-being. The questionnaire is evaluated using a Likert scale and an open-ended question. The information gathered from this questionnaire was categorical. The questionnaire score for social media screen time was calculated by looking at the amount of time spent on social media (Akulwar-Tajane et. al. 2020)). According to the previous study by Akulwar-Tajane et. al. (2020), the average time spent on social media is 2 hours and 24 minutes per person, each day. Consequently, the categorical data collected from this questionnaire considers screen time of less than one hour to be low social media screen time, 1-3 hours to be average social media screen time, and more than three hours to be high social media screen time.

Quality of Life Assessment

The quality of life was measured using the shorter version of WHOQOL-100 called WHOQOL-BREF. WHOQOL-BREF instrument consists of 26 self-report questionnaires to evaluate one’s health and well-being. One question from each of the 24 facets of the WHOQOL-100 has been incorporated to offer a thorough and complete evaluation. The WHOQOL-BREF is divided into four domains,

each with its own set of items. The domains involved are physical health, psychological, social relationships and environment. Section 1 consists of two questions to assess Overall Quality of Life and General Health. Section 2 involved 7 questions to assess respondents' physical health. Section 3 has 6 questions to evaluate the psychological wellbeing of respondents. Section 4 included 3 questions for social relationship and section 5 assessed the environment which contained 4 questions. The psychometric properties of the WHOQOL-BREF have been thoroughly investigated and verified by the WHO and other international researchers. The questionnaire was distributed in the English language, The respondents were asked to respond to questions by using a five-point Likert scale format were (1 representing "not at all", "very poor", "very dissatisfied", or "never", 2 represent "a little", "poor", "dissatisfied", "slightly" or "seldom", 3 represent "moderately", "neither poor nor good", "neither satisfied nor dissatisfied", "moderate amount", "neither poor nor well" or "quite often", 4 represent "mostly", "good", "satisfied", "very much", "well" or "very often" and last but not least, 5 represent "completely", "very good", "very satisfied", "an extreme amount", "extremely", "very well" or "always". The scales vary according to the questions in each domain including the overall quality of life and general health (Al-Fayez & Ohaeri 2011).

The following are the scale score ranges for each domain: Physical health = 7-35, Psychological = 6-30, Social relationship = 3-15 and Environment = 8-40. The mean scores of items within each domain are used to calculate the domain score.After the scores from all domains are calculated, average scores are obtained by dividing the total scores from all domains by four. Based on the previous study, WHOQOL-BREF has met the 0.7 Cronbach's alpha value thus the questionnaire had passed the reliability test and showed acceptable internal consistency. Before conducting the study, an email was sent to gain approval to use the questionnaire in this study (Al-Fayez & Ohaeri 2011).

RESULTS

Sociodemographic data

The basic demographic characteristics of participants are presented in Table 1. Data were collected from 182 students of the university student, 34 (18.7%) males and 148 (81.3%) females. There are 45 students from each year 1 and year 2 while 46 students in both years 3 and year 4 were involved in this study. Most of the students come from nuclear families, consisting of both parents and one or more children. According to the table, 53.3% of students are in the B40 group, 12.6% from the T20 group and 34.1% come from the M40 group. Among 182 students, 78 (42.95) of them achieve CGPA around 3.33 to 3.66. The

residency of students differs according to rural, urban, and suburban areas. Most of the students are healthy with no mental illnesses reported.

Table 1 : *Characteristics of participants*

Participant Characteristics		Frequency	Percentage (%)
Gender			
	Male	34	18.7
	Female	148	81.3
Year of study			
	First	45	24.7
	Second	45	24.7
	Third	46	25.3
	Fourth	46	25.3
Type of family structure			
	Nuclear family	140	76.9
	Joint family	17	9.3
	Divided family	25	13.7
Socio-economic (Household income)			
	B40	97	53.3
	M40	62	34.1
	T20	23	12.6
Residence			
	Rural	37	20.3
	Urban	84	46.2
	Suburban	61	33.5

Table 2: *Percentage of the type of gadget preferred, frequently used social media platform and mostly search trend.*

variables		frequency (n)	Percentage (%)
Gadget Preferred			
	Smartphone	160	87.9
	Tablet	5	2.7
	Laptop	13	7.1
	PC	4	2.2
Frequently used Social Media Platform			
	Facebook	5	2.7
	WhatsApp	114	62.6
	Instagram	23	12.6
	Twitter	13	7.1
	Youtube	19	10.4
	Other	8	4.4
Mostly Searched Trend			
	Educational purpose	47	25.8
	Social & entertainment	96	52.7
	Health & wellness	7	3.8
	Sport & fitness	3	1.6
	Finance	3	1.6
	Online shopping	14	7.7
	News	5	2.7
	E-sport	7	3.8

As shown in Table 2, smartphones are a highly preferred gadget with 87.9% (n=160) of students owning a smartphone followed by laptop (2.7%, n=5). WhatsApp (62.6%, n=114), Instagram (12.6%, n=23) and YouTube (10.4%, n=19) were the most popular and frequently used social media platforms. Facebook has the lowest access percentage among students with only 2.7% (n=5). A majority of students were online for social & entertainment (52.7%, n=96) and educational purposes (25.8%, n=47).

Table 3: *Association between level of social media screen time per day according to gender, year of study, and income.*

Variable	Less than 3 hours, n (%)	More than 3 hours, n (%)	Chi Square test χ^2	(p
Gender				
Male	12 (35.3)	22 (64.7)	0.404	0.525
Female	61 (41.2)	87 (58.8)		
Year of study				
Year 1	25 (55.6)	20 (44.4)	10.787	0.013*
Year 2	12 (26.7)	33 (73.3)		
Year 3	22 (47.8)	24 (52.2)		
Year 4	14 (30.4)	32 (69.6)		
Income level				
B40	38 (39.2)	59 (60.8)	3.064	0.216
M40	29 (46.8)	33 (53.2)		
T20	6 (26.1)	17 (73.9)		

*p<0.05

In Table 3, a chi-square test was done determine the relationship between social media screen time level per day and gender, year of study and socioeconomic (household income). This test showed that there was no significant association between gender and social media screen time level per day (p>0.05). Meanwhile, there was a significant association between year of study and social media screen time level per day, χ^2 (3) = 10.787, p =0.013. However, there was no significant association between socioeconomic (household income) and social media screen time level per day,

χ^2 (2) = 3.064, p >0.05.

Binary logistic regression was employed in Table 4 to examine the probability of spent time on social media more than 3 hours per day among students with gender, year of study and income level. Assumptions conducted prior the analysis did not indicate any violations. The omnibus model for logistic

regression was statistically significant χ2 (6) = 15.638, p < .001, Cox and Snell R^2 = 0.082, Nagelkerke R^2= .0.111. The model was 64.8% accurate in its predictions of probability of spending time more than 3 hours per day on social media. The Hosmer Lemeshow test results confirmed that the model was a good fit for the data χ^2 (7) =4.687, p>0.05. Wald test was used to indicate the most important predictor. The higher the Wald, the importance the predictor are (Chan 2004).According to Wald test the most important predictor was year of study. The results in Table 7 indicated quality of life domain was not a significant predictor for level of screen time. Furthermore, the results indicated that 3.726 times student second year compare to first year has more than 3 hours spent time on social media significantly(p=0.004). Meanwhile, student 4th year compare to first year was 3.204 times higher, spent time on social media more than 3 hours per day, significantly(p=0.010).

Table 4: *Results of the predictor variables by the binary logistic regression*

Predictor variable	**B**	**Odds ratio (95% CI)**	**p**
Quality of life			
Physical health	-0.06	0.94[0.76,1.16]	0.569
Psychological	-0.06	0.94[0.80,1.11]	0.468
Social relationships	0.09	1.10[0.92,1.30]	0.296
Environment	-0.09	0.95[0.77,1.16]	0.584
Gender			
Male	-0.34	0.710[0.317,1.593]	0.407
Year of Study			
Second Year	1.30	3.67[1.47,9.21]	0.006*
Third Year	0.37	1.44[0.61,3.4]	0.373
Fourth Year	1.14	3.14[1.27,7.77]	0.013*
Income			
M40	-.35	0.71[0.35,1.42]	0.327
T20	.78	2.19[0.74,6.48]	0.158

*p<0.05

DISCUSSION

This study investigated the relationship between social media screen time and quality of life among undergraduate students of the Biomedical Science program in Kuala Lumpur. The sample size for this research was calculated by using the formula provided below as the number of populations is known. From the data obtained, we found that the use of social media for more than 3 hours is high in both genders however it is not significant, indicating that genders have no association to the total amount spent on social media. This is contradicted with the previous study which stated that the proportion of screen time among males is higher than among females (Ma et al. 2020). However, we found there was a significant association between the level of screen time and with year of study.

Most students from year 2, year 3 and year 4 spent more than 3 hours on social media daily. A study previous researcher stated that during the lockdown, the use of the internet for social networking and entertainment has increased tremendously among students (Kolan, et al. 2020; Nassr et al. 2020). Year 2 has the highest percentage of students (18.1%) that spent more than 3 hours online. This is because the students are able to adapt the study schedule better than year 1 with lesser assignments and requirements than year 3 and year 4. Meanwhile, students from year 4 used social media more frequently as they have more group work compared to the other years of study involved.

The chi-square test was conducted to determine the relationship between level of social media screen time according to gender, year of study and socioeconomic status. The study shows that there is significant relationship in social media screen time level per day between years of study. Students with social media screen time more than 3 hours per day were higher among second-year students compared to year 1,3 and 4 but there was no relationship in student's gender and socioeconomic status. This is parallel with previous study in China among adolescent as older age, poor health status and low academic performance was associated with higher level of screen time (Wang et al. 2018)

A previous study by Al-Fayez and Ohaeri (2011) found no difference in social media screen time between genders. This aligns with our study's findings, which also suggest that social media screen time does not vary by gender. Additionally, while earlier research identified a relationship between social media screen time and socioeconomic factors, our study shows no such association. It’s important to note that previous studies considered factors such as parental occupation, educational qualifications, and financial background as part of their socioeconomic analysis, whereas our study focuses solely on household income (Bisegger et al. 2005; Ishak et al. 2021).

According to the results to compare between quality of life and social media usage score according to gender, year of study indicating there was no significant differences. According to previous study males showed higher values

in quality of life compared to females which is opposite with our study (Anye et al. 2013). They also mentioned that quality of life especially for the physical health and psychological domain improved more with increasing age especially in male than females. A study done by previous researcher, there was no significant relationship between quality of life with college students regardless of the year of study. This support our research study showed that there were no differences between quality of life with the year of study. Previous study indicated, high socio-economic status proved a good development in quality of life either in children or present life as there will be less mortality rate and better psychological health (Sasaki et al. 2022; Boer et al. 2021).

Spearman's correlation test was done in order to determine the correlation between social media screen time and quality of life. This study showed that there is no significant relationship between social media screen time and quality of life among undergraduate students from year 1 to year 4. Upon doing the analysis test, the Spearman correlation is -0.044 whereas p=0.553. According to the value, we can conclude that there is no association between social media screen time and the quality of life. According to the previous study, the association between screen time and well-being was not linear (Totland et al. 2014). The study showed that there is an inflexion point when the users use their screen time 1 hour/day for most measures. In comparison with that, previous researchers stated that there is evidence of social media and quality of life showing a strong negative correlation. The increased usage of social media screen time has decreased the quality of life of these young adults (Abdullah et al. 2021).

According to the result from binary logistic regression, male students are 1.52 times more likely to have screen time for more than 3 hours compared to female students, which explains the reason why the most of male students use social media as a platform to connect with peers for esports based on the data we collected from open-ended questions. Compared to Year 1 students, Year 2 students are 3.67 times more likely to have screen time of more than 3 hours, perhaps due to the organization of webinars or online workshops where they need to use social media as a platform to invite the public to join. Year 4 students are 3.14 times more likely to have more screen time. This might be due to Year 4 students spending more time on social media such as WhatsApp to discuss with their group members for their final year project. T20 income group students are 2.19 times more likely to have screen time of more than 3 hours compared to B40, due to their higher purchasing power to buy electronic gadgets which increases the ease of using social media. Based on the previous study, there was a significant difference between the level of screen usage duration with gender which this study has supported our research (Jaafar et al. 2021) . In this study, previous studies have revealed that male spends more screen time compared to female because of more time spent on video games. Besides, there is a positive relationship between the social relationship domain in Quality of Life (QoL) and social media screen time. This might be due to more social media screen time allowing them to connect with old friends and chatting with them, thus it can improve social relationships (Cornejo et al. 2013).

CONCLUSION

In this study, it can be concluded that there is no significant relationship between social media screen time and quality of life consisting of four domains, namely physical health, psychological, social relationship, and environment. However, binary logistic regression showed that year of study was a significant predictor in predicting the level of screen time among biomedical science students in Kuala Lumpur.

The study's conclusions highlight the necessity of comprehensive digital literacy initiatives in educational settings. Students need to be informed about both the positive and bad effects that social media use may have on their quality of life, as it becomes a more integral part of their lives. Modules on appropriate social media usage, with a focus on time management, the significance of striking a balance between online and offline activities, and the psychological effects of social media, could be incorporated by the Ministry of Higher Education.

The Ministry of Youth can use the study's conclusions to create and carry out youth-focused awareness programs. These advertisements should stress the value of using social media with awareness and encourage physical and mental health-promoting activities. The department can encourage youngsters to adopt healthy lifestyle choices by addressing the possible hazards that come with excessive use of social media, including decreased physical activity, sleep difficulties, and social isolation.

A longitudinal approach would provide a more thorough understanding of how social media impacts quality of life over time. By tracking individuals for several years, researchers could observe changes in behavior, mental health, and life satisfaction. This method would enable the detection of long-term effects that might not be apparent in cross-sectional studies (Hussain et al. 2019).

There could be variations in the impact on quality of life depending on the type of content ingested and how social media contact is done (e.g., active involvement versus passive browsing). Subsequent studies may examine how these factors impact outcomes including self-esteem, social connectivity, and mental health.

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PERSPEKTIF, DILEMA, ISU DAN CABARAN YANG DIHADAPI OLEH BELIA DALAM PEMILIKAN RUMAH PERTAMA: ANALISIS HARGA RUMAH DAN CORAK KEMAMPUAN

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ABSTRACT

Homeownership is a significant milestone in the lives of young people in Malaysia, but it is confronted with various significant issues and challenges. The objective of this study is to analyze the perspectives, dilemmas, issues, and challenges faced by youth in their efforts to own a first home, with a particular emphasis on housing price analysis and youth affordability patterns. This study employs a secondary analysis method, involving the collection and analysis of data from existing sources such as journals, government reports, and economic documents. The findings reveal that factors such as high house prices, non-strategic housing locations, and difficulties in obtaining housing loans are among the main challenges faced by young people. Additionally, the financial burden caused by rising living costs further complicates their efforts to purchase a first home. The study also identifies a gap between government policies and the realities on the ground, where existing housing initiatives are still insufficient to meet the actual needs of the youth. The conclusion of this study suggests improvements in housing policies, enhanced collaboration among stakeholders, and the need for financial education to increase the resilience of homeownership among youth. More comprehensive and thorough financial education at an early stage may help this group better plan their finances and avoid costly mistakes in the future. With appropriate actions, it is hoped that young people can achieve the stability and security they desire through owning their first home.

Keywords: Homeownership, Youth, Housing prices, Challenges, Policy.

ABSTRAK

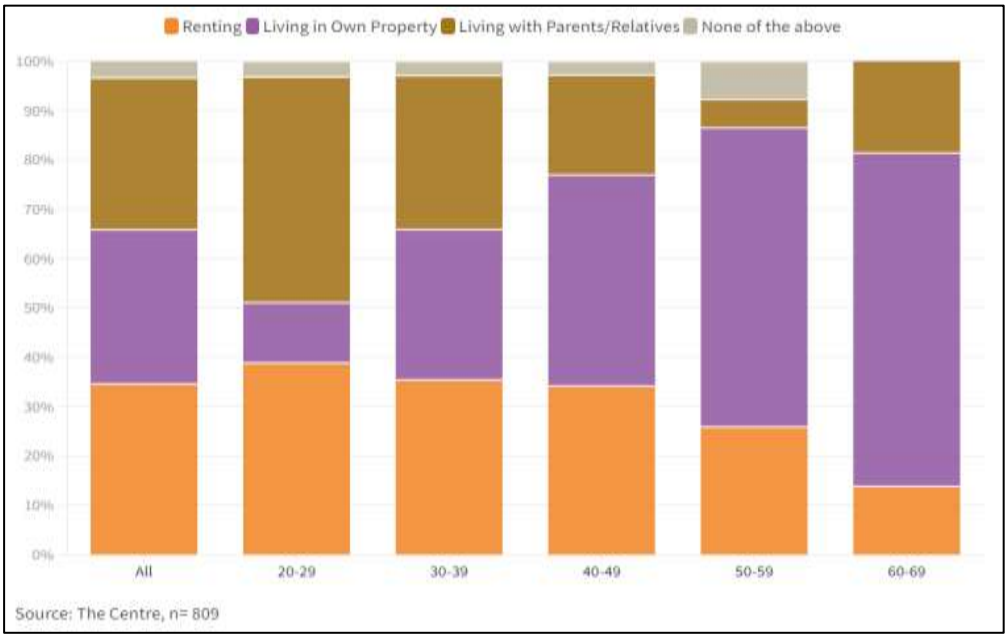
Pemilikan rumah pertama merupakan langkah penting dalam kehidupan golongan belia di Malaysia, namun ia dihadapkan dengan pelbagai isu dan cabaran yang signifikan. Objektif kajian ini adalah untuk menganalisis perspektif, dilema, isu, dan cabaran yang dihadapi oleh belia dalam usaha memiliki rumah pertama, dengan penekanan khusus terhadap analisis harga rumah dan corak kemampuan belia. Kajian ini menggunakan kaedah analisis sekunder yang melibatkan pengumpulan dan analisis data daripada sumber-sumber sedia ada seperti jurnal, laporan kerajaan, dan dokumen-dokumen ekonomi. Hasil kajian menunjukkan bahawa faktor-faktor seperti harga rumah yang tinggi, lokasi perumahan yang tidak strategik, serta kesukaran dalam mendapatkan pinjaman perumahan merupakan antara cabaran utama yang dihadapi oleh belia. Di samping itu, beban kewangan yang berat akibat kos sara hidup yang meningkat turut menyukarkan lagi usaha pemilikan rumah pertama ini. Kajian ini juga mengenal pasti jurang antara dasar yang dirangka oleh kerajaan dengan realiti di lapangan, di mana inisiatif perumahan sedia ada masih belum mencukupi untuk memenuhi keperluan sebenar golongan belia. Kesimpulan kajian ini mencadangkan penambahbaikan dalam dasar perumahan, peningkatan kerjasama antara pihak berkepentingan, dan perlunya pendidikan kewangan bagi meningkatkan daya tahan pemilikan rumah di kalangan belia. Pendidikan kewangan yang lebih komprehensif dan menyeluruh di peringkat awal mungkin dapat membantu golongan ini merancang kewangan mereka dengan lebih baik dan mengelakkan dari kesilapan yang boleh merugikan di masa hadapan. Dengan tindakan yang tepat, diharapkan golongan belia dapat menikmati kestabilan dan keselamatan yang diinginkan melalui pemilikan rumah pertama mereka.

Kata Kunci: Pemilikan Rumah, Belia, Harga Rumah, Cabaran, Polisi.

PENGENALAN

Pemilikan rumah pertama merupakan langkah penting dalam kehidupan ramai orang di Malaysia. Walau bagaimanapun, status pemilikan rumah di kalangan belia menunjukkan bahawa hanya 16.33% golongan muda memiliki rumah, jauh lebih rendah berbanding keseluruhan rakyat Malaysia (Institut Penyelidikan Khazanah, 2023). Fenomena ini disebabkan oleh beberapa faktor utama. Ramai pembeli rumah pertama tidak memberi perhatian yang cukup terhadap status hak milik rumah sebelum membeli (Utusan Malaysia, 2023). Selain itu, kebanyakan belia tidak mempunyai baki pendapatan yang mencukupi untuk membayar ansuran bulanan pinjaman perumahan (Bank Negara Malaysia, 2024). Terdapat juga perbezaan dalam pemilikan kediaman oleh belia mengikut negeri di Malaysia (Jabatan Perangkaan Malaysia, 2024). Pemilikan rumah dalam kalangan belia di Malaysia yang berumur antara 20 hingga 29 tahun masih rendah dan dianggarkan sebanyak 12. 2% daripada kumpulan ini dan 30.5% pada umur 30 hingga 39 tahun. Mengikut kajian mendapati pemilikan rumah yang tinggi oleh belia terdapat di negeri-negeri utara Malaysia dengan kadar 37.3%. Sebaliknya kadar rendah pemilikan rumah terletak di kawasan pusat

bandar seperti Kuala Lumpur yang mempunyai halangan kewangan yang terhad untuk memiliki rumah kediaman yang sesuai. Rajah 1 di bawah menunjukkan situasi perbezaan pemilikan rumah mengikut kumpulan umur. Berdasarkan kajian yang dijalankan mendapati peratusan bagi pemilikan rumah oleh belia adalah pada tahap yang rendah berbanding umur 40 ke atas.



Rajah 1. Situasi Pemilikan Rumah Mengikut Kumpulan Umur di Malaysia

Harga rumah di pasaran telah mengalami peningkatan yang signifikan sejak tahun 2016 hingga sekarang. Hal ini telah menyebabkan kesukaran bagi golongan belia untuk memiliki rumah pertama mereka (Institut Penyelidikan Khazanah, 2023). Terdapat beberapa faktor yang turut mempengaruhi kenaikan harga rumah. Salah satunya adalah kos pembinaan yang semakin meningkat akibat kenaikan harga bahan mentah seperti simen, besi, dan kayu (The Edge Markets, 2023). Contohnya, kos bahan mentah yang tinggi menyebabkan pembinaan rumah menjadi lebih mahal, secara tidak langsung harga jualan rumah juga meningkat (Ali, 2022). Selain itu, permintaan yang melebihi penawaran turut menyumbang kepada kenaikan harga rumah (Institut Penyelidikan Khazanah, 2023). Di kawasan bandar yang mempunyai kekurangan tanah untuk pembangunan, harga rumah cenderung meningkat kerana permintaan yang tinggi. Sebagai contoh, kawasan yang mempunyai kemudahan awam yang baik seperti pusat membeli-belah, hospital, dan sekolah biasanya mempunyai harga rumah yang lebih tinggi kerana faktor lokasi yang strategik (New Straits Times, 2024). Kemudahan dan infrastruktur yang disediakan juga memainkan peranan penting dalam penentuan harga rumah. Misalnya, kawasan yang mempunyai akses mudah ke pengangkutan awam seperti stesen LRT atau bas akan menarik pembeli yang mengutamakan kemudahan tersebut (Harun, 2023). Seiring dengan itu, pembangunan

infrastruktur seperti jalan raya baru atau taman permainan juga dapat meningkatkan nilai sebuah rumah (The Star, 2024). Oleh itu, adalah penting bagi golongan belia untuk merancang dengan bijak sebelum membeli rumah pertama bagi menghadapi cabaran harga rumah yang semakin meningkat (Jabatan Perumahan Negara, 2024).

Kemampuan untuk memiliki rumah tidak hanya bergantung kepada pendapatan isi rumah, tetapi juga dipengaruhi oleh beberapa faktor lain. Salah satu faktor penting ialah harga rumah itu sendiri. Contohnya, di kawasan bandar yang mempunyai harga rumah yang tinggi, golongan berpendapatan rendah mungkin menghadapi kesukaran untuk memiliki rumah kerana harga yang tidak mampu dicapai (Utusan Malaysia, 2023). Selain itu, kadar faedah pinjaman perumahan juga memainkan peranan penting. Misalnya, jika kadar faedah tinggi, ini akan menambah beban kewangan bagi pembeli rumah (Bank Negara Malaysia, 2024). Tempoh pinjaman juga perlu diambil kira. Bagi golongan B40 yang kekurangan baki pendapatan selepas membayar keperluan asas, tempoh pinjaman yang panjang mungkin membantu mengurangkan jumlah bulanan yang perlu dibayar (Institut Penyelidikan Khazanah, 2023). Namun, ini juga bermakna mereka perlu membayar lebih banyak faedah secara keseluruhan (Ali, 2022). Oleh itu, penting bagi pihak berkuasa untuk mempertimbangkan semua faktor ini apabila merancang dasar perumahan untuk memastikan aksesibiliti kepada rumah yang lebih baik bagi semua lapisan masyarakat (The Star, 2024).

Beberapa kajian kes yang dijalankan di Malaysia mengesahkan cabaran yang dihadapi oleh golongan belia dalam pemilikan rumah. Selain daripada harga rumah yang tinggi, faktor-faktor lain turut memberi impak kepada golongan belia yang ingin memiliki rumah sendiri. Sebagai contoh, kajian di Kuala Lumpur, Selangor, dan Johor menunjukkan bahawa selain daripada faktor harga, lokasi rumah juga memainkan peranan penting (Jabatan Perangkaan Malaysia, 2024). Golongan belia mungkin menghadapi kesukaran untuk memiliki rumah di kawasan yang strategik dan berdekatan dengan kemudahan asas seperti pengangkutan awam dan pusat beli-belah (Harun, 2023). Di samping itu, kajian di Bayan Lepas, Pulau Pinang, turut menggariskan bahawa masalah pemilikan rumah di kalangan belia bukan sahaja berkaitan dengan faktor ekonomi semata-mata. Terdapat juga isu-isu berkaitan dengan kestabilan pekerjaan dan pendapatan yang mempengaruhi keupayaan golongan belia untuk memiliki rumah (Jabatan Perumahan Negara, 2024). Dengan itu, penting untuk melihat secara holistik cabaran yang dihadapi oleh golongan belia dalam aspek pemilikan rumah (Institut Penyelidikan Khazanah, 2023). Kajian di Lembah Klang turut mendapati bahawa ramai pembeli rumah pertama tidak memberi keutamaan kepada status hak milik rumah sebelum membuat keputusan pembelian (IYRES, 2020). Ini menunjukkan perlunya kesedaran dan pemahaman yang lebih mendalam mengenai proses pembelian rumah dan hak-hak yang perlu dilindungi (New Straits Times, 2024). Oleh itu, langkah-langkah pendidikan dan pemahaman perlu ditingkatkan bagi memastikan golongan belia dapat membuat keputusan yang lebih bijak dan berpengetahuan dalam membeli rumah pertama mereka (Jabatan Perumahan Negara, 2024).

Bagi mengatasi isu ini, kerajaan telah mengambil beberapa langkah untuk membantu golongan belia memiliki rumah pertama mereka. Antaranya ialah memperkenalkan skim perumahan mampu milik, menawarkan insentif cukai kepada pemaju untuk membina rumah mampu milik, serta menyediakan bantuan kewangan seperti deposit dan ansuran bulanan (Bank Negara Malaysia, 2024). Kerajaan juga terus menambah baik skim sedia ada mengikut arus peredaran masa (Utusan Malaysia, 2023). Di samping itu, pembeli rumah pertama perlu mengambil langkah proaktif dengan membuat perancangan kewangan yang rapi sebelum membeli rumah. Mereka juga perlu memahami status hak milik rumah dan menyemak perkara penting dalam Perjanjian Jual Beli (SPA) sebelum menandatanganinya (Jabatan Perumahan Negara, 2024). Dengan kerjasama antara kerajaan, pemaju, dan pembeli, isu pemilikan rumah pertama di Malaysia dapat diatasi secara berperingkat (Institut Penyelidikan Khazanah, 2023). Artikel ini memberi fokus kepada permasalahan belia terhadap pemilikan rumah pertama yang menjadi dilema untuk memiliki rumah disebabkan pelbagai faktor yang menghalang belia tersebut. Oleh hal yang demikian, perancangan dan polisi oleh pihak bertanggungjawab dalam menangani isu ini dapat diatasi dengan segera.

KAJIAN LITERATUR

Pemilikan rumah pertama merupakan isu yang kompleks dan penting, baik di peringkat lokal mahupun global. Di peringkat global, harga rumah yang semakin meningkat, terutamanya di bandar-bandar besar, menyebabkan ramai golongan muda sukar untuk memiliki rumah pertama mereka. Kajian menunjukkan bahawa negara-negara maju seperti Amerika Syarikat, Kanada, dan Australia menghadapi masalah yang sama, di mana harga rumah yang tinggi tidak seimbang dengan kadar peningkatan pendapatan. Misalnya, di Amerika Syarikat, terdapat sebahagian golongan muda yang terpaksa bergantung kepada pinjaman besar untuk memiliki rumah pertama mereka, yang akhirnya memberi tekanan kepada kewangan mereka (Smith, 2020). Di Kanada, terdapat trend di mana generasi muda lebih cenderung untuk menyewa rumah berbanding membeli kerana kos pemilikan rumah yang semakin meningkat, yang menimbulkan kebimbangan tentang kestabilan pasaran hartanah (Brown, 2021). Di Australia, kekurangan rumah mampu milik di kawasan bandar telah menyebabkan golongan muda terpaksa mencari alternatif lain, seperti tinggal di kawasan pinggir bandar yang lebih jauh (Johnson, 2020). Fenomena ini membawa impak sosial dan ekonomi yang signifikan kepada masyarakat tempatan.

Di Malaysia, situasi ini turut memberi kesan kepada golongan belia, terutama dalam kalangan kumpulan berpendapatan rendah (B40) dan sederhana (M40). Para belia dari kumpulan ini sering menghadapi cabaran besar dalam memenuhi keperluan asas seperti memiliki rumah sendiri. Misalnya, ramai belia B40 dan M40 terpaksa menyewa rumah kerana tidak mampu untuk membeli rumah sendiri disebabkan beban kewangan yang tinggi (Hassan & Ahmad, 2022). Penyelesaian yang dicadangkan, seperti skim pinjaman

perumahan, mungkin tidak mencukupi untuk membantu mereka memiliki rumah impian. Contohnya, kadar faedah yang tinggi atau syarat-syarat yang ketat sering menjadi halangan utama bagi belia dalam mendapatkan pinjaman perumahan (Zainal, 2021). Oleh itu, keperluan untuk penyelesaian yang lebih inovatif dan berkesan dalam menyokong pemilikan rumah pertama golongan muda sangat penting. Sebagai contoh, kerajaan boleh memperkenalkan skim pinjaman khas dengan kadar faedah yang lebih rendah untuk belia B40 dan M40. Selain itu, program pendidikan kewangan juga boleh diperluaskan untuk membantu belia memahami proses membeli rumah dan mengurus kewangan dengan bijak (Rahim, 2022). Dengan pendekatan yang holistik dan bersepadu, golongan belia akan lebih mudah mencapai impian memiliki rumah sendiri tanpa tekanan kewangan yang berlebihan.

Perbandingan ini menunjukkan persamaan dalam cabaran yang dihadapi oleh golongan muda di peringkat global, meskipun terdapat perbezaan dalam konteks ekonomi dan sosial setiap negara. Dengan peningkatan harga rumah yang tidak seiring dengan pendapatan, golongan muda di pelbagai negara seperti Poland, China, Jepun, Hong Kong, dan United Kingdom menghadapi kesukaran yang sama dalam memiliki rumah pertama mereka. Golongan belia di Botswana juga menghadapi cabaran harga hartanah yang tinggi, akses pembiayaan terbatas, faedah yang tinggi, dan keperluan cagaran yang besar (Guruwo, 2018). Oleh itu, tindakan bersepadu dan kerjasama antarabangsa mungkin diperlukan untuk mengatasi isu ini secara menyeluruh dan memberi peluang kepada lebih ramai golongan muda untuk memiliki rumah pertama mereka (World Bank, 2022). Di peringkat lokal, statistik menunjukkan bahawa kadar pemilikan rumah dalam kalangan belia di Malaysia berbeza mengikut jantina, bangsa, dan negeri. Kajian terdahulu menunjukkan bahawa belia lelaki lebih cenderung untuk memiliki rumah berbanding belia perempuan. Contohnya, dalam masyarakat tradisional, lelaki sering dianggap sebagai ketua keluarga yang bertanggungjawab untuk memiliki rumah sebagai aset keluarga (Yusof, 2021). Sementara itu, kadar pemilikan rumah dalam kalangan Bumiputera adalah lebih tinggi berbanding kaum lain. Di Sabah dan Sarawak, kebanyakan Bumiputera memiliki rumah sendiri kerana faktor kebudayaan dan warisan tanah adat yang diteruskan dari generasi ke generasi (Ismail, 2022). Negeri-negeri seperti Kelantan dan Terengganu juga menunjukkan kadar pemilikan rumah yang tinggi dalam kalangan Bumiputera kerana kepentingan mewarisi harta pusaka (Ramli, 2021). Namun, di negeri-negeri maju seperti Selangor dan Kuala Lumpur, kadar pemilikan rumah lebih rendah disebabkan oleh harga rumah yang tinggi dan persaingan pasaran yang ketat. Ramai belia menghadapi cabaran untuk memiliki rumah sendiri kerana kos sara hidup yang meningkat dan kekurangan ruang pembangunan (Lim, 2021). Oleh itu, program perumahan kerajaan dan inisiatif swasta perlu ditingkatkan untuk membantu belia memperoleh rumah idaman mereka (Kementerian Perumahan dan Kerajaan Tempatan, 2022). Kajian oleh Tawil et al. di Lembah Klang mendapati belia lebih berminat dalam memiliki rumah bertingkat, seperti kondominium dan pangsapuri, yang sesuai dengan gaya hidup yang dinamik dan keselamatan (Tawil et al., 2019).

Purata harga rumah di Malaysia telah meningkat dengan ketara dalam beberapa tahun kebelakangan ini, terutamanya di kawasan bandar utama. Data dari Bank Negara Malaysia menunjukkan bahawa purata harga rumah pada tahun 2020 adalah sekitar RM300,000 hingga RM400,000, bergantung kepada lokasi dan jenis rumah. Contohnya, harga rumah di kawasan seperti Kuala Lumpur dan Petaling Jaya mungkin jauh lebih tinggi berbanding kawasan pinggir bandar (Bank Negara Malaysia, 2020). Indeks pemilikan rumah yang dikeluarkan oleh Pusat Informasi Hartanah Negara (NAPIC) menunjukkan bahawa kemampuan pemilikan rumah di Malaysia adalah rendah, terutama dalam kalangan belia dan golongan berpendapatan rendah. Hal ini dapat dilihat apabila membandingkan kadar pertumbuhan pendapatan dengan peningkatan harga rumah yang signifikan. Misalnya, terdapat peningkatan gaji tahunan sebanyak 5%, tetapi harga rumah meningkat sebanyak 10% setiap tahun (NAPIC, 2021). Oleh itu, golongan belia berpendapatan rendah mungkin menghadapi cabaran dalam memiliki rumah sendiri. Kajian oleh Institut Penyelidikan Pembangunan Belia Malaysia (IYRES) menunjukkan indeks kemampuan pemilikan rumah yang menganggarkan harga rumah yang mampu dimiliki dan nisbah gadai janji pendapatan (Mohd Hadi et al., 2023).

Golongan belia di Malaysia umumnya menghadapi kesukaran untuk memiliki rumah kerana pendapatan mereka yang tidak mencukupi. Dapatan kajian oleh IYRES bagi seorang graduan lepasan ijazah yang baru memulakan kerjaya menunjukkan pendapatan awal hanya berada dalam lingkungan RM2,000 hingga RM2,500 sebulan, yang jauh dari mencukupi untuk menanggung kos hidup harian, apalagi untuk menabung bagi membeli rumah (Jabatan Perangkaan Malaysia, 2022). Menurut laporan Jabatan Perangkaan Malaysia, purata pendapatan bulanan belia di Malaysia adalah sekitar RM2,000 hingga RM4,000, bergantung kepada sektor pekerjaan dan lokasi. Di bandar-bandar besar seperti Kuala Lumpur atau Pulau Pinang, kos sara hidup lebih tinggi berbanding kawasan luar bandar, menyebabkan golongan belia di bandar menghadapi lebih banyak cabaran dalam menyimpan wang untuk membeli rumah (Jabatan Perangkaan Malaysia, 2022).

Dengan kos sara hidup yang semakin meningkat, sukar bagi golongan ini untuk menyimpan wang yang mencukupi bagi membeli rumah pertama mereka. Selain daripada perbelanjaan harian, mereka juga perlu memikirkan tentang bayaran pinjaman, cukai hartanah, dan kos pemeliharaan rumah (Mahmud, 2021). Oleh itu, penting bagi kerajaan dan pihak berkuasa untuk mencari cara bagi membantu golongan belia agar dapat memiliki rumah tanpa terlalu tertekan dengan beban kewangan. Kajian oleh Baskaran et al. menunjukkan bahawa kos sara hidup yang tinggi, motivasi yang rendah, dan kadar gaji yang rendah adalah antara cabaran yang dihadapi oleh belia dalam pemilikan rumah (Baskaran et al., 2020). Susilawati dan Wong memfokuskan kepada golongan muda, khususnya pelajar universiti, dalam pemilikan rumah mampu milik. Penyelidik mendapati terdapat halangan utama seperti kos hartanah yang tinggi, pendapatan yang rendah, kekurangan celik kewangan, dan kadar pengangguran dalam memenuhi syarat pinjaman bank (Susilawati & Wong, 2014).

Perbandingan pemilikan rumah antara Bumiputera dan bukan Bumiputera menunjukkan perbezaan yang ketara. Kajian menunjukkan bahawa Bumiputera lebih cenderung untuk memiliki rumah melalui bantuan kerajaan dan skim perumahan yang disediakan khusus untuk mereka. Program rumah mampu milik seperti Projek Perumahan Rakyat (PPR) telah memberi peluang kepada ramai Bumiputera untuk memiliki rumah dengan harga yang lebih berpatutan dan layak untuk mendapat potongan diskaun bagi pembelian rumah berbanding dengan bukan Bumiputera (Salleh, 2022). Sebaliknya, bukan Bumiputera, terutamanya di bandar besar, menghadapi cabaran yang lebih besar disebabkan oleh harga rumah yang lebih tinggi dan persaingan pasaran yang ketat. Banyak generasi muda bukan Bumiputera terpaksa menangguhkan impian memiliki rumah sendiri kerana terbeban dengan hutang pelajaran yang tinggi. Pasaran hartanah yang sering melonjak membuatkan rumah di bandar menjadi tidak mampu dijangkau oleh golongan ini (Tan, 2022).

Oleh itu, penting bagi pihak berkuasa untuk mempertimbangkan strategi yang lebih inklusif bagi semua lapisan masyarakat. Selain menyediakan bantuan kewangan, langkah-langkah seperti meningkatkan akses kepada pendidikan kewangan dan pembangunan kemahiran juga penting untuk membantu golongan yang berdepan dengan cabaran dalam memiliki rumah (Ahmad, 2023). Dengan usaha berterusan, diharapkan dividen pemilikan rumah yang lebih seimbang dan adil dapat dicapai dalam jangka masa panjang. Dari perspektif dasar, Pelan Rancangan Malaysia ke-12 (RMK-12) menekankan kepentingan pemilikan rumah mampu milik sebagai salah satu matlamat utama pembangunan negara (Jabatan Perdana Menteri Malaysia, 2021). Ini menunjukkan kepentingan untuk memastikan setiap rakyat Malaysia, termasuk golongan belia, mempunyai kemampuan untuk memiliki rumah sendiri. Program subsidi rumah yang disediakan oleh kerajaan membantu golongan berpendapatan rendah untuk memiliki rumah tanpa terlalu banyak beban kewangan (Institut Penyelidikan Ekonomi Malaysia, 2022).

Kerajaan Malaysia telah memperkenalkan beberapa skim perumahan mampu milik seperti PR1MA, Program Bantuan Rumah, Program Perumahan Rakyat, Program Rumah Mesra Rakyat 1 Malaysia, Skim Rumah Pertamaku, Perumahan Penjawat Awam 1 Malaysia (PPA1M), dan Skim Perumahan Mampu Milik Swasta (MyHome) yang ditujukan khas untuk golongan belia. Skim-skim ini bertujuan untuk membantu belia memiliki rumah dengan menawarkan harga yang lebih berpatutan dan syarat pembiayaan yang lebih fleksibel (Jabatan Perumahan Negara, 2022). Namun, keberkesanan skim ini masih menjadi perbincangan, terutamanya dalam kalangan belia yang masih berhadapan dengan cabaran kewangan dan kekurangan maklumat mengenai peluang-peluang ini (Ali, 2021).

Pada tahun 2024, kerajaan memperkenalkan inisiatif deposit madani yang dicadangkan oleh Kementerian Perumahan dan Kerajaan Tempatan (KPKT) untuk membantu pembeli rumah pertama khususnya belia berumur antara 25 hingga 34 tahun dengan menyediakan bantuan deposit hingga RM30,000. Pemberian deposit ini bertujuan untuk mengatasi kewangan yang

dihadapi oleh golongan muda dan individu yang baru memulakan kerjaya untuk membayar deposit 10% semasa proses pembelian rumah. Persatuan Pemaju Hartanah dan Perumahan Malaysia (REHDA) menyokong inisiatif ini yang dapat memberikan peluang dalam pemilikan rumah seiring dengan dasar Kerajaan "Rumahku Syurgaku". Selain itu, KPKT pada tahun 2023 telah membina sebanyak 1,048unit Rumah Belia Madani (RBM) di Kuala Lumpur melalui Perjanjian Pembangunan Rumah Transit Belia bersama syarikat BMG Global Sdn Bhd melalui konsep sewaan. Pembinaan RBM di Kuala Lumpur boleh dijadikan sebagai perintis kepada negeri-negeri lain untuk belia memiliki rumah mampu milik.

Pelan RMK-12 juga sejajar dengan matlamat Pembangunan Lestari (SDG) yang menekankan kepentingan perumahan yang mampu milik sebagai elemen penting dalam pembangunan bandar yang lestari dan inklusif (United Nations Development Programme, 2020). Usaha untuk menyediakan kemudahan infrastruktur yang baik, seperti pengangkutan awam yang efisien, turut diberi penekanan. Pembinaan stesen keretapi yang berdekatan dengan kawasan perumahan boleh menggalakkan penggunaan pengangkutan awam dan mengurangkan penggunaan kenderaan persendirian (Ng, 2021). Dengan memastikan akses kepada perumahan yang mampu milik, Malaysia boleh memastikan bahawa penduduk bandar dapat menikmati kesejahteraan dan kemudahan asas dengan lebih baik. Ini tidak hanya membawa manfaat kepada individu, tetapi juga kepada keseluruhan masyarakat dalam jangka masa panjang (Ismail, 2023). Oleh itu, langkah-langkah yang diambil dalam Pelan RMK-12 adalah penting untuk memastikan bahawa Malaysia terus membangun secara mampan dan inklusif (Jabatan Perdana Menteri Malaysia, 2021).

Pemilikan rumah memainkan peranan penting dalam kehidupan manusia, dan konsep ini dapat dilihat melalui lensa Teori Keperluan Maslow. Menurut teori ini, pemilikan rumah bukan sekadar tentang memiliki tempat tinggal, tetapi juga melibatkan aspek keselamatan dan kestabilan (Maslow, 1943). Rumah memberikan rasa kepastian kepada individu kerana mereka memiliki tempat yang mereka boleh panggil sebagai milik sendiri, di mana mereka boleh berasa selamat dan tenteram (Tan, 2022). Kesejahteraan mental dan fizikal individu juga dipengaruhi oleh pemilikan rumah. Apabila seseorang memiliki rumah sendiri, mereka cenderung lebih tenteram secara psikologi kerana tidak perlu bimbang tentang perpindahan atau kestabilan tempat tinggal (Rahman, 2023). Tambahan pula, memiliki rumah juga memberi peluang untuk meningkatkan keadaan fizikal rumah mengikut kehendak dan citarasa individu, yang pada gilirannya dapat meningkatkan kesejahteraan keseluruhan (Leong, 2022). Oleh itu, penting bagi masyarakat untuk memahami bahawa usaha meningkatkan kadar pemilikan rumah dalam kalangan belia bukan hanya berkaitan dengan aspek ekonomi semata-mata. Ia juga memainkan peranan penting dalam meningkatkan kesejahteraan sosial dan psikologi masyarakat secara keseluruhan (Ng, 2021). Kajian oleh Osman et al. yang membincangkan faktor penyumbang pemilikan rumah oleh belia di Melaka mendapati bahawa pendapatan isi rumah, akses kepada pembiayaan, tahap pendidikan, dan kesedaran terhadap dasar kerajaan adalah faktor penting (Osman et al., 2018).

Secara kesimpulan, isu dan cabaran yang dihadapi oleh belia di Malaysia dalam pemilikan rumah pertama adalah aspek utama dalam menentukan gaya hidup belia pada masa kini. Penglibatan yang sedikit dalam membeli atau memiliki rumah pada usia muda disebabkan oleh beberapa faktor atau halangan seperti deposit yang tinggi, tidak memenuhi syarat pembelian rumah, gaji yang tidak mencukupi, dan kos sara hidup yang tidak stabil antara kawasan bandar dan luar bandar.

METODOLOGI KAJIAN

Kajian ini menggunakan reka bentuk kajian kualitatif yang berfokuskan kepada analisis sekunder, di mana pendekatan ini dipilih untuk membolehkan penyelidik menganalisis data sedia ada secara mendalam. Instrumen utama yang digunakan dalam kajian ini adalah bahan-bahan sekunder seperti jurnal, laporan kerajaan, dokumen ekonomi, dan laporan-laporan penyelidikan terdahulu. Data dikumpulkan melalui kajian literatur yang melibatkan pencarian bahan-bahan sekunder daripada sumber yang boleh dipercayai seperti pangkalan data akademik, laporan rasmi dari agensi kerajaan, dan artikel yang diterbitkan dalam jurnal yang diiktiraf. Proses ini merangkumi penilaian kritikal terhadap bahan-bahan yang relevan untuk memastikan kualiti dan kesesuaian data yang dikumpulkan. Seterusnya, data yang diperoleh dianalisis secara kualitatif melalui proses pengkodan dan penilaian tema-tema utama yang muncul. Analisis ini bertujuan untuk mengenal pasti corak, trend, dan jurang dalam pelaksanaan dasar perumahan serta kesannya terhadap kemampuan belia untuk memiliki rumah pertama. Di samping itu, kajian ini menggunakan data sekunder, populasi kajian terdiri daripada pelbagai sumber data yang telah dikumpulkan oleh penyelidik terdahulu, tanpa melibatkan pengumpulan data primer. Sebaliknya, kajian ini memberi tumpuan kepada analisis kritikal terhadap data yang telah diterbitkan sebelumnya, dengan tujuan untuk memberikan gambaran yang komprehensif mengenai isu dan cabaran yang dihadapi oleh belia dalam usaha memiliki rumah pertama. Kajian terdahulu mengenai pemilikan rumah pertama dalam kalangan belia di Malaysia menggunakan pelbagai pendekatan untuk memahami isu ini dengan lebih mendalam. Antara pendekatan yang sering digunakan adalah kaedah kualitatif seperti temuramah secara separa-struktur. Melalui kaedah ini, penyelidik dapat mengumpul maklumat yang lebih mendalam dan dimensi daripada responden, terutamanya dalam memahami motivasi, persepsi, dan cabaran yang dihadapi oleh belia dalam proses pemilikan rumah. Persampelan bertujuan digunakan untuk memilih responden yang relevan dan dapat memberikan pandangan yang berharga mengenai topik kajian (Abdullah et al., 2020).

Selain itu, berdasarkan kajian-kajian lepas kaedah kuantitatif seperti soal selidik juga digunakan secara meluas. Soal selidik membolehkan penyelidik mengumpul data daripada sampel yang lebih besar, yang dipilih berdasarkan populasi sesuatu kumpulan belia. Dengan pendekatan ini, penyelidik dapat menganalisis corak dan trend pemilikan rumah secara statistik, serta membuat generalisasi tentang isu-isu yang dihadapi oleh belia di seluruh negara

(Kamaruddin, 2019). Data kuantitatif ini sering disokong oleh analisis statistik yang membantu dalam membuat kesimpulan yang lebih tepat dan berasaskan data.

Sumber sekunder seperti jurnal, surat khabar, dan dokumen kerajaan juga menjadi asas penting dalam kajian-kajian terdahulu. Sumber-sumber ini memberikan latar belakang yang kaya dan kontekstual mengenai isu pemilikan rumah, termasuk dasar-dasar kerajaan, trend pasaran perumahan, dan pandangan masyarakat umum. Sebagai contoh, dokumen kerajaan seperti Pelan Rancangan Malaysia (RMK-12) dan laporan oleh Bank Negara Malaysia sering dirujuk untuk mendapatkan gambaran makroekonomi dan dasar berkaitan pemilikan rumah (Bank Negara Malaysia, 2020). Jurnal akademik pula menyediakan analisis kritis dan mendalam yang memperkayakan pemahaman tentang cabaran dan peluang yang dihadapi oleh belia (Ting, 2018).

Oleh hal yang demikian, kajian ini menggunakan pendekatan kualitatif dengan analisis sekunder untuk menilai isu pemilikan rumah pertama dalam kalangan belia di Malaysia. Data dikumpulkan melalui kajian literatur yang melibatkan jurnal, laporan kerajaan, dan dokumen ekonomi dari sumber yang boleh dipercayai. Analisis dijalankan secara kualitatif melalui proses pengkodan dan penilaian tema utama yang muncul daripada data yang dikaji. Tujuannya adalah untuk mengenal pasti corak, trend, dan jurang dalam pelaksanaan dasar perumahan yang mempengaruhi kemampuan belia memiliki rumah. Berbanding pengumpulan data primer, kajian ini memberi tumpuan kepada analisis kritikal data sekunder yang telah diterbitkan, bertujuan menyediakan gambaran yang menyeluruh mengenai isu dan cabaran yang dihadapi oleh belia dalam pemilikan rumah.

Kesimpulannya, pendekatan kualitatif melalui analisis sekunder membolehkan penyelidik memahami secara mendalam faktor-faktor yang mempengaruhi pemilikan rumah pertama oleh belia. Kajian ini mengenal pasti jurang dan cabaran dalam pelaksanaan dasar perumahan yang boleh mempengaruhi keupayaan belia memiliki rumah, di samping mencadangkan bahawa lebih banyak penyelidikan diperlukan untuk mengatasi isu ini secara efektif.

KEPUTUSAN DAN PERBINCANGAN

Isu dan Cabaran Pemilikan Rumah Pertama

Pemilikan rumah pertama di Malaysia menerima pelbagai isu dan cabaran yang signifikan, terutamanya bagi golongan belia. Salah satu cabaran utama adalah keperluan untuk menyediakan deposit yang tinggi atau membayar sewa bulanan yang mahal, yang sering kali berada di luar kemampuan kebanyakan belia (Institut Penyelidikan Khazanah, 2019). Selain itu, akses yang terhad kepada skim penyewaan rumah mampu milik turut menjadi halangan besar. Walaupun terdapat beberapa skim penyewaan yang disediakan, ramai penyewa merasakan bahawa syarat-syarat yang dikenakan tidak sesuai dengan kemampuan mereka, dan terdapat juga kekurangan dari segi kelayakan untuk

menyertai skim-skim tersebut (Kementerian Perumahan dan Kerajaan Tempatan, 2020).

Persepsi dan sikap belia terhadap lokasi perumahan yang tidak strategik, terutamanya dari segi akses kepada pengangkutan awam, juga menambah kesukaran dalam pemilikan rumah. Kebanyakan pembangunan perumahan baru terletak di kawasan yang jauh dari pusat bandar dan kemudahan pengangkutan awam yang efisien, menyebabkan kesukaran bagi mereka yang bekerja di bandar (Rahman, 2018, Mohd Hadi et al., 2023). Selain itu, pendapatan bulanan yang rendah dan status pekerjaan yang tidak stabil menjadikan lebih sukar bagi belia untuk memenuhi syarat kelayakan pinjaman bank (Mohd Hadi et al., 2023). Dalam konteks ini, kos sara hidup yang tinggi di kawasan bandar, di mana kebanyakan pembinaan perumahan dijalankan, memperburuk lagi situasi (Bank Negara Malaysia, 2021). Selain itu, isu kebankrapan oleh belia pada usia muda mendapati lebih 30,000 orang sejak 2014 hingga Mei 2023 berdasarkan Jabatan Insolvensi Malaysia (MDI) dan hal ini membimbangkan belia untuk memohon rumah pertama. Berdasarkan dapatan kajian oleh IYRES mendapati faktor utama belia menjadi bankrap adalah disebabkan oleh pinjaman peribadi. Wilayah Persekutuan Kuala Lumpur dan Negeri Selangor mencatatkan nilai tertinggi belia di Malaysia (IYRES, 2022).

Rekaan dan ruangan dalam serta luar rumah turut menjadi faktor penting yang mempengaruhi keputusan untuk membeli rumah. Rumah yang direka dengan tidak sesuai atau tidak memenuhi keperluan keluarga muda sering kali ditolak (Ismail, 2017). Selain itu, kesedaran yang rendah mengenai kepentingan simpanan kewangan turut menjadi isu. Tanpa perancangan kewangan yang baik, ramai belia gagal untuk menyediakan dana yang mencukupi untuk membayar deposit atau menguruskan kewangan mereka dengan berkesan (Institut penyelidikan Ekonomi Malaysia, 2020).

Trend dan Corak Kemampuan

Dalam konteks kemampuan pemilikan rumah, terdapat perbandingan yang jelas antara kawasan bandar dan luar bandar. Di kawasan bandar, harga rumah lebih tinggi, yang menyebabkan ramai belia memilih untuk membeli rumah di kawasan luar bandar di mana harga rumah lebih mampu milik (Institut Penyelidikan Khazanah, 2019). Kajian yang dijalankan oleh Md. Sani dan Mohd Nori mendapati bahawa pendapatan belia lebih rendah di kawasan Batu Kurau kerana bekerja sebagai petani dan peniaga kecil (Md.Sani & Mohd Nori, 2021). Contohnya, di kawasan bandar seperti Kuala Lumpur, harga rumah boleh mencecah jutaan ringgit manakala di kawasan luar bandar seperti Hulu Langat, harga rumah lebih berpatutan (Bank Negara Malaysia, 2021). Kajian yang dijalankan oleh Suhana Ismail et al., mendapati belia berminat kepada lokasi bandar berbanding pinggir bandar dan luar bandar (Ismail et al., 2021). Belia juga berminat kepada jenis rumah bertanah berbanding rumah bertingkat tinggi. Jumlah nilai rumah yang mampu dimiliki sekitar antara RM42,000 hingga RM250,000 seperti rumah bandar bertingkat, flat, kondominium, dan apartment.

Di kawasan luar bandar, rumah kampung dan semi-D lebih popular kerana harganya yang lebih rendah berbanding di bandar. Sebagai contoh, di kawasan perumahan yang terletak jauh dari bandar seperti Bentong, rumah kampung yang mempunyai halaman luas dan suasana yang tenang menjadi pilihan utama (Ismail, 2018). Selain itu, terdapat trend di mana sesetengah belia membeli rumah bukan sahaja untuk kegunaan sendiri, tetapi juga sebagai pelaburan jangka panjang. Mereka membeli rumah dengan harapan nilai hartanah akan meningkat seiring dengan masa (World Bank, 2022). Namun, di dalam situasi ini belia mendapati bahawa pelaburan dalam hartanah memerlukan perancangan yang teliti dan pengetahuan yang mendalam mengenai pasaran perumahan (Institut Penyelidikan Ekonomi Malaysia, 2020).

Kajian mengenai kemampuan pemilikan rumah oleh belia bumiputera di Gelang Patah menunjukkan cabaran besar kerana kenaikan harga hartanah, pendapatan yang tidak seimbang serta kesukaran mendapatkan pinjaman (Ismail, 2015). Walaupun terdapat polisi kuota Bumiputera dan skim kerajaan, ramai belia masih sukar memiliki rumah kerana persaingan yang tinggi dan komitmen kewangan. Urbanisasi pesat juga meningkatkan tekanan ke atas pasaran hartanah dan menjadikan pemilikan rumah semakin mencabar.

Dari segi harga rumah di Malaysia, data menunjukkan bahawa harga rumah telah meningkat dengan ketara sejak beberapa tahun kebelakangan ini. Menurut laporan Pusat Maklumat Hartanah Negara (NAPIC), purata harga rumah di Malaysia pada tahun 2020 berada dalam lingkungan RM300,000 hingga RM400,000, dengan harga rumah di kawasan bandar utama seperti Kuala Lumpur dan Selangor melebihi purata ini (NAPIC, 2021). Harga rumah yang tinggi ini menyebabkan kesukaran bagi golongan belia, terutamanya yang berpendapatan rendah dan sederhana, untuk memiliki rumah pertama mereka.

Kaitan dengan peta lokasi perumahan juga penting dalam memahami aksesibiliti dan kemampuan pemilikan rumah. Peta lokasi perumahan membantu menunjukkan kawasan-kawasan yang mengalami peningkatan harga rumah yang ketara, serta kawasan-kawasan yang masih mempunyai rumah mampu milik. Sebagai contoh, peta lokasi di Lembah Klang menunjukkan bahawa kawasan seperti Petaling Jaya dan Subang Jaya mempunyai harga rumah yang jauh lebih tinggi iaitu sekitar RM353,000 hingga RM880,000 berbanding kawasan pinggir bandar seperti Rawang dan Semenyih iaitu sekitar RM120,000 hingga RM538,000 mengikut jenis kediaman (Lee, 2021). Perkara ini membolehkan belia membuat keputusan yang lebih bijak tentang lokasi yang sesuai dan mampu milik untuk mereka membeli rumah pertama. Secara keseluruhan, berdasarkan kajian mendapati negeri Johor, Melaka dan Pulau Pinang mencatatkan kadar pemilikan yang lebih baik berbanding negeri-negeri lain dengan pelbagai inisiatif dan program bagi menyokong belia dalam memiliki rumah (Md Yassin, 2023).

Strategi dan Penyelesaian

Untuk mengatasi cabaran-cabaran ini, kerajaan memainkan peranan penting dengan menyediakan pelbagai skim bantuan dan insentif untuk membantu

golongan belia memiliki rumah pertama. Contohnya, skim seperti PR1MA, Skim Rumah Pertamaku dan Rumah Selangorku telah diperkenalkan untuk menyediakan rumah mampu milik dengan syarat pembiayaan yang lebih fleksibel (Kementerian Perumahan dan Kerajaan Tempatan, 2020, Mohd Hadi et al., 2023). Selain itu, kerajaan juga menyedari kepentingan pendidikan kewangan dalam membantu belia merancang kewangan mereka dengan lebih baik. Untuk itu, pelbagai kursus kewangan disediakan oleh kerajaan, institusi kewangan, dan organisasi bukan kerajaan bagi memberi pemahaman yang lebih mendalam kepada belia (Institut Penyelidikan Ekonomi Malaysia, 2020).

Sebagai contoh, program-program latihan kewangan seperti kelas pemantapan kewangan dan bengkel perancangan kewangan boleh membantu belia memahami konsep-konsep kewangan asas seperti pengurusan hutang, pelaburan, dan perancangan persaraan. Ini akan membolehkan mereka membuat keputusan kewangan yang lebih bijak dan berdaya maju (Bank Negara Malaysia, 2021). Di samping itu, kerajaan juga turut memberi tumpuan kepada aspek pembiayaan dengan menyediakan skim pinjaman yang mudah dan berpatutan untuk membolehkan belia memiliki rumah impian mereka tanpa tekanan kewangan yang berlebihan (Institut Penyelidikan Khazanah, 2019). Program literasi kewangan merupakan salah satu agenda utama dalam menyelesaikan isu ini melalui sistem pendidikan yang bermula sejak di sekolah menengah. Negara Singapura merupakan salah satu negara yang berjaya memperkenalkan program literasi pada tahun 2014 untuk sekolah dengan mendedahkan pelajar kepada keperluan kemahiran pengurusan termasuk simpanan, pengurusan kredit, bajet dan pinjaman. Dengan usaha yang berterusan dalam menyediakan bantuan dan pendidikan kewangan kepada golongan belia, diharapkan mereka dapat memperbaiki kestabilan kewangan peribadi dan menyumbang kepada pertumbuhan ekonomi negara secara keseluruhan. Melalui inisiatif ini, belia akan dapat memiliki rumah pertama dengan lebih yakin dan merancang masa depan kewangan mereka dengan lebih berkesan (World Bank, 2022).

Kerjasama antara sektor swasta dan kerajaan dalam membina rumah mampu milik juga perlu diperkasakan. Sektor swasta boleh memainkan peranan dengan memperkenalkan projek perumahan yang memenuhi keperluan golongan berpendapatan sederhana dan rendah, manakala kerajaan boleh menawarkan insentif cukai dan subsidi bagi memastikan rumah-rumah ini dijual pada harga yang mampu milik seperti Skim Perumahan Belia (SPB) yang diperkenalkan pada tahun 2020, Myhome iaitu pemberian subsidi sehingga RM30,000, dan Rumah Majlis Agama Islam Wilayah Persekutuan (RUMAWIP) di Kuala Lumpur, Putrajaya dan Labuan yang menyediakan 80,000 unit bagi kumpulan B40 dan M40 (Hassan et al., 2022). Di Negeri Johor, kerajaan negeri telah membina Rumah Transit Bangsa Johor yang dapat memberi fokus kepada golongan belia yang berpendapatan rendah dan menengah merebut peluang dalam memiliki rumah mampu milik. Contoh kejayaan usaha bersama ini dapat dilihat di negara-negara seperti Singapura, di mana kerjasama antara pemerintah dan sektor swasta telah berjaya menyediakan perumahan mampu

milik kepada sebahagian besar penduduknya (Lembaga Perumahan dan Pembangunan, 2021).

Di Singapura, misalnya, program kerjasama antara sektor swasta dan kerajaan telah menghasilkan penciptaan perumahan yang terjangkau bagi warga dengan berbagai tingkat pendapatan. Langkah-langkah seperti penawaran tanah dengan harga yang kompetitif kepada pemaju swasta telah membantu mengurangkan kos pembinaan, yang pada gilirannya menjadikan rumah-rumah tersebut lebih terjangkau (Lembaga Perumahan dan Pembangunan, 2021). Selain itu, penyediaan subsidi oleh kerajaan untuk golongan berpendapatan rendah turut memberi dorongan kepada pemaju swasta untuk terlibat dalam pembinaan rumah mampu milik (World Bank, 2022).

Dengan adanya kerjasama yang kukuh antara sektor swasta dan kerajaan, keperluan akan perumahan mampu milik dapat dipenuhi dengan lebih efisien dan berkesan. Ini tidak hanya memberi manfaat kepada golongan yang memerlukan tetapi juga memberi peluang kepada pemaju swasta untuk turut serta dalam membangunkan komuniti yang lebih mampan dan inklusif. Oleh itu, penting untuk terus memperkasakan kerjasama ini demi kepentingan bersama dalam pembinaan rumah mampu milik (Institut Penyelidikan Khazanah, 2019). Adaptasi teknologi pintar, kaedah pembinaan, amalan bangunan hijau yang lebih kompeten mampu milik dan rumah lestari dapat memberikan keselesaan kepada pembeli terutama golongan muda.

Kajian Kes

Terdapat beberapa kisah kejayaan individu dan keluarga muda yang berjaya memiliki rumah pertama mereka walaupun menghadapi cabaran yang besar. Sebagai contoh, seorang pasangan muda di Selangor berjaya memiliki rumah pertama mereka melalui skim PR1MA, dengan bantuan kewangan tambahan daripada keluarga dan perancangan kewangan yang teliti (Institut Penyelidikan Khazanah, 2019). Mereka mengumpul wang untuk deposit melalui simpanan bulanan dan mengurangkan perbelanjaan yang tidak perlu, membuktikan bahawa dengan disiplin kewangan, cabaran pemilikan rumah dapat diatasi (Bank Negara Malaysia, 2021).

Kisah kejayaan seperti ini menginspirasi ramai individu muda untuk merancang dengan teliti bagi tujuan memiliki rumah sendiri. Contohnya, seorang graduan baru yang bekerja keras dan menjimatkan sebahagian daripada gaji bulanannya untuk menabung bagi membeli rumah impian. Dengan tekad yang kuat dan matlamat yang jelas, beliau berjaya memiliki rumah tanpa memerlukan bantuan kewangan tambahan (Institut Penyelidikan Ekonomi Malaysia, 2020). Selain itu, terdapat juga cerita tentang seorang ibu tunggal yang bergelut dengan cabaran untuk memiliki rumah pertamanya demi keselesaan anak-anaknya. Melalui usaha yang gigih dan sokongan daripada komuniti setempat, beliau berjaya mendapatkan rumah idamannya dengan menggunakan skim pinjaman perumahan kerajaan (Kementerian Perumahan dan Kerajaan Tempatan, 2020).

Ini membuktikan bahawa dengan ketekunan dan semangat gigih, impian memiliki rumah sendiri bukanlah sesuatu yang mustahil (World Bank, 2022).

Di peringkat antarabangsa, program bantuan perumahan di negara lain seperti Singapura dan Hong Kong boleh dijadikan rujukan untuk Malaysia. Di Singapura, program Perumahan dan Pembangunan Lembaga (HDB) telah berjaya menyediakan rumah mampu milik untuk majoriti rakyat Singapura dengan subsidi yang signifikan dan pilihan skim pembiayaan yang fleksibel (Lembaga Perumahan dan Pembangunan, 2021). Contohnya, HDB telah membangunkan kawasan perumahan yang dilengkapi dengan kemudahan awam seperti taman permainan, tempat letak kereta, dan pusat membeli-belah untuk meningkatkan kualiti hidup penduduk (Ismail, 2018). Selain itu, HDB telah menyediakan geran khas perumahan bagi membeli rumah pertama sehingga SGD 40,000. Di negara Australia, pengenalan kepada skim simpanan bersama diwujudkan apabila majikan menawarkan faedah atau sumbangan kepada pekerja dalam merancang simpanan untuk menyokong pekerja memiliki rumah pertama. Malaysia boleh menjadikan negara US sebagai platform insentif kewangan dengan memperkenalkan program Cukai Kredit Perumahan Kos Rendah di mana kerajaan menawarkan cukai kredit kepada pemaju untuk membina rumah mampu milik.

Malaysia boleh mencontohi pendekatan yang dijalankan oleh negara-negara maju seperti Singapura, Australia, United States (US), dan United Kingdom (UK) dengan memperkenalkan lebih banyak skim seperti Geran Khas Perumahan (SHG), Skim Pemilik Berkongsi, Program Pentadbiran Perumahan Persekutuan (FHA) dan Model Bantuan Perumahan oleh Majikan yang menyasarkan golongan belia dan berpendapatan rendah. Sebagai contoh, Malaysia boleh memperluaskan program rumah mampu milik dan penambahbaikan dari segi polisi dan kelonggaran pinjaman bagi golongan belia yang baru memasuki pasaran pekerjaan. Selain itu, Malaysia perlu memastikan bahawa rumah yang disediakan memenuhi keperluan dan kehendak pembeli dengan menyediakan pelbagai pilihan reka bentuk dan lokasi (Khazanah Research Institute, 2019). Langkah ini penting untuk memastikan kepuasan pembeli dan mempromosikan kelestarian komuniti perumahan. Dengan mengambil contoh daripada Singapura dan Hong Kong, Malaysia boleh memperbaiki landskap perumahan negara dan menyediakan peluang yang lebih baik untuk rakyatnya (World Bank, 2022).

Analisis menunjukkan bahawa cabaran pemilikan rumah di Malaysia, khususnya bagi golongan belia B40 dan M40, melibatkan harga rumah yang melambung dan pendapatan yang tidak seimbang. Meskipun kerajaan telah memperkenalkan pelbagai skim bantuan, keberkesanannya masih diragui, terutama dalam aspek pendidikan kewangan dan akses kepada maklumat. Jurang antara pemilikan Bumiputera dan bukan Bumiputera mencetuskan ketidaksamarataan, manakala syarat kelayakan dan lokasi perumahan yang tidak strategik menambah kesulitan. Kritikan terhadap dasar sedia ada menekankan perlunya pendekatan lebih inklusif dan penyelesaian jangka

panjang yang merangkumi sokongan kewangan dan pemerkasaan pendidikan. Kejayaan model luar negara seperti Singapura juga perlu dipertimbangkan bagi meningkatkan keberkesanan program perumahan di Malaysia.

KESIMPULAN, IMPLIKASI DAN CADANGAN

Isu pemilikan rumah pertama di Malaysia adalah satu cabaran besar yang melibatkan pelbagai pihak berkepentingan, termasuk kerajaan, pemaju hartanah, institusi kewangan, dan pembeli sendiri. Walaupun banyak inisiatif telah diperkenalkan, seperti PR1MA, Rumah Selangorku, dan Skim Rumah Pertamaku, pelaksanaan dasar ini sering menghadapi masalah di lapangan. Prosedur yang rumit dan syarat kelayakan yang ketat sering menghalang golongan belia yang berpendapatan rendah daripada menikmati manfaat skim-skim ini. Selain itu, jurang antara polisi yang dirangka dengan realiti di lapangan menyebabkan harga rumah terus meningkat melebihi kemampuan majoriti pembeli belia, terutamanya di kawasan bandar.

Impak dari kegagalan menangani isu ini termasuklah peningkatan kadar hutang isi rumah, ketidakstabilan sosial, dan ketidakupayaan generasi muda untuk membina aset jangka panjang telah menghalang golongan belia ini memiliki rumah pertama. Sekiranya masalah ini berterusan, ia boleh membawa kepada penurunan kualiti hidup serta menjejaskan pertumbuhan sektor hartanah dan kestabilan pasaran perumahan di Malaysia. Oleh itu, penambahbaikan dalam skim pembiayaan adalah penting, termasuk penyediaan skim sewa beli atau pinjaman dengan syarat yang lebih longgar untuk membantu golongan belia berpendapatan rendah dan sederhana memiliki rumah.

Kerjasama antara kerajaan dan sektor swasta juga perlu diperkukuhkan untuk memastikan pembangunan rumah mampu milik yang berkualiti dapat dicapai. Pemantauan yang lebih ketat terhadap pemaju hartanah perlu dilakukan bagi mengelakkan manipulasi harga tanah dan rumah. Selain itu, pendidikan kewangan perlu dipertingkatkan bagi membantu golongan muda membuat keputusan bijak dalam pemilikan rumah. Dengan pelaksanaan strategi-strategi ini, isu pemilikan rumah pertama di Malaysia dapat ditangani dengan lebih efektif, memastikan golongan muda mampu bukan sahaja membeli, tetapi juga mengekalkan pemilikan rumah dalam jangka panjang (Institut Penyelidikan Pembangunan Belia Malaysia, 2019, 2023).

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CRITICAL E-LEARNING VALUES AND ATTRIBUTES: PERSPECTIVES FROM VOCATIONAL TEACHERS AND STUDENTS

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ABSTRACT

E-learning platforms are designed to meet user demands and enhance value, making it crucial to identify their key attributes. In vocational institutions, where teachers and students are integral co-creators of value, e-learning tools are used to enrich technical education. This study utilizes a means-end-chain approach to explore the critical attributes, values, and impacts of e-learning from the perspectives of vocational teachers and students. The study uses laddering techniques to identify the co-creation value based on the principles of Service-Dominant Logic, Means-End Chain Theory, and a list of values. A tool called APT Data Laddering Col&Cal was developed to analyze data on the laddering technique. The data is also validated with LadderUX software and subsequently used to generate a Hierarchical Value Map. The conceptual analysis results and the Hierarchical Value Map form the components of the developed model. By mapping the relationships between these attributes and the resulting values, the research identifies nine significant values: accomplishment, self-fulfillment, and a high-quality lifestyle, which stand out as the most prominent. The study also highlights that interactive elements such as games, quizzes, and videos play a significant role in facilitating value co-creation. The importance of this research lies in its ability to pinpoint how specific e-learning attributes contribute to value creation, offering valuable insights for designing e-learning models that better serve the needs of both educators and learners. Understanding these dynamics can significantly enhance how e-learning platforms are developed to effectively engage and benefit youth in vocational settings.

Keywords: Value Co-Creation, Means-End-Chain, E-learning, Vocational, Youth

INTRODUCTION

The technological world is always evolving, and the educational system also evolves with time. The use of technology in education has begun at a young age. Various approaches using technology are taken so that students and teachers can adapt and gain information and communication technology (ICT) skills (Matriano, 2023). Each educational institution must employ an online learning platform to support teaching and learning because it is crucial to modern education. If formerly e-learning utilization was not as anticipated, it now plays a crucial role in promoting and motivating education and learning among its users (Masadeh et al., 2023). The restriction on students and teachers entering educational institutions during the pandemic is necessary, significant, and important (Oliveira et al., 2021). Although teachers and students initially prefer face-to-face learning, they must find alternatives to enable continuous teaching and learning. Computer-based educational systems and e-learning services have been actively explored, created, and implemented over time to bolster and enhance teaching and learning. When creating e-learning platforms, most developers prioritize tangible resources (such as hardware and infrastructure) while paying less attention to intangible resources like the value to users and institutions (Palioura & Dimoulas, 2022). As a result, the available e-learning is not used as it should be, indicating a lack of value co-creation between users. Even though values are individual to each person and live in their cognitive space, they can nevertheless affect how a user behaves when utilizing a product or service. E-learning platforms should offer services to deliver value (Alkhaldi et al., 2024) that fulfill users' needs. Therefore, this paper aims to identify e-learning critical attributes (frequently or most used attributes) of the e-learning platform from the users' perspective among teachers and students.

Approaches based on service science emphasize value co-creation (VCC) in the design, construction, operation, use, maintenance, and disposal of service systems for the value of customers, providers, and society. Service science, however, provides a fresh viewpoint based on S-D Logic (Vargo & Lusch, 2016). VCC is essential for creating value by fusing their value with that of others and creating a new one (Zhang et al., 2019). A successful system may be achieved through user involvement in system development, and with VCC, all users are considered value creators when utilizing the system. Teachers and students can now participate in VCC's educational processes in an active learning environment to transform the conventional teacher-student models, where teachers choose the learning resources.

This study concentrated on e-learning services at vocational schools to discover crucial functional characteristics of an effective e-learning platform by comprehending the cognitive structure toward system utilization and the values generated from the views of students and teachers. The education ministry aims

to develop skilled students to satisfy the requirements of the evolving industry (Saleem et al., 2024). One way is by instilling digital usage while studying and actively participating in learning activities. Vocational institutions must adapt to the current technological environment, particularly in digital learning, to improve graduates' technical skills, prevent them from falling behind, and produce a skilled labor force. Thus, one way is to make students and teachers being active users of e-learning.

The pandemic proved that online learning is essential (Asfour & Alkharoubi, 2023). Thus, this paper aims to determine the critical attributes of e-learning from the users' perspective among teachers and students. The Means-End Chain (MEC) theory and the association pattern technique (APT) are used to allow e-learning attributes to connect to various values, such as ease of communication, enjoyment, and values that cognitively bind the respondent. E-learning with personal values will enable system developers to effectively design the platform and motivate usage or long-term use from users.

LITERATURE REVIEW

E-learning is made possible by the use of information and communication technologies, such as the Internet and intranet, which support and enable teaching and learning. (Mncube et al., 2024). E-learning is delivered via web-based or mobile-based and has become common in education. Numerous platforms can be used, including learning management systems (LMS), virtual learning environments (VLEs), and massive open online courses (MOOCs) (Avilés et al., 2023). The development of technology has made it possible for teachers and students to interact and collaborate in dynamic ways through collaborative and virtual learning environments. A successful e-learning system ought to offer a platform that permits effective communication between teachers and students, as well as between students or teachers themselves. Previous e-learning providers put too much emphasis on creating dynamic content and user-friendly platforms at the expense of more practical aspects like infrastructure and equipment. According to Sun et al. (2009), there are three main approaches described in previous studies to analyze functional requirements of e-learning: (i) analyze traditional systems and design methodologies, (ii) use pedagogy as the basis of needs, and (iii) use a problem-oriented approach to identify needs. However, the needs, expectations, and factors influencing users' participation in online learning must be examined (Wook et al., 2015).

A multidisciplinary effort called "service science" aims to comprehend how service systems interact and provide shared value (Spohrer et al., 2008). Value can only be created by teamwork and collaboration between the parties involved, such as between service providers and customers. VCC exists while a good or service is being used and meets user needs. This is supported by the progression role of the users from being passive to co-creators of value (Muriati, et al. 2012). The stakeholders and users involved in VCC are known as actors. The vocational teachers and students are the sample to explore how these actors

translate the attributes of their preferred e-learning attributes into meaningful consequences and values.

Values are the principles or criteria of an individual's conduct that direct and influence how customers make decisions (Bhuasiri et al., 2012). Every person has values, which can affect attitudes toward other people and guide a person's decisions. Without the user experience component, the assessment of a product is based solely on technical factors or outside influences (Mohamed Nazul et al., 2013). In order to enable the events to be handled jointly and produce a new value, the notion of VCC is employed to build interaction between the supplier (teacher) and the users (students) (Elias et al., 2021). According to Uribe-Rios et al. (2018), real-world experiences, conversations with subject matter experts, and discussions during the co-creation process can all inspire students to study. Students can feel value through co-creation, mainly when their opinions are valued. A study by Thangaiah et al. (2020) identified the need for co-creation in the e-learning environment or vocational institute.

Several classification systems have been proposed and applied to express users' values, such as the Rokeach Value System, List of Values (LOV), Schwartz's classification system, and values and lifestyles (VALS). Most studies use any value system, while some did not apply any particular value system in their research (Qi et al., 2021). Studies focused on online behavior and have been used to study internet-related user values applied to LOV (Cheng et al., 2018). Therefore, LOV would be used as the central value to identify the e-learning value of the study and supported by other specific values such as responsibility, quality of life, help, power, and culture from the Schwartz classification system and previous MEC studies to enrich the value list.

MEC theory is a popular theory for identifying the innermost thinking toward a product/service in customer cognitive structure (Lin et al., 2022). Scholars have used MEC theory to understand how people perceive value (Phillips & Reynolds, 2009) by choosing a product or service based on attributes. Platform attributes (A) are means, via consequences (C) upon product/service usage, to reach users' anticipated ends, referring to values (V). Attribute helps the user to fulfill the valued desires through consequences/values. Attributes refer to concrete features such as physical or technical (e.g., widget and video) or abstract features such as intangible characteristics (e.g., safety and quality). Consequences can be categorized into functional consequences (FC) and psychosocial consequences (PC). FC refers to concrete values of service usage, and PC refers to subjectivity, such as feelings. Values are closely associated with attitudes, personality, and needs but are conceptually different (Park et al., 2019). Thus, by MEC, every product/service leads to consequences and values. We integrate MEC and co-creation to explore the critical values provided by the e-learning platform from the students’ and teachers’ perspectives.

According to Gutman (1982), laddering is the most commonly used technique in MEC theory, and there are two: soft laddering and hard laddering.

Soft laddering is a qualitative technique that involves individual, face-to-face, semi-structured interviews. Hard laddering is a quantitative technique that uses questionnaires and larger samples between the two. More researchers used soft laddering between both and hard laddering (Borgardt, 2020). Still, soft laddering is projected as time-consuming to collect and analyse data, expensive, and requires experienced interviewers (Trang, 2022). However, the hard laddering technique is used in the study to collect responses from teachers and students. This is because hard laddering provides an easy option for respondents who want to explain their experiences in a simple way (Kim & Kim 2019). Thus, hard laddering makes it simple to gain the value that encourages people to use e-learning.

This study collected favorable attributes, consequences, and values from vocational students and teachers using one of the hard laddering techniques known as the Association pattern technique (APT) outlined by Reynolds and Gutman (2001) and Ter Hofstede et al. (1998). APT has been widely used in marketing research (Sorakunnas et al., 2023), requiring respondents to select the attributes they often use and need to have on e-learning platforms based on experience. Thus, the APT is used for data collection and presented in matrix form called Summary Implication Matrix (SIM). There are three primary SIM tables given to actors: A→FC, FC→PC, and PC→V.

A pilot test is conducted to finalize the constructs and attributes collected from literature papers and interviews. The pilot study, conducted in a computer lab and lasting an hour, involved six teachers and 19 students in total. The respondents were instructed to construct 27 ladders, each with four layers: attributes (A) → functional response (FC) → psychological response (PC) → value (V). 25 respondents constructed a total of 655 stairs. It was discovered through observation that there are a significant number of laddering items and a need to provide a guide with illustrations to assist respondents in answering the questions.

Consequently, the results of the pilot test yield ladder data that requires improvement to facilitate the ladder computation. Then, a two-dimensional table is constructed to generate six tables: A→FC, A→PC, A→V, FC→PC, FC→V, and PC→V. These tables match the elements on the laddering. Using the outcomes of the six tables, an implication matrix is constructed. Therefore, based on the findings, the researcher handled some modifications to the items, wording, explanation, and the APT tool. Table 1 shows the final list of constructs and attributes. In the end, a matrix form of A→FC→PC→V associations (also termed Implication Matrix) reveals the dominant links in a Hierarchical Value Matrix (HVM).

Table 1: Items for each construct

Constructs	Items
Attributes	Forums, Design & layout, Widgets & apps, E-portfolio, Animated content, Rewards, Help & Support, Video, Digitalized library,

	Announcement, Games & quiz, Bilingual, Colour & graphic, Live to learn, System quality, Information quality, Service quality, Data safety, Simulation exercise, Sharing repository, Personalized interface, Expert support, Evaluation, Question bank, Course management
Functional consequences	Ease communication, Encourage sharing, Simplify the task, Ease learning, Fortify knowledge comprehension, Ensures learning equality, Facilitate access to information, Easy referencing, Control learning, Learn at your own pace, Gives popularity and prestige, Increase competitiveness, Gain new skills, Increase productivity, Learn new technology
Psychosocial consequences	Feel proud, Positive thinking style, E///njoy using the platform, Attracted to trying new technology, Highlight experience and knowledge, Carry out duties, Involved in learning, Learn to share ideas, Motivated to learn, Grateful for the opportunity, Elevate the level of thinking, Get new perception, Feel respected and appreciated, Feel comfortable, Gain new experience
Values	Excitement, Fun and enjoyment of life, Sense of belonging, Self-respect, Sense of accomplishment, Being well respected, A warm relationship with others, Security, Self-fulfilment, Responsible, Self-discipline, Helpful, Power, Culture, Practical, Quality lifestyle

RESEARCH METHODOLOGY

Online data collection was used to administer the laddering task. Snowball sampling was used by their teachers to identify students with e-learning platform experiences. They were briefed on the research aim and procedures in advance using social media such as WhatsApp and Telegram. Once an agreement was reached, the respondent was given the link to Google Forms to collect their demographic information. Next, based on the email contained in Google Forms, each respondent was given the link to the laddering tool of Google Sheets. Respondents completed the laddering by clicking on the check box provided according to its instructions. Respondents were given a list of items from MEC constructs, as shown in Table 1. Respondents were required to click three important attributes and click the following sheets to determine the functional consequences of why each attribute is critical. Next, they will click on three psychological consequences for the attribute and the value. The process was repeated for the second and third attributes. Respondents are assisted by manuals of laddering, and the researcher if they need additional help. Once the laddering process is completed, respondents can view the summary of completed ladders. The Google Sheets tab is viewable; thus, the respondent can view the number of sheets to answer and anticipate the timing, and avoid vagueness. As a result, one respondent can build 27 ladders. The study was conducted with two hundred and fifty-one (251) respondents. Two hundred and one (201) surveys were accepted after the pre-processing process. The information of respondents is summarized in Table 2.

It was generally observed that more female students participated than male students, and likewise for teachers. More students under 18-19 years old (64.9%) participated in the age category. Meanwhile, respondents from each region were within the range of 25 - 30 students and 12-15 teachers. It shows that respondents are collected equally and not overpowered by one. In terms of frequency of e-learning usage (weekly), daily (62.5%) is the highest compared to other options for students, whereas else for teachers, 2-3 times weekly (54%). Students have online classes daily, and teachers only handle specific courses weekly. Teachers and students used e-learning more at home than in the institute. Regarding preference for handling teaching and learning, most teachers choose e-learning platforms (52%), but some prefer social media such as WhatsApp and Telegram to reach the students.

Table 2: Demographic profile of respondents (n = 201)

Item	Student		Teacher	
	Frequency	(%)	Frequency	(%)
Gender:				
Male	69	45.7	16	32.0
Female	82	54.3	34	68.0
Age (years old):				
16-17	53	35.1	-	-
18-19	98	64.9	-	-
Teaching experience (teacher):				
<6 years	-	-	14	28.0
6-10 years	-	-	7	14.0
11-15 years	-	-	12	24.0
16-20 years	-	-	15	30.0
>20 years	-	-	2	4.0
Region:				
North	38	25.2	15	30.0
Middle	40	26.5	13	26.0
South	40	26.5	10	20.0
East	33	21.9	12	24.0
Current e-learning platform used:				
Google Classroom	151	98.1	48	75.5
VLE Frog	2	1.3	7	10.9
MOOC	0	0.0	0	0.0
Khan’s academy	1	0.6	2	3.1
Others	0	0.0	7	10.9
Frequency of using e-learning platforms in a week:				
None	0	0.0	0	0.0
Once	0	0.0	1	2.0
2-3 times weekly	2	1.9	27	54.0
4-6 times weekly	37	35.6	16	32.0
Daily	65	62.5	6	12.0
Preference for handling teaching and learning:				
E-learning platform	-	-	26	52.0

Social media	-	-	11	22.0
E-learning platform and social media	-	-	13	26.0
E-learning is mainly used at:				
Home/hostel	111	73.5	31	62.0
Learning Institute/Workplace	2	1.3	4	8.0
Both	38	25.2	15	30.0

RESEARCH FINDINGS

Data analysis discusses the quantitative APT analysis results from the data collection procedure. The laddering format consists of A → FC → PC → V and supports the e-learning platform requirement features. A SIM displays the frequency of each construct category leading to another in the same row for three implication matrices of A – FC, FC – PC, and PC – V. LadderUX, a computer-assisted software (Borgardt, 2020), and Microsoft Excel were used to analyze data. The finalized ladder was determined by the cut-off value, abstraction, and centralization indexes. Both software calculated the three indexes, produced similar results, and validated them.

The top-down technique determines the PC → V ladders that exceed the determining cut-off value. First, the cut-off index determines the stability for the ladder under the cut-off index to be eliminated, thereby making the HVM more representative (Gengler & Reynolds, 1995). Next, the path from the attribute that produces the ladder is specified. According to Gengler and Reynolds (1995) and Lin and Tu (2012), a cut-off index value of 5% of the total respondents is applied in this research. Thus, 5% of 151 students would be eight, and 50 teachers are 3 were used as the benchmark for this study.

The SIM was analyzed to find the ladders that pass the cut-off index. The cut-off index determination is critical if the value is too small, and most ladders would be accepted, whereas if the cut-off is too big, some critical ladders will be missed. The second index is abstractness, which identifies each attribute's hierarchical position in the HVM by calculating the ratio of in-degrees over the sum of in-degrees and out-degrees (Tey et al., 2017). Attributes with high abstractness values are classified as ends, while attributes with low abstractness are means (Xiao et al., 2017). With hard laddering, all attributes produce an abstraction value of 0 since all attributes have no in-degree value ratio. Whereas for all the functional consequences attributes, the values are 0.333. The psychosocial consequences are 0.667, and the values are 1. As the abstractness value for the attribute construct is 0, all the attributes are positioned at the bottom of the HVM diagram, followed by functional consequences, psychological consequences, and value attributes on the top. Thus, it validated the relationship described earlier as A → FC → PC → V. Besides that, hard laddering only has a direct connection compared to soft laddering, which has a direct and indirect relationship. Next, the third index in designing HVM is the centrality value. Centrality determines the importance of each attribute in HVM by calculating the

ratio of the sum of the construct's column and row totals in the SIM over the sum of all cell entries in the SIM (Kaciak et al., 2015). A higher centrality value means the particular attribute is dominant in the linkages with other factors, either as a source or destination (Pieters et al., 1995).

As a result, nineteen (19) ladders are chosen for students, compromising twelve (12) attributes, eight (8) functional consequences, eight (8) psychosocial consequences, and eight (8) values. Meanwhile, for teachers, fifteen (15) ladders compromising ten (10) attributes, eight (8) functional consequences, eight (8) psychological consequences, and eight (8) values were selected. The MEC theory with SIM and HVM allows us to understand better how students and teachers attain their respective values in using e-learning. The result and discussion section focus on values that lead respondents to the critical attribute of e-learning based on the cut-off index and higher centrality index from the list. All three index values are used to develop the HVM diagram, as shown in Diagram 1 and Diagram 2. The lines connecting each attribute show the relationship, and the thickness indicates the strength. The thicker lines mean more relationships were built between the items. Diagram 1 shows the HVM diagram for the students, and Diagram 2 shows the HVM diagram for teachers. The diagram is color-coded with different shapes to show different types of constructs.

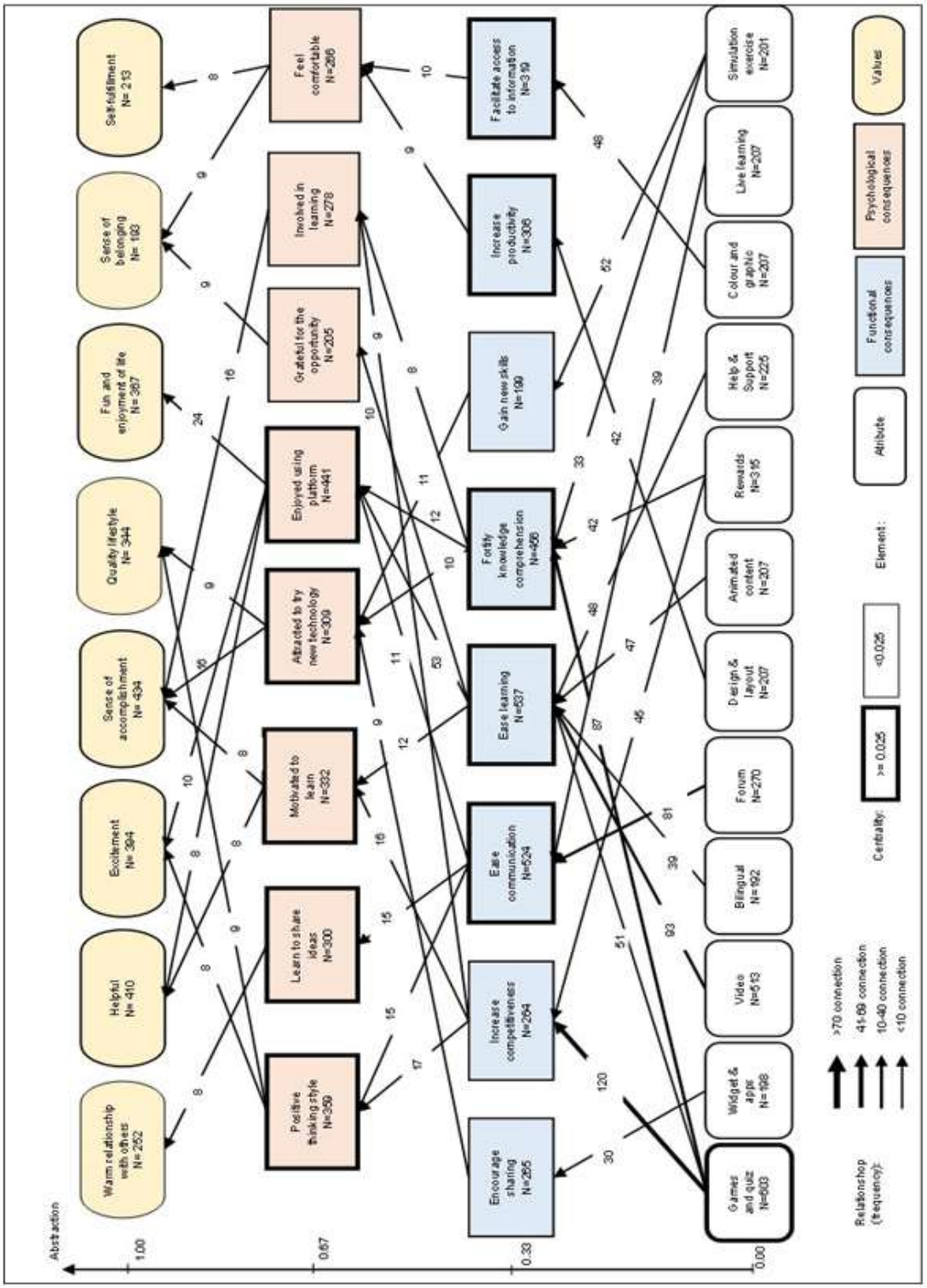
Abstraction
1.00
0.67
0.33
0.00
Warm relationship with others N=252
Helpful N= 410
Excitement N= 394
Sense of accomplishment N= 434
Quality lifestyle N= 344
Fun and enjoyment of life N= 367
Sense of belonging N= 183
Self-fulfillment N= 213
Positive thinking style N=359
Learn to share ideas N=300
Motivated to learn N=332
Attracted to try new technology N=309
Enjoyed using platform N=441
Grateful for the opportunity N=205
Involved in learning N=278
Feel comfortable N=266
Encourage sharing N=295
Increase competitiveness N=294
Ease communication N=524
Ease learning N=537
Fortify knowledge comprehension N=406
Gain new skills N=199
Increase productivity N=308
Facilitate access to information N=319
Games and quiz N=603
Widget & apps N=198
Video N=513
Bilingual N=192
Forum N=270
Design & layout N=207
Animated content N=207
Rewards N=315
Help & Support N=225
Colour and graphic N=207
Live learning N=207
Simulation exercise N=201
Relationship (frequency):
>70 connection
41-69 connection
10-40 connection
<10 connection
Centrality:
>= 0.025
<0.025
Element :
Attribute
Functional consequences
Psychological consequences
Values

Diagram 1: HVM diagram for students

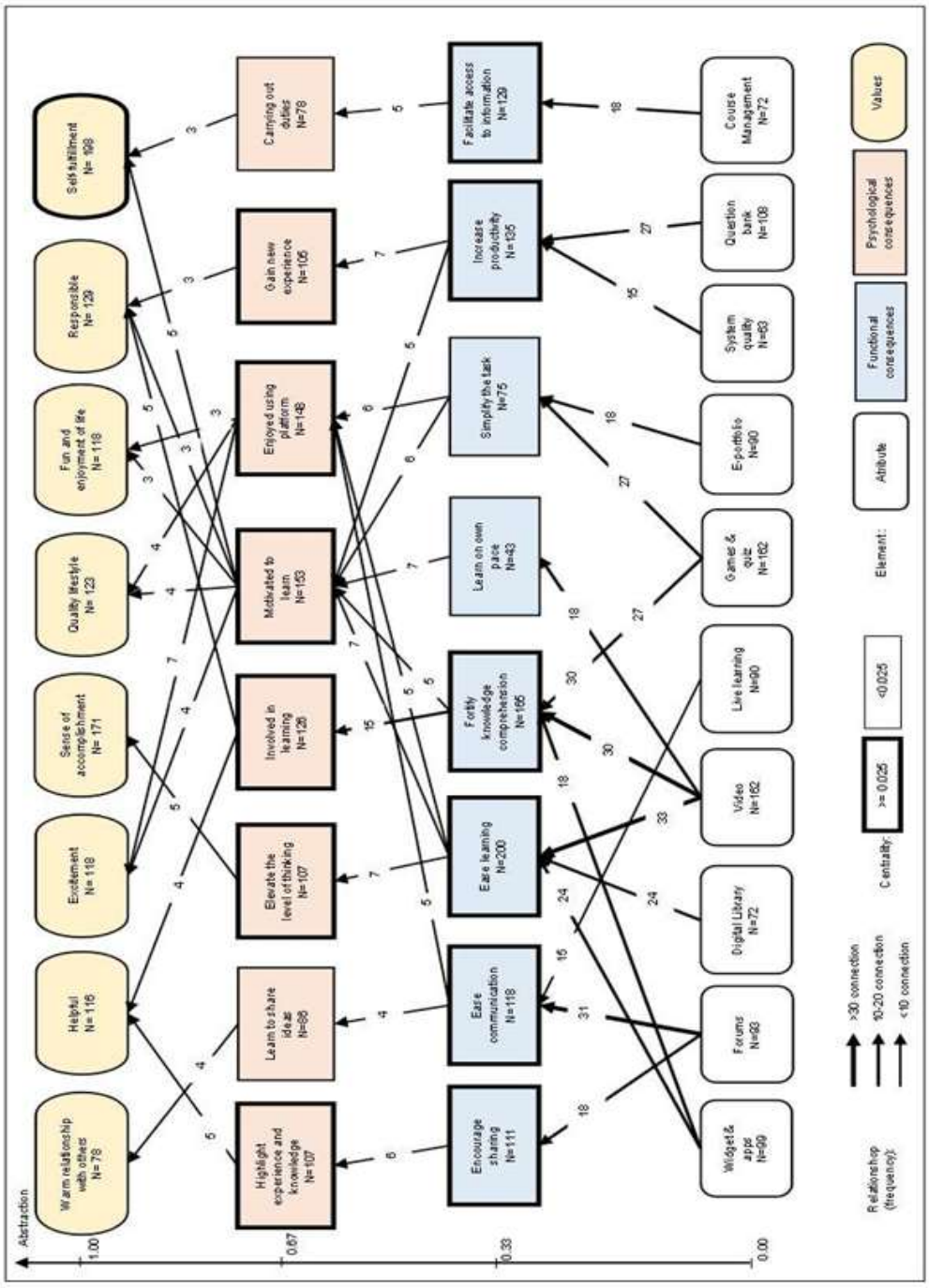

Diagram 2: HVM diagram for teachers

DISCUSSION

In this section, nine values identified from the laddering technique are presented and discussed. At the value creation level, value is created in the space of students and teachers during the use of e-learning platforms in response to the value sources proposed on the platform. Thus, the attributes that link to the values are discussed for each value type. The findings help to understand the underlying influence of these values on teachers and students using the attributes of the e-learning platform.

Sense of Accomplishment

The value of a sense of accomplishment is when a person feels like achieving something significant, such as the intrinsic rewards received from a task performed (Huang & Chen, 2018). According to Lee et al. (2014), success shows competence according to a set by having ambition, influence, capability, success, intelligence, or self-esteem characteristics. A person who has a sense of achievement can complete and perform better than others in performing a task (Xuebing et al., 2023). Based on the centrality index, the sense of accomplishment was the highest value in the students' choice, while the second-highest value was in the teacher. The study found that students and teachers emphasized the attributes of widgets and apps for a sense of accomplishment value. Widgets and apps help students and teachers value their self-esteem in the teaching and learning process. For example, Kahoot!, Quizizz, and YouTube are options for teaching and learning. This attribute was also expressed during the pilot study by the respondents. Students love to explore and try new things with various widgets and digital apps offered on multiple social media platforms. In addition, students choose widgets and app attributes because it allows them to learn new technologies. Widgets and apps are attributes of e-learning that engage users and help their users (Chew et al., 2017). Teachers use the platform actively during pandemics, and they engage students with a variety of widgets and apps to provide fun learning. However, too many widgets and graphics options may alienate users (Harrati et al., 2016).

In addition, students felt that reward attributes, games and quizzes, and simulation exercises also drove those values. Undoubtedly, the competition encourages competition among users, and if there is a reward, it will be more attractive to them (Ningtyas & Atmaja 2024). A reward is a form of intrinsic or extrinsic motivation that attracts students to use e-learning platforms. Students are tempted to use the platform if there is a reward in prizes or points given if performing a task or achieving a target. Digital game-based learning also brings a sense of achievement to students, thus helping them improve their learning outcomes and motivating them to think (Lin & Lin, 2014). In the context of this research, the value of the sense of achievement is driven by competitiveness and reinforces understanding. In addition, various widgets and applications help teachers work on digital platforms. When users are interested in trying new technologies, their level of thinking also changes. With this, in particular, students are more involved with learning and motivated to use the platform.

Excitement

The second most influential value in determining critical attributes is the value of excitement. The value of excitement occurs when a person has feelings of contentment, fun, and comfort in every aspect of life and a precise sense of satisfaction encompassing mental health (Huang & Chen, 2018). A feeling of joy gives a high sense of enthusiasm and interest in completing a job efficiently (Chiu, 2005). The study found that students and teachers emphasized forum attributes for the value of excitement. Nowadays, forum attributes are critical on any social media, and one is given space to express opinions or perceptions. Platforms that enable interaction can engage users (Ramaswamy & Ozcan, 2018). Since vocational colleges are available in every state in Malaysia, an excellent platform to gather everyone will value the institution and its citizens. Games in education can increase the value of teaching procedures in institutions, provide fun, happiness, and intention to learn something in games and improve learning performance (Kitsawad & Guinard, 2014). In addition, students gain excitement values from games and quizzes (Makhdum et al., 2023). Therefore, teachers need to adapt the learning environment with more competitions or contests to motivate students (Tey et al., 2017). Undoubtedly, most students are now more interested in games and quiz apps on any platform. With digital game-based learning, games and quizzes should be focused on e-learning platforms. It can attract the interest of users. Besides, teachers get excitement through the "System quality" attribute. System quality encompasses functional design, response time, safety, and efficiency (Xiao et al., 2017). When a platform provides the value of excitement, it indirectly simplifies the communication process, facilitates learning, and increases productivity. This made users have fun and motivated to use the platform and build a more positive thinking style. Thus, it is essential to apply the value of co-creation through excitement to attributes of e-learning.

Self-fulfillment

The value of self-fulfillment is when self-potential can be achieved, have high self-esteem, and achieve goals (Kapuściński et al. 2023). The laddering technique found that the design and layout attributed to the students, the games and quizzes, and the course management to the teachers gave value to self-fulfillment. Teachers believe that rich content and simple management course management can enhance knowledge understanding and facilitate learning exchanges and interactions. The study recommends that developers prioritize these attributes and increase functionality through course management attributes, such as popular courses that allow students to access the list of major/new courses available on the platform. A teacher often teaches more than one subject or more. An organized organization that can differentiate classes or subjects is essential to use the platform and carry out responsibilities efficiently. Such a function allows students to access the courses they want quickly and ultimately achieve the value of self-fulfillment by achieving goals. Thus, achievements encourage users to use the system. Awareness of platform design must include attributes that engage students to sustain learning and increase learning motivation. The design and layout attribute is the students' choice

because they believe that a platform with a design that meets their preferences increases productivity and simplifies tasks. For example, well-designed online discussions can increase user engagement and interaction (Zheng & Warschauer, 2015). Self-fulfillment makes a person feel like one's potential is achieved, which is conceptualized as high self-esteem and achieving goals (Huang & Chen, 2018). In addition, the value of self-fulfillment was also performed in a previous study by (Chiu, 2005) involving users' understanding of web-based document management systems and a survey of digital educational game development in research and development of innovative products and marketing strategies by (Lin & Lin, 2014). In addition, the value of self-fulfilment also influences users in generating co-creation value on pages such as Facebook (Huang & Chen, 2018). Therefore, system developers should focus on self-fulfillment because this value can attract users to use e-learning.

Helpfulness

Helpfulness is one of the values used by Schwartz to maintain and improve the well-being of people in frequent contact with someone (Kitsawad & Guinard, 2014; Xuebing et al., 2023). Preserving and enhancing the well-being of those in regular contact with someone (Lee & Kim, 2018) in e-learning is of value when one thinks e-learning content forms a helpful attitude and is willing to share information with other stakeholders in e-learning. The laddering technique found both teachers and students found video lead to helpful value. Video is an essential attribute of learning among vocational students because it involves valuable learning materials. Only through reading are learning objectives challenging to convey. Video is beneficial in vocational learning because physical concepts can be explained with text, equations, diagrams, and animations and show real-world applications. In face-to-face education, the teacher can demonstrate directly to the students, but through e-learning, the most appropriate technique is video. This also allows users, especially students, to watch the video repeatedly if they do not understand. Many students are also actively taking videos, so the intention to help can be applied through video. In addition, students felt that help and support were necessary if they encountered technical problems or problems using the platform. The value of helping was also an option in studies that analyzed the critical attributes of e-learning from the point of view of educators (Sun et al., 2009) and the nature of service quality in higher education that students expect from their lecturers (Voss et al., 2007). Teachers also choose forums to help other friends and students convey opinions or share additional material. (Nawrot & Doucet, 2014) stated that the MOOC platform, one of the e-learning platforms, offers high-quality learning materials for their students and further supports and assists students in their quest for knowledge. Thus, it affirms that helpful value is critical on an e-learning platform, and attributes such as forums can help convey information to individuals or a group of users.

Fun and Enjoyment of Life

The value of fun and enjoyment of life is also a choice of both students and teachers. This value refers to when a person feels a high sense of excitement, enthusiasm, and interest. According to (Ercis et al., 2006), this value is more prevalent among young people, and in this study, more ladders were built with

students than teachers. Students create ladders leading to this value through animated content attributes, videos, games, and quizzes while through widgets and apps for teachers. The video attribute is becoming the choice of many because the subjects in many vocational colleges involve vocational subjects. Video attributes can assist students in learning through visuals and help enrich their understanding. A more effective presentation is through videos where students can see how a skill task is carried out. Students can also watch the video more than once. In addition, the vocational syllabus is more developed in terms of technology and direct materials. However, today's video is linear, and the viewing is passive. Thus, adding interactive attributes such as quizzes in the video can attract students' interest (Makhdum et al., 2023). Meanwhile, there is no denying that animated content can attract users' attention, especially students. However, there is a need for moderation to avoid making the system feel crowded and not providing value that encourages students to use e-learning platforms. From teachers' point of view, there is no doubt that widgets and apps help teachers provide learning and teaching materials in various methods. This technique indirectly helps the teacher and attracts the interest of the students. Both students and teachers feel comfortable using the platform and providing values, including increased fun and enjoyment of life. While attributes such as widgets and apps lead to the value of fun and enjoyment of life, they indirectly build interest, strengthen resilience, and motivate to use the platform. The value of fun and enjoyment of life has also been another previous study related to users on social media, Facebook (Huang & Chen, 2018), and the MOCC digital platform. The research suggests that system developers prioritize the value of fun and enjoyment of life and create learning venues.

Quality Lifestyle

Quality lifestyle values refer to values taken into account to improve the quality of learning and teaching methods, upgrade the quality of life (Xiao et al., 2017), and provide long-term satisfaction (Kim et al., 2016). For teachers, the value starts from the e-portfolio and digital library attributes; meanwhile, simulation exercises, games and quizzes, and live learning for students. In vocational colleges, all student work is collected in file form from the beginning of the study to the end. An e-portfolio is a collection of student work that shows students' efforts, progress, and achievements throughout their studies. The response that made them choose the attribute was that it simplifies the job and is fun to use the platform. The e-portfolio attribute is critical to the teacher because the student's work can be filed paperless. Besides, the value of a quality lifestyle can improve the quality of learning and teaching methods. Digital libraries are a requirement in learning institutes to obtain accreditation from the Malaysia Qualification Agency (MQA) for courses conducted at institutes. Students have been given digital library links on other platforms, so teachers feel this attribute is necessary to provide quality lifestyle value. The other attribute of a quality lifestyle is live streaming. Live streaming enables one to see other users online and connect and renew the learning experience. Now, various live streaming resources can be accessed and used for teaching and learning, such as Zoom, Microsoft platform, WebEx Blackboard, and Google Classroom, which are helpful for teaching and learning and providing quality learning. With the pandemic, the

most prominent issue for teachers and students is doing practicals. Simulation exercises on the platform enable students to do activities and gain helpful experience. In addition, simulation training can strengthen the understanding of the subjects. Simulation exercises can provide initial exposure to students before performing practicals on real devices or machines. Indirectly gives a sense of achievement to students for completing assignments (Xuebing et al. 2023). This paves the way for everyone to try new technologies and adapt to new ways of learning by having a better quality of life and improving their quality of life (Xiao et al., 2017). Several respondents stated that software such as simulation training and packet tracers helped them test their knowledge and prepare them for the final practical assessment. Therefore, this value should be offered to users to be actively involved on the platform.

A Warm Relationship with Others

A warm relationship with others is one of the values in LOV that defines value when a person experiences good and friendly friendships, gives strength and positive impact, and forms close and meaningful relationships (Huang & Chen, 2018). Students and teachers point out that forums and live learning are critical attributes related to the value of warm relationships with others when using e-learning. Teachers select live learning attributes, while students select forums. Although students and teachers choose different attributes, both attributes provide space that gathers many users at a time. The live learning attribute enables real-time communication that allows users to immediately ask questions when they discover content they lack or do not understand. The uniqueness of both attributes is the ease of peer-to-peer help and settlement among students. This value was also achieved in a study related to young people's perceptions of social networking sites (Lin et al., 2020) and video sharing on websites (Lin & Fu, 2018). Thus, the value of good relationships with others proved to be especially important for students. Thus, this enables students to experience the importance of good relationships with others and builds the value of co-creation with the teacher. Additionally, the application of these values to the platform can be widely used to express the cognitive structure of the user during use.

Sense of Belonging

Students point out that bilingual attributes, color, and graphics, are critical attributes related to the value of a sense of belonging when deciding on e-learning. A sense of belonging is defined as the value when a person feels they are becoming placed and accepted (Huang & Chen, 2018). The bilingual attribute became students' choice because some students stated they felt closer when using the platform provided by using a more familiar language. Students also feel grateful for the opportunities available to do learning activities and think that the learning platform is not unfamiliar. This gives them confidence in the learning platform and a sense of belonging and forms their own learning space (Xuebing et al., 2023). Most of the existing platforms are based on English only, and many students in Malaysia are still not proficient in English (Renganathan, 2021). Among other reasons students choose bilingualism is that the attribute can facilitate access to information. A learning medium that can provide equal opportunities to all students is essential to receive the data presented. If the

mentioned attribute is available on the platform, users will feel a sense of belonging, fun, and commitment (Zhou et al., 2019). Thus, although not dominantly, co-creation values in a dominant sense of belonging and joy result from bilingual attributes. Meanwhile, color and graphic attributes facilitate access to information and provide a sense of comfort. E-learning would be boring if the color and visual attributes are not applied or ignored because they can influence students' feelings where each color has its meaning and role (Maizatul Aminah Ibrahim et al. 2013). The value of a sense of belonging motivates users who use e-learning who not only seek information or knowledge to solve specific problems (Aprilianti et al. 2022); they also participate in the community to meet others, gain support, and stay in touch with friends (Chou et al., 2016). The learning platform should prioritize creating a sense of belonging for students, encouraging them to utilize it willingly and complete their tasks for the institution with dedication and loyalty.

Responsible

Although in the model, the value of responsibility is shown by the teacher only, the value did present in the student but did not build a strong ladder. Teachers choose responsible values through video and game attributes and quizzes. The presentation of learning materials in the video is beneficial for teachers and students. They can learn at their own pace. Since the pandemic, many educators are starting to build their YouTube channels and share videos. The second attribute that the teacher chooses is games and quizzes. Teachers argue that the variety of applications available helps a lot in the teaching and learning process. Games, in particular, strengthen students' understanding and engagement with learning. The question bank also contributes towards responsible value. Sharing question banks can increase teacher productivity and provide new experiences. One of the duties of a teacher is to prepare questions and manage examinations for the subjects taught. Thus, having a question bank can help the teacher in their task. Although MEC-related studies with education or digital platforms have no responsibility, such value is achieved through MEC studies with food hazards (Bieberstein & Roosen, 2015) and healthy beverages (Lee et al., 2014). Students need to have responsible values. Thus, system developers and teachers should create a value of responsibility on the platform via particular attribute usage without coercion.

CONCLUSION

Vocational schools' teaching is more practical training, which cooperates with hands-on assessments. This paper aimed to detect vocational teachers’ and students’ drivers using e-learning platforms. The APT technique has been applied to identify the values that drive users to specific attributes that value them. A total of nine values are identified with eighteen attributes. Sense of accomplishment, excitement, fun, and enjoyment of life are the most sought values among teachers and students in e-learning. The attributes that were valued were games and quizzes, videos, forums, and widgets with the application. Meanwhile, attributes such as the digitalized library, e-portfolio,

system quality, question bank, and course management value the vocational institutes as a whole. In addition, attributes such as simulation exercises and live learning are unique compared to regular schools, which helps attract vocational students and institutes.

According to Kovanovića et al. (2019), most students do not use the available tools for e-learning appropriately, indicating a lack of metacognitive capacity, skills, and motivation to the provided technology effectively. Thus, the identification of VCC can guide stakeholders to focus on improving critical features of an attribute instead. The VCC attribute can influence users' behavior in continuing to use the e-learning platform. This paper successfully identified the values of e-learning for teachers and students and what attributes are essential to them. Therefore, when software developers design e-learning platforms and services, they can emphasize physiological functions and apply them. The study has some limitations. First, because our participants relied on the list given by the researcher, there is a chance that some important things will be missed. Besides, since the laddering technique differs from the commonly used questionnaire, the researcher must present to collect quality data during the data collection process. Hence, we recommend analyzing the features of more detailed attributes for the laddering items. Future studies may explore particular attributes such as games and quizzes with videos with more specific attributes to lead the users.

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PEMBANGUNAN DAN MAKLUM BALAS BELIA TERHADAP APLIKASI MUDAH ALIH UNTUK KESEDARAN DAN PENCEGAHAN LEPTOSPIROSIS

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ABSTRAK

Leptospirosis merupakan penyakit zoonosis yang disebabkan oleh bakteria Leptospira, namun penyakit ini masih kurang disedari oleh masyarakat. Oleh itu, kajian ini bertujuan membangunkan aplikasi mudah alih e-Leptospirosis sebagai platform pendidikan kesihatan untuk meningkatkan pengetahuan tentang penyakit ini. Metodologi Agile digunakan dalam pembangunan aplikasi ini, yang melibatkan fasa perancangan, analisis, reka bentuk, pembangunan, dan pengujian untuk memastikan fleksibiliti dan penambahbaikan berterusan. Aplikasi ini mengandungi maklumat mengenai Leptospirosis, termasuk simptom, pencegahan, dan rawatan, serta kuiz interaktif untuk menguji pemahaman pengguna. Ujian kebolehgunaan yang melibatkan 37 pengguna belia menunjukkan aplikasi ini mudah digunakan, dengan min kebolehgunaan 4.74, kemudahan penggunaan 4.85, reka bentuk 4.57, dan kepuasan pengguna 4.27. Kesimpulannya, e-Leptospirosis berpotensi menjadi alat yang efektif dalam meningkatkan kesedaran tentang Leptospirosis, dengan penambahbaikan seperti penambahan pilihan dwibahasa dan servis pelanggan dapat meningkatkan lagi keberkesanan aplikasi ini di masa hadapan. Implikasi kajian ini adalah aplikasi e-Leptospirosis dapat menyokong usaha kesihatan awam dalam mengurangkan risiko penularan dan komplikasi penyakit melalui pengesanan awal dan penyebaran maklumat yang tepat. Aplikasi ini juga dapat menjadi alat pelengkap dalam program kesedaran kesihatan oleh pihak berkuasa, dengan mempromosikan penglibatan komuniti dan kolaborasi yang lebih baik antara masyarakat dan agensi kesihatan untuk menangani penyakit zoonosis secara menyeluruh.

Kata Kunci: Aplikasi Mudah Alih, Leptospirosis, e-Pendidikan, Pendidikan Kesihatan, Metodologi Agile

ABSTRACT

Leptospirosis is a zoonotic disease caused by the Leptospira bacteria, which remains under-recognized by the public. Therefore, this study aims to develop the e-Leptospirosis mobile application as a health education platform to enhance knowledge about the disease. The Agile methodology was employed in the development of this application, involving phases of planning, analysis, design, development, and testing to ensure flexibility and continuous improvement. The application provides information about Leptospirosis, including symptoms, prevention, and treatment, as well as interactive quizzes to test user understanding. Usability testing involving 37 users indicated that the application is easy to use, with a mean usability score of 4.74, ease of use score of 4.85, design score of 4.57, and user satisfaction score of 4.27. In conclusion, e-Leptospirosis has the potential to be an effective tool in raising awareness about Leptospirosis, with future improvements such as adding bilingual options and customer service features to further enhance its effectiveness. The implication of this study is that the e-Leptospirosis application can support public health efforts in reducing the risk of disease transmission and complications through early detection and accurate information dissemination. The application can also serve as a complementary tool in health awareness programs by authorities, promoting community engagement and better collaboration between the public and health agencies to comprehensively address zoonotic diseases.

Keywords: Mobile Application, Leptospirosis, e-Education, Health Education, Agile Methodology

PENGENALAN

Dalam era digital yang semakin maju dan pesat berkembang ini, penggunaan infografik telah menjadi salah satu medium yang paling efektif untuk menyampaikan maklumat secara jelas dan ringkas. Dengan perkembangan teknologi maklumat, cara penyampaian data dan maklumat turut berubah, dan infografik menjadi pilihan utama kerana kemampuan untuk menyajikan informasi dalam bentuk visual yang menarik serta mudah difahami. Hal ini disebabkan oleh kecenderungan manusia untuk memproses maklumat visual dengan lebih cepat berbanding teks. Menurut Sharudin et al. (2020), infografik memudahkan pemahaman dan meningkatkan daya ingatan pengguna, kerana visualisasi yang jelas memudahkan penyerapan maklumat secara langsung dan berkesan.

Tambahan pula, kajian oleh Zerfass dan Viertmann (2017) menunjukkan bahawa trend penggunaan komunikasi visual semakin meluas, dengan

sebanyak 89 peratus organisasi di Eropah melaporkan bahawa mereka telah beralih kepada penggunaan infografik dan bentuk komunikasi visual lain, menggantikan kandungan berasaskan teks. Peralihan ini berlaku dalam tempoh tiga tahun, iaitu dari 2015 hingga 2017, menunjukkan peningkatan yang ketara dalam penggunaan infografik sebagai alat komunikasi. Perkembangan ini mencerminkan kesedaran organisasi terhadap keperluan untuk menyampaikan mesej secara lebih efektif dan mudah dihadam oleh khalayak sasaran.

Di samping itu, dapatan kajian oleh Newsom et al. (2014) turut menyokong pandangan bahawa infografik merupakan pengganti visual terbaik untuk penyampaian maklumat masa kini. Kajian tersebut mendapati bahawa penyampaian informasi melalui gabungan grafik dan teks dapat meningkatkan kejelasan, mempermudah pemahaman, dan mempercepatkan penyerapan maklumat oleh penerima. Keupayaan infografik untuk menstrukturkan data dan fakta dalam bentuk visual yang menarik menjadikannya medium yang sangat sesuai dalam dunia komunikasi moden, di mana maklumat perlu disampaikan dengan cepat dan berkesan. Secara keseluruhannya, penggunaan infografik tidak hanya mempercepatkan proses pemahaman tetapi juga mampu menarik perhatian dan mengekalkan minat khalayak. Ini menjadikannya pilihan yang relevan dalam pelbagai bidang, termasuk pendidikan, perniagaan, dan komunikasi korporat, di mana keupayaan untuk menyampaikan maklumat secara jelas dan menarik sangat penting.

Teknologi informasi dalam bidang pendidikan telah mengalami transformasi yang ketara dalam beberapa tahun kebelakangan ini, memungkinkan penyampaian informasi yang tepat, cepat, dan berguna kepada masyarakat di mana sahaja mereka berada. Dalam konteks ini, teknologi informasi memainkan peranan penting dalam mempertingkatkan akses kepada pendidikan dan memudahkan proses pembelajaran. Menurut Mumin (2019), teknologi informasi dalam pendidikan, yang lebih dikenali sebagai e-pendidikan, membawa pelbagai kelebihan, terutamanya dalam menyediakan infrastruktur pembelajaran yang lebih efisien. Salah satu kelebihan utama e-pendidikan adalah tersedianya bahan bacaan dan pengajaran dalam bentuk digital. Ini membolehkan pelajar dan pendidik mengakses sumber maklumat dari pelbagai platform secara dalam talian tanpa batasan geografi. Dalam era digital ini, semua orang, termasuk mereka yang tinggal di kawasan terpencil, boleh mendapatkan akses kepada bahan pendidikan yang berkualiti tanpa perlu bergantung kepada bahan bercetak. Mumin (2019) menegaskan bahawa e-pendidikan bukan sahaja memudahkan pembelajaran tetapi juga membolehkan pengajaran berlaku di mana sahaja, memberikan kebebasan kepada pelajar untuk belajar pada waktu dan tempat yang paling sesuai untuk mereka.

Selain itu, teknologi e-pendidikan khususnya dalam bidang kesihatan, telah memudahkan penyampaian informasi kepada masyarakat. Wynn (2020) menyatakan bahawa informasi mengenai kesihatan yang disampaikan melalui platform digital lebih mudah dicapai berbanding dengan bahan bacaan tradisional yang bersifat cetak. Hal ini penting, terutama dalam situasi di mana maklumat kesihatan yang tepat dan terkini adalah kritikal untuk meningkatkan kesedaran masyarakat dan membantu mereka membuat keputusan yang lebih baik mengenai kesihatan mereka. E-pendidikan juga menyediakan interaktiviti yang lebih baik antara pelajar dan pendidik. Melalui penggunaan alat pembelajaran digital seperti video, kuiz dalam talian, dan forum perbincangan, pelajar dapat terlibat secara aktif dalam proses pembelajaran mereka. Ini tidak hanya meningkatkan pemahaman tetapi juga mendorong kolaborasi antara pelajar, membolehkan mereka belajar dari satu sama lain.

Secara keseluruhannya, teknologi informasi dalam pendidikan telah merubah cara kita belajar dan mengajar. Ia bukan sahaja meningkatkan akses kepada maklumat tetapi juga meningkatkan pengalaman pembelajaran dengan menyediakan pelbagai sumber dan kaedah yang lebih interaktif. Oleh itu, e-pendidikan menjadi pilihan yang relevan dan penting dalam memastikan bahawa masyarakat dapat memperoleh pendidikan yang berkualiti, tidak kira di mana mereka beradaOleh itu, penyelidik telah mengambil inisiatif untuk membangunkan satu aplikasi mudah alih yang dapat memberikan maklumat dengan cepat, tepat serta dapat digunakan oleh pelbagai golongan masyarakat, khususnya bidang pendidikan kesihatan seperti Leptospirosis. Hal ini kerana berdasarkan beberapa hasil pembacaan penyelidik mendapati bahawa majoriti masyarakat kurang kesedaran tentang kewujudan penyakit-penyakit baru terutamanya penyakit Leptospirosis. Selain itu, kurangnya aplikasi yang khusus untuk sesuatu penyakit juga menjadi sebab perlunya pembangun aplikasi baharu.

Menurut Kementerian Kesihatan Malaysia (2010), Leptospirosis adalah sejenis penyakit zoonosis, yang bermaksud penyakit ini boleh dijangkiti daripada haiwan kepada manusia. Penyakit ini disebabkan oleh bakteria dari genus Leptospira, yang biasanya terdapat dalam air kencing haiwan yang terjangkit. Antara haiwan yang menjadi punca jangkitan termasuklah tikus, kucing, anjing, lembu, kambing, babi, kuda, dan pelbagai spesies haiwan liar. Jangkitan leptospirosis boleh berlaku apabila manusia terdedah kepada air, makanan, atau tanah yang tercemar dengan air kencing haiwan yang terinfeksi. Air yang tercemar dengan bakteria Leptospira ini dapat masuk ke dalam badan manusia melalui luka terbuka, membran mukosa, atau bahkan melalui kulit yang rosak. Penyebaran penyakit ini lebih umum di negara-negara beriklim panas dan lembap, di mana kondisi alam sekitar yang tidak bersih dan penanganan sisa yang lemah dapat meningkatkan risiko pencemaran.

Leptospirosis sering berlaku selepas hujan lebat atau banjir, di mana air yang bertakung mengandungi bakteria dari air kencing haiwan. Oleh itu, kawasan yang sering terdedah kepada banjir atau memiliki persekitaran kotor, seperti kawasan pertanian dan peternakan, berisiko tinggi untuk mengalami kejadian leptospirosis. Penyakit ini mempunyai pelbagai simptom yang boleh muncul dalam jangka masa yang berbeza selepas pendedahan. Simptom-simptom ini mungkin termasuk demam, sakit kepala, sakit otot, dan keletihan, yang pada awalnya boleh disalah anggap sebagai gejala penyakit lain yang lebih ringan. Dalam kes yang lebih teruk, leptospirosis boleh menyebabkan komplikasi serius seperti kegagalan buah pinggang, penyakit hati, dan masalah pernafasan, yang memerlukan rawatan perubatan segera.

Malangnya, walaupun leptospirosis merupakan penyakit yang berbahaya, masih ramai individu yang tidak menyedari simptom dan kesan penyakit ini. Kekurangan kesedaran ini boleh menyebabkan mereka tidak mendapatkan rawatan yang diperlukan pada peringkat awal, sekali gus meningkatkan risiko komplikasi. Oleh itu, pendidikan awam mengenai leptospirosis adalah sangat penting untuk meningkatkan kesedaran masyarakat tentang cara jangkitan, simptom yang perlu diperhatikan, serta langkah pencegahan yang boleh diambil untuk mengurangkan risiko penularan penyakit ini.

Dalam usaha untuk mencegah penularan leptospirosis, masyarakat perlu diberi maklumat yang jelas tentang pentingnya menjaga kebersihan persekitaran dan langkah-langkah pencegahan, seperti menghindari pendedahan kepada air yang tercemar dan segera mendapatkan rawatan jika mengalami simptom yang berkaitan. Melalui usaha ini, diharapkan kesedaran dan pemahaman masyarakat tentang leptospirosis dapat ditingkatkan, yang seterusnya akan membantu mengurangkan kejadian penyakit ini di kalangan penduduk.

Namun, masalah ini berpunca daripada beberapa faktor, termasuk kekurangan maklumat yang mudah diakses dan difahami oleh masyarakat umum mengenai penyakit leptospirosis dan langkah-langkah pencegahan yang boleh diambil. Penyampaian maklumat yang tidak mencukupi atau tidak sampai kepada kumpulan sasaran tertentu, terutamanya di kawasan luar bandar, memburukkan lagi keadaan. Individu di kawasan ini seringkali tidak mendapat akses kepada maklumat kesihatan terkini, yang meningkatkan risiko mereka terdedah kepada jangkitan tanpa pengetahuan yang mencukupi tentang cara pencegahan dan rawatan.

Keadaan ini menimbulkan keperluan untuk kaedah yang lebih berkesan dalam menyebarkan maklumat kesihatan dan pendidikan awam mengenai penyakit ini. Sebagai respons kepada masalah ini, aplikasi mudah alih e-Leptospirosis dibangunkan untuk menyediakan maklumat terperinci dan interaktif mengenai leptospirosis. Aplikasi ini dirancang untuk menjadi sumber

maklumat yang mudah diakses, yang membolehkan masyarakat mendapatkan pengetahuan yang diperlukan secara langsung di hujung jari mereka. Melalui aplikasi ini, pengguna bukan sahaja dapat meningkatkan kesedaran dan pengetahuan mereka tentang penyakit ini, tetapi juga dapat mengenali gejala awal serta memahami langkah-langkah pencegahan dan rawatan yang sesuai. Ciri-ciri seperti kuiz interaktif dan panduan langkah demi langkah dalam aplikasi ini berfungsi sebagai alat pendidikan kesihatan yang membolehkan pengguna mengambil tindakan pencegahan secara proaktif. Dengan menyediakan maklumat yang mudah difahami dan diakses, aplikasi ini diharapkan dapat membantu masyarakat mendapatkan rawatan yang diperlukan dengan segera jika mereka mengalami simptom, sekaligus mengurangkan risiko jangkitan yang lebih teruk dan komplikasi yang mungkin berlaku. Melalui pendekatan ini, diharapkan kesedaran dan pengetahuan tentang leptospirosis dalam kalangan masyarakat dapat ditingkatkan, seterusnya mengurangkan kejadian penyakit ini di kalangan penduduk.

SOROTAN LITERATUR

Penyakit Leptospirosis dan Kepentingan Kesedaran Masyarakat

Leptospirosis ialah sejenis penyakit zoonosis yang disebabkan oleh bakteria Leptospira dan boleh merebak melalui air, makanan, atau tanah yang dicemari dengan air kencing haiwan yang terjangkit seperti tikus, kucing, anjing, lembu, dan lain-lain (Kementerian Kesihatan Malaysia, 2010). Penyakit ini menunjukkan symptom seperti demam, sakit kepala, dan sakit otot, yang sering menyerupai penyakit berjangkit lain, menyebabkab ia mudah disalah diagnosis pada peringkat awal (World Organization, 2022). Sering kali, rawatan hanya dicari apabila keadaan menjadi kritikal, yang boleh membawa kepada komplikasi seperti kegagalan buah pinggang (Vijayachari et al. 2008). Yew Chee Yen (2017) telah menjalankan kajian bagi mengenal pasti risiko dan faktor prognosis untuk penyakit kencing tikus dan kematian dan mendapati masalah pembekuan darah dan perubahan dalam elektrokardiografi merupakan risiko untuk kadar mortaliti yang tinggi. Asia Tenggara dilaporkan mempunyai kadar kejadian leptospirosis tertinggi di dunia. Penyakit ini adalah endemik di Malaysia dan secara konsisten menyebabkan wabak dalam kalangan manusia dengan kesan yang teruk (Garba & Moussa, 2021). Namun kesedaran dan pengetahuan masyarakat tentang penyakit ini masih rendah, dengan kajian menunjukkan sebanyak 53.1% responden tidak mengetahu tentang leptospirosis (Samsudin et al., 2020). Oleh itu, meningkatkan kesedaran dan pengetahuan masyarakat dan amalan menjaga kebersihan adalah penting bagi mencegah penularan. Penggunaan aplikasi mudah alih merupakan pendekatan yang sesuai untuk meningkatkan kesedaran, terutamanya dalam kalangan belia, kerana ia dapat menyampaikan maklumat pencegahan dan rawatan secara interaktif dan mudah diakses. Melalui aplikasi ini, pengguna dapat memperoleh pengetahuan tentang langkah-langkah pencegahan dan risiko jangkitan, sekali gus membantu mengurangkan kadar penyebaran penyakit.

Isu Penyakit Leptopirosis Dalam dan Luar Negara

Leptospirosis merupakan penyakit zoonosis yang tersebar luas di seluruh dunia, terutamanya di kawasan tropika dan subtropika. Di Malaysia, leptospirosis adalah antara penyakit berjangkit yang sering dilaporkan, dengan peningkatan kes yang ketara dalam beberapa dekad terakhir. Kajian yang dijalankan di negeri-negeri seperti Kelantan, Selangor, dan Pahang menunjukkan bahawa kawasan berisiko tinggi termasuk persekitaran yang sering terdedah kepada air yang tercemar dan aktiviti pertanian (Garba et al., 2017). Peningkatan jumlah kes leptospirosis juga dikaitkan dengan keadaan cuaca yang lembap, banjir, dan persekitaran urban yang kurang bersih.

Di peringkat antarabangsa, leptospirosis adalah masalah kesihatan utama di negara-negara dengan iklim tropika seperti Thailand, Filipina, dan Brazil. Sebagai contoh, Thailand melaporkan kadar insiden yang tinggi terutamanya dalam kalangan petani yang terdedah kepada persekitaran basah seperti sawah padi (Hinjoy et al., 2019). Di Brazil, leptospirosis sering dikaitkan dengan kawasan urban yang padat penduduk, di mana sistem saliran yang lemah dan pengurusan sampah yang tidak mencukupi meningkatkan risiko penyebaran penyakit ini (Galan et al., 2021). Faktor seperti kebersihan persekitaran dan pengurusan air memainkan peranan penting dalam penyebaran penyakit ini di kawasan yang terjejas.

Walaupun leptospirosis dianggap sebagai penyakit yang mudah dicegah melalui langkah-langkah sanitasi yang baik, ia masih merupakan isu kesihatan yang besar di banyak negara membangun. Di negara-negara maju seperti Amerika Syarikat dan Australia, leptospirosis juga dilaporkan, namun prevalensnya lebih rendah berbanding negara tropika. Kes di negara-negara ini sering dikaitkan dengan aktiviti luar seperti rekreasi air dan pekerjaan yang melibatkan pendedahan kepada haiwan (Rebeca & Deborah, 2000). Hal ini menunjukkan bahawa walaupun leptospirosis lebih kerap berlaku di negara-negara membangun, ia masih boleh memberi impak di negara-negara maju apabila terdapat keadaan yang memudahkan penyebaran bakteria *Leptospira*.

Analisis Perbandingan Aplikasi Mudah Alih dalam Pendidikan Kesihatan

Dalam era digital, teknologi maklumat berperanan penting dalam penyampaian maklumat kesihatan secara pantas dan efektif. Berdasarkan kajian terdahulu, penyelidik mendapati bahawa aplikasi mudah alih sebagai platform pendidikan kesihatan terbukti mampu meningkatkan pengetahuan masyarakat mengenai penyakit-penyakit yang kurang diberi perhatian seperti Leptospirosis. Beberapa contoh aplikasi yang berkaitan dengan e-pendidikan kesihatan yang boleh

didapati di play.google.com termasuk MyFitnessPal, Ada Health, dan Headspace, yang masing-masing menawarkan fokus dan ciri yang berbeza.

1. MyFitnessPal
    - Fungsi Utama: Aplikasi ini membantu pengguna dalam mengurus pemakanan dan aktiviti fizikal harian mereka melalui ciri pemantauan kalori, maklumat nutrisi, dan cadangan diet.
    - Perbezaan: MyFitnessPal lebih fokus kepada pengurusan kesihatan peribadi berdasarkan maklumat pemakanan dan kecergasan, berbanding aplikasi yang memberi tumpuan khusus kepada pendidikan kesihatan seperti pengajaran teori atau panduan kesihatan yang mendalam.
2. Ada Health
    - Fungsi Utama: Aplikasi ini menggunakan teknologi AI untuk memberikan penilaian simptom dan cadangan awal kepada pengguna tentang keadaan kesihatan mereka.
    - Perbezaan: Walaupun Ada Health memberi maklumat kesihatan berdasarkan simptom, ia tidak direka untuk pendidikan kesihatan yang formal tetapi lebih kepada panduan perubatan segera berdasarkan keadaan pengguna.
3. Headspace
    - Fungsi Utama: Memberikan panduan meditasi dan kesihatan mental melalui latihan mindfulness dan pelan meditasi.
    - Perbezaan: Fokusnya adalah lebih kepada kesihatan mental dan kesejahteraan psikologi, bukan kepada pendidikan formal mengenai kesihatan fizikal atau rawatan perubatan.
4. Medscape
    - Fungsi Utama: Aplikasi yang digunakan oleh profesional perubatan untuk mendapatkan akses kepada artikel penyelidikan, panduan klinikal, dan berita perubatan terkini.
    - Perbezaan: Aplikasi ini ditujukan kepada pengamal perubatan dan tidak bersifat mesra pengguna umum, menjadikannya lebih sebagai sumber pendidikan bagi profesional kesihatan daripada alat pembelajaran untuk orang awam.

Perbezaan utama antara aplikasi-aplikasi ini terletak pada sasaran pengguna dan fokusnya. Ada yang lebih berorientasikan penjagaan kesihatan peribadi dan kecergasan (MyFitnessPal), ada yang memberi tumpuan kepada bantuan diagnosis (Ada Health), manakala yang lain lebih memfokuskan kepada kesihatan mental (Headspace).

METODOLOGI KAJIAN

Metodologi Agile telah menjadi pendekatan yang semakin popular dalam pengurusan projek teknologi sejak awal tahun 2000-an. Pendekatan ini melibatkan proses iteratif dan penambahbaikan berterusan yang berpandukan maklum balas pengguna, membolehkan penyesuaian aplikasi dilakukan secara berkesan (Aniket, 2006). Silvius & Stoop (2013) juga menyokong pandangan ini dengan menyatakan bahawa metodologi Agile membantu mengekalkan kerelevanan dan responsiviti aplikasi terhadap keperluan pengguna. Artikel ini akan memberikan gambaran yang lebih jelas tentang metodologi Agile, termasuk definisi asas, nilai teras, prinsip utama, dan faedahnya, serta bagaimana pendekatan ini dapat menghasilkan pengurusan projek yang lebih fleksibel dan responsive. Oleh itu, Metodologi Agile telah dipilih dalam pembangunan aplikasi ini kerana mempunyai fleksibiliti dan kebolehubahsuaian berdasarkan maklum balas pengguna secara berterusan. Metodologi Agile terdiri daripada beberapa fasa yang berulang, iaitu perancangan, analisis, reka bentuk, pembangunan, dan pengujian. Di setiap fasa, maklum balas daripada pengguna dan penilaian terhadap aplikasi digunakan untuk manambah baik aplikasi. Rajah 1 menunjukkan kitaran pembangunan bagi metodologi “Agile”.

Rajah 1 Kitaran Pembangunan Metodologi “Agile”

Sumber: www.javatpoint.com 2021

Fasa perancangan merupakan fasa pertama dalam kitaran pembangunan bagi metodologi Agile. Fasa ini melibatkan penentuan objektif utama pembangunan aplikasi e-Leptospirosis, termasuk mengenal pasti masalah yang ingin diselesaikan, iaitu meningkatkan kesedaran tentang leptospirosis melalui aplikasi mudah alih. Dalam fasa ini, kajian susastera berkaitan dengan e-pendidikan, informasi atas talian dan penyakit leptospirosis juga dilakukan dan membandingkan aplikasi sedia ada yang berkaitan dengan pendidikan kesihatan. Di samping itu, dalam fasa perancangan, kriteria pemilihan

responden juga ditetapkan. Responden terdiri daripada 22 individu dalam kategori belia (18-40 tahun) yang semuanya merupakan dari kalangan pelajar universiti. Kriteria ini dipilih bagi memastikan aplikasi yang dibangunkan dapat diterima dan digunakan dengan baik oleh pengguna celik teknologi dan aktif menggunakan aplikasi mudah alih dalam kehidupan harian mereka.

Fasa seterusnya adalah fasa analisis. Dalam fasa ini, keperluan aplikasi e-Leptospirosis dikaji dengan terperinci menerusi pentafsiran maklumat yang diperoleh daripada kajian yang dilakukan pada fasa perancangan. Hasil daripada fasa analisis ini kemudiannya diterjemahkan ke dalam bentuk model sistem bagi menggambarkan sistem aplikasi e-Leptospirosis secara keseluruhan. Selain itu juga, dalam fasa ini perancangan awal untuk instrument soal selidik yang akan digunakan dalam ujian kebolehgunaan turut dibuat. Instrumen ini akan mengukur aspek kebergunaan, mudah guna, reka bentuk antara muka dan kepuasan pengguna.

Reka bentuk awal mula dilakukan menerusi fasa ini, iaitu fasa reka bentuk dengan merujuk kesemua hasil analisis bagi aplikasi e-Leptospirosis yang dilakukan semasa fasa sebelumnya. Menerusi fasa ini, reka bentuk antara muka dan pangkalan data dilakar untuk memberikan gambaran setiap fungsian dalam aplikasi ini yang telah ditetapkan setelah memilih reka bentuk seni bina yang sesuai untuk membangunkan aplikasi e-Leptospirosis ini. Algoritma sistem juga dibina dan dipersembahkan ke dalam bentuk carta alir untuk menggambarkan pergerakan atau aliran setiap fungsi .

Fasa pembangunan merupakan fasa pembangunan aplikasi sebenar setelah membuat analisis dan reka bentuk awal sistem. Reka bentuk yang dihasilkan digunapakai sebagai rujukan dalam menghasilkan sistem yang lengkap dan mencapai keperluan pengguna. Pengekodan dalam membangunkan sistem aplikasi ini menggunakan bahasa pengaturcaraan seperti *Javascript, HTML*, *PHP*, *CSS,* dan *MySQL*. Penggunaan *Bootstrap* juga membantu dalam pembangunan reka bentuk antara muka bagi kesemua fungsian sistem yang telah ditetapkan. Dalam proses pembangunan, perhatian diberikan kepada integrasi pangkalan data dengan antara muka dan algoritma sistem yang dirancang semasa fasa reka bentuk. Kamus data yang direka bentuk semasa fasa reka bentuk membantu memudahkan dalam proses rujukan semasa pembangunan pangkalan data dilaksanakan.

Menerusi fasa pembangunan ini juga, penambahbaikan dan pengubahsuaian dilakukan secara iteratif terhadap cadangan awal antara muka dan pangkalan data bagi mencapai keperluan pengguna dengan baik tanpa sebarang ralat teknikal.

Akhir sekali, fasa pengujian yang melibatkan dua jenis pengujian utama: pengujian fungsional dan ujian kebolehgunaan. Pengujian fungsional akan memastikan semua fungsi sistem beroperasi dengan baik dan input dari pengguna direkodkan dengan tepat dalam pangkalan data. Sebagai tambahan, ujian kebolehgunaan dijalankan untuk menilai kebergunaan, mudah guna, dan kepuasan pengguna ketika menggunakan aplikasi. Data dari ujian kebolehgunaan membantu dalam membuat penambahbaikan yang diperlukan bagi meningkatkan pengalaman pengguna.

HASIL DAPATAN DAN PERBINCANGAN KAJIAN

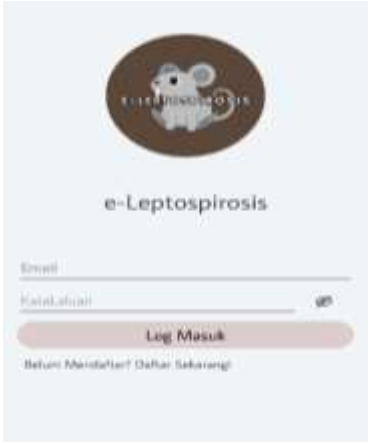
Pembangunan Aplikasi e-Leptospirosis menggunakan Metodologi Agile

Aplikasi Mudah Alih Leptospirosis merupakan aplikasi pendidkan kesihatan bagi penyakit Leptospirosis. Aplikasi Mudah Alih Pendidikan Kesihatan Leptospirosis (e-Leptospirosis) telah dibangunkan dengan menggunakan beberapa perisian dan teknologi. Aplikasi ini terjadi dari hasil pengaturcaraan dan antara muka. Sepanjang proses pembangunan, perisian yang telah digunakan ialah “Android Studio” dan pangkalan data firebase. Skrip ditulis menggunakan bahasa pengaturcaraan Java di dalam Android Studio bagi fungsi-fungsi di dalam aplikasi ini termasuklah sistem log masuk/keluar, sistem antara muka dan sistem. Selain itu, pangkalan data yang digunakan bagi sistem log masuk/keluar dan juga sistem pemarkahan ialah “Firebase”.

Rajah 2 menunjukkan antara muka halaman utama sistem dimana pengguna boleh memilih untuk membuka antara muka “Apa Itu Leptospirosis”, “Simptom dan Kesan Leptospirosis”, “Mencegah dan Mengubati Letospirosis” atau “Ayuh Jawab Quiz”. Satu butang disediakan bagi setiap pilihan. Rekaan yang jelas dan ringkas telah digunakan bagi memudahkan pengguna untuk melihat dan membaca antara muka.

Rajah 2 Antara Muka Halaman Utama

Rajah 3 menunjukkan antara muka bagi log masuk pengguna. Pengguna harus memasukkan e-mel dan juga kata laluan untuk masuk ke dalam aplikasi. Selepas memasukkan e-mel dan kata laluan, pengguna harus menekan butang "log masuk" untuk masuk ke dalam sistem. Bagi pengguna yang belum berdaftar, pengguna boleh menekan butang "daftar" untuk daftar akaun pengguna. Apabila menekan butang "daftar", pengguna dibawa ke antara muka daftar pengguna (Rajah 4) yang mana pengguna harus memasukkan nama, e-mel dan kata laluan.



Rajah 3 Antara Muka Log Masuk

Rajah 4 Antara Muka Daftar Pengguna

Rajah 5, 6 dan 7 menunjukkan antara muka bagi tiga fungsi utama aplikasi iaitu "Apa Itu Leptospirosis", "Simptom dan Kesan" dan "Mencegah dan Mengubati". Pengguna harus masuk ke menu utam aplikasi dan menekan fungsi yang ingin dilihat. Ketiga-tiga fungsi ini mempunyai bahan bacaan ringkas bagi penerangan tajuk fungsi, video yang berkaitan dengan Leptospirosis dan infografik yang mudah difahami. Pengguna boleh menekan video dan infografik yang disediakan untuk menonton video dan membaca infografik dalam mod skrin penuh.

Rajah 5 Apa Itu Leptospirosis

Rajah 6 Simptom dan Kesan

Rajah 7 Mencegah dan Mengubati

Rajah 8 iaitu Antara Muka fungsi “quiz” membolehkan pengguna untuk menjawab 10 soalan quiz yang disediakan selepas pengguna menonton video dan membaca infografik yang disediakan. Quiz yang disediakan adalah berkaitan dengan Leptospirosis dan fakta yang diberikan terdapat dalam video dan infografik yang disediakan. Selepas pengguna menjawab semua soalan yang diberiakn, pengguna boleh melihat skor yang telah diperoleh daripada hasil menjawab quiz dengan betul.

Rajah 8 Antara Muka Quiz

Pengujian Kebolehgunaan Aplikasi E-Leptospirosis

Ujian kebolehgunaan aplikasi e-Leptospirosis dijalankan ke atas 22 responden yang melengkapkan soal selidik secara atas talian. Responden terdiri daripada pengguna yang secara sukarela bersetuju untuk menyertai kajian ini. Bagi mengumpul data pengujian kebolehgunaan, pengguna diminta untuk menjawab soal selidik yang disediakan.

Pengujian kebolehgunaan aplikasi ini dianalisis secara deskriptif, di mana data dikumpul melalui soal selidik menggunakan skala Likert dengan penilaian 1 hingga 5, di mana (1: Sangat Tidak Setuju, 2: Tidak Setuju, 3: Sederhana Setuju, 4: Setuju, 5: Sangat Setuju). Analisis deskriptif merangkumi pengiraan skor min, kekerapan, dan sisihan piawai untuk menilai tahap kebolehgunaan berdasarkan empat faktor utama: kebergunaan, mudah guna, reka bentuk, dan kepuasan pengguna. Dengan pendekatan ini, interpretasi tahap kebolehgunaan boleh dibuat dengan menentukan kategori tahap rendah, sederhana, dan tinggi bagi setiap faktor, berdasarkan julat skor min yang telah ditetapkan (1 hingga 2.32 untuk tahap rendah, 2.33 hingga 3.62 untuk tahap sederhana, dan 3.63 hingga 5.00 untuk tahap tinggi). Pembahagian ini membolehkan penilaian yang lebih jelas terhadap tahap kebolehgunaan setiap faktor. Sebagai contoh, jika skor purata untuk sesuatu faktor berada dalam julat 3.63 hingga 5.00, ini

menunjukkan bahawa kebanyakan pengguna memberikan penilaian yang tinggi terhadap aspek tersebut. Sebaliknya, jika skor purata jatuh dalam julat 2.33 hingga 3.62, ia menandakan tahap kepuasan yang sederhana, manakala nilai di bawah 2.33 menunjukkan bahawa pengguna kurang berpuas hati atau mengalami kesukaran dalam aspek tertentu. Hasil analisis ini memberikan gambaran umum tentang persepsi pengguna terhadap aplikasi dan mengenal pasti aspek yang memerlukan penambahbaikan. Untuk memastikan kebolehpercayaan instrument, ujian Alpha Cronbach dijalankan dan memberikan nilai α = 0.87, menunjukkan tahap kebolehpercayaan yang tinggi. Ini bermaksud, soal selidik yang digunakan adalah konsisten dalam mengukur aspek kebolehgunaan yang ditetapkan. Seorang pakar dalam bidang Interaksi Manusia-Komputer (HCI) telah menyemak dan mengesahkan instrumen kajian, memastikan bahawa soal selidik dan alat pengukuran yang digunakan adalah sesuai dan relevan dengan konteks kebolehgunaan aplikasi. Penilaian pakar ini memastikan bahawa instrumen tersebut tidak menghadapi sebarang masalah berkaitan kesahan, sekali gus meningkatkan kebolehpercayaan hasil pengujian kebolehgunaan. Dengan pengesahan pakar HCI, instrumen kajian dianggap sahih untuk menilai pengalaman pengguna dalam menggunakan aplikasi ini.Jadual 1 menunjukkan analisis statistik hasil pengujian kebolehgunaan aplikasi e-Leptospirosis. Min keseluruhan bagi faktor kebergunaan adalah 4.74, mencerminkan kepuasan yang tinggi dalam kalangan pengguna terhadap kebergunaan aplikasi ini.

Jadual 1 Analisis statistik bagi faktor kebergunaan aplikasi

Faktor	**Kekerapan**					**Min**	**Sisihan Piawai**
Kebergunaan	**1**	**2**	**3**	**4**	**5**	**4.74**	
Aplikasi ini memudahkan saya mengenali penyakit Leptospirosis dengan lebih mudah.	0	0	1	6	15	4.64	2.44
Aplikasi ini membantu saya memahami penyakit Leptospirosis dengan lebih mudah.	0	0	0	4	18	4.82	3.79

Aplikasi ini memudahkan saya untuk mengetahui maklumat terperinci penyakit Leptospirosis.	0	0	1	3	18	4.77	3.76	

Hasil analisis menunjukkan bahawa secara keseluruhan, pengguna menilai aplikasi e-Leptospirosis dengan sangat positif, dengan skor min keseluruhan 4.74 yang hampir mencapai tahap maksimum. Ini menunjukkan bahawa kebanyakan pengguna berpendapat faktor kebergunaan aplikasi memenuhi keperluan mereka. Dalam aspek mengenali penyakit Leptospirosis, skor purata adalah 4.64 dengan majoriti pengguna (15 daripada 22) memberikan penilaian tertinggi (5). Walaupun terdapat sedikit variasi dalam penilaiannseperti yang ditunjukkan oleh nilai sisihan piawai 2.33, kebanyakan pengguna bersetuju bahawa aplikasi ini berfungsi dengan baik untuk tujuan tesebut.

Bagi membantu pengguna memahami penyakit Leptospirosis, skor purata tertinggi ialah 4.82. Kesemua pengguna memberikan penilaian yang baik (4 atau 5), menunjukkan bahawa aplikasi ini berkesan dalam meningkatkan pemahaman mereka. Namun, sisihan piawai yang lebih tinggi (3.79) menunjukkan adanya perbezaan pengalaman pengguna, mungkin disebabkan oleh faktor individu seperti pengetahuan sedia ada atau kebiasaan dengan teknologi. Akhirnya, dalam memberikan maklumat terperinci mengenai penyakit Leptospirosis, aplikasi ini mendapat skor purata 4.77. Hanya seorang pengguna memberikan skor sederhana, sementara selebihnya memberikan skor tertinggi. Ini menunjukkan bahawa aplikasi mampu menyediakan maklumat yang diperlukan oleh pengguna secara efektif.

Jadual 2 menunjukkan analisis statistic bagi faktor mudah guna aplikasi. Hasil kajian menunjukkan bahawa aplikasi ini mendapat penilaian yang positif dari segi mudah guna, dengan skor min keseluruhan 4.85. Majoriti pengguna berpendapat bahawa aplikasi ini mudah digunakan, seperti yang ditunjukkan oleh skor min 4.82, walaupun terdapat sedikit variasi dalam pengalaman pengguna. Penilaian aspek mesra pengguna mencatat skor min tertinggi iaitu 4.91, menunjukkan aplikasi ini sangat mesra pengguna. Begitu juga aspek mudah dipelajarimendapat skor min 4,77, yang menunjukkan aplikasi senang dipelajari. Selain itu, penggunaan aplikasi tanpa arahan atau tunjuk ajar mendapat skor min 4.91, mencerminkan tahap mudah guna yang tinggi. Secara keseluruhan, dapatan ini menunjukkan bahawa aplikasi ini direka bentuk dengan baik untuk memenuhi keperluan pengguna dari segi mudah guna. Walaupun terdapat sedikit variasi dalam penilaian individu, skor yang tinggi dalam setiap

aspek menunjukkan kebanyakan pengguna berpendapat bahawa aplikasi ini sangat memudahkan dan sesuai dgunakan.

Jadual 2 Analisis statistik bagi faktor mudah guna

Faktor	**Kekerapan**					**Min**	**Sisihan Piawai**
Mudah Guna	**1**	**2**	**3**	**4**	**5**	**4.85**	
Aplikasi ini mudah digunakan	0	0	0	4	18	4.82	3.79
Aplikasi ini mesra pengguna	0	0	0	2	20	4.91	4.07
Penggunaan aplikasi ini mudah dipelajari	0	0	0	5	17	4.77	3.77
Saya boleh menggunakan aplikasi ini tanpa arahan dan tunjuk ajar	0	0	0	2	20	4.91	4.07

Hasil analisis dalam Jadual 3 menunjukkan bahawa reka bentuk aplikasi dinilai secara positif oleh pengguna dengan skor min keseluruhan 4.57. Penilaian ini menunjukkan tahap kepuasan yang tinggi terhadap aspek reka bentuk, yang dianggap menyenangkan dan mesra pengguna. Aspek "Reka bentuk sistem ini menyenangkan" mendapat skor min 4.45, menunjukkan kebanyakan pengguna berpuas hati dengan reka bentuk aplikasi, walaupun terdapat sedikit variasi dengan beberapa pengguna memberikan skor sederhana (3). Ini mungkin disebabkan oleh perbezaan keutamaan estetik individu. Skor untuk aspek "Penggunaan tulisan sistem mudah dibaca dan difahami" serta "Saya selesa dengan reka bentuk antara muka aplikasi ini" adalah tinggi, masing-masing 4.68, menunjukkan bahawa kebanyakan pengguna mendapati aplikasi ini mudah dibaca, difahami, dan selesa digunakan. Namun, untuk aspek "Penyampaian maklumat dalam aplikasi mudah difahami dan jelas," mendapat skor min 4.45, menunjukkan bahawa walaupun kebanyakan pengguna berpendapat maklumat yang disampaikan adalah jelas, terdapat sedikit variasi dalam penilaian. Ini mungkin menunjukkan adanya ruang untuk penambahbaikan dalam menyampaikan maklumat dengan lebih konsisten. Secara keseluruhan, hasil kajian ini menunjukkan bahawa reka bentuk aplikasi ini Berjaya memenuhi jangkaan pengguna dalam aspek estetik dan kejelasan maklumat. Meskipun terdapat sedikit variasi dalam penilaian individu, majoriti pengguna memberikan

penilaian positif terhadap aspek reka bentuk aplikasi ini, menjadikannya sesuai untuk penggunaan harian.

Jadual 3 Analisis statistik bagi faktor reka bentuk

Faktor	**Kekerapan**					**Min**	**Sisihan Piawai**
Reka Bentuk	**1**	**2**	**3**	**4**	**5**	**4.57**	
Reka bentuk sistem ini menyenangkan.	0	0	4	4	14	4.45	3.29
Penggunaan tulisan sistem mudah dibaca dan difahami	0	0	0	7	15	4.68	3.72
Penyampaian maklumat dalam aplikasi mudah difahami dan jelas.	0	0	0	12	10	4.45	3.45
Saya selesa dengan reka bentuk antara muka aplikasi ini.	0	0	2	3	17	4.68	3.74

Hasil kajian yang ditunjukkan dalam Jadual 4 memperlihatkan bahawa tahap kepuasan pengguna terhadap aplikasi adalah tinggi, dengan skor min keseluruhan 4.27. Dapatan ini menunjukkan bahawa majoriti pengguna berpuas hati dengan prestasi aplikasi, dengan kebanyakan responden memberikan penilaian 4 atau 5. Bagi aspek "Saya berpuas hati dengan aplikasi ini," skor min ialah 4.27, mencerminkan tahap kepuasan yang baik secara keseluruhan. Hanya seorang pengguna memberikan penilaian sederhana (3), manakala selebihnya memberikan penilaian positif (4 atau 5). Ini menunjukkan bahwa aplikasi ini Berjaya memenuhi jangkaan sebahagian besar pengguna, walaupun terdapat sedikit varisi dalam tahap kepuasan seperti yang ditunjukkan oleh sisihan piawai 3.80. Aspek "Aplikasi ini berfungsi seperti yang dijangkakan" turut mencatatkan skor min 4.27, menunjukkan bahawa pengguna merasakan aplikasi ini berfungsi dengan baik dan seperti yang diharapkan. Walau bagaimanapun, sisihan piawai 4.14 menunjukkan adanya sedikit variasi dalam pengalaman pengguna, yang mungkin disebabkan oleh perbezaan dalam jangkaan individu terhadap fungsi aplikasi. Secara keseluruhan, dapatan ini menunjukkan bahawa aplikasi diterima baik oleh pengguna, dengan penilaian yang konsisten terhadap aspek kepuasan san fungsi. Majoriti memberikan skor positif, yang mencerminkan bahawa

aplikasi ini memenuhi keperluan dan jangkaan mereka dalam penggunaan seharian. Walaupun terdapat sedikit variasi dalam penilaian individu, tahap kepuasan yang dicapai adalah tinggi, menunjukkan bahawa aplikasi ini direka dengan berkesan untuk memberikan pengalamn yang meuaskan kepada pengguna.

Jadual 4 Analisis statistik bagi faktor kepuasan pengguna

Faktor	**Kekerapan**					**n**	**Sisihan Piawai**
Kepuasan Pengguna	**1**	**2**	**3**	**4**	**5**	**4.27**	
Saya berpuas hati dengan aplikasi ini.	0	0	1	14	7	4.27	3.80
Aplikasi ini berfungsi seperti yang dijangkakan.	0	0	0	16	6	4.27	4.14

KESIMPULAN

kajian ini menunjukkan bahawa aplikasi e-Leptospirosis telah berjaya mendapatkan penilaian yang positif dalam beberapa aspek utama, termasuk kebergunaan, mudah guna, reka bentuk, dan kepuasan pengguna secara keseluruhan. Penilaian yang positif ini mencerminkan keberkesanan aplikasi dalam menyediakan maklumat terperinci dan menyampaikan pengalaman yang interaktif serta memuaskan kepada pengguna.

Keberkesanan aplikasi ini tidak hanya terletak pada kandungan yang disampaikan, tetapi juga pada cara penyampaian maklumat tersebut. Pendekatan interaktif yang digunakan, bersama dengan fokus terhadap kemudahan penggunaan, menunjukkan kesesuaian aplikasi dengan prinsip metodologi Agile. Metodologi Agile menekankan penglibatan pengguna secara aktif dalam proses pembangunan produk dan penambahbaikan berterusan. Dengan mengikut prinsip ini, aplikasi e-Leptospirosis tidak hanya memenuhi keperluan pengguna semasa, tetapi juga terbuka untuk penambahbaikan berdasarkan maklum balas yang diterima.

Melalui penglibatan pengguna yang berterusan, aplikasi ini berpotensi untuk terus diperbaiki dan disesuaikan mengikut keperluan dan kehendak pengguna. Ini bermakna maklumat berkaitan leptospirosis dapat disampaikan dengan lebih berkesan, memastikan pengguna memperoleh informasi yang tepat dan terkini. Peningkatan berterusan dalam aplikasi ini akan menjadikannya lebih responsif terhadap keperluan pengguna dan memastikan bahawa aplikasi ini bertindak sebagai alat pendidikan kesihatan yang adaptif.

Akhirnya, aplikasi e-Leptospirosis mempunyai potensi yang besar untuk menjadi lebih baik dalam menangani keperluan pendidikan kesihatan masyarakat. Dengan memberikan maklumat yang relevan dan bermanfaat, aplikasi ini diharapkan dapat memainkan peranan penting dalam meningkatkan kesedaran tentang leptospirosis dan langkah-langkah pencegahan yang diperlukan. Dengan itu, masyarakat dapat dilengkapi dengan pengetahuan yang diperlukan untuk melindungi diri mereka daripada risiko penyakit ini dan mengambil tindakan yang sesuai sekiranya mereka mengalami simptom berkaitan.

CADANGAN DAN IMPLIKASI

Aplikasi e-Leptospirosis mempunyai potensi yang besar dalam meningkatkan kesedaran dan pemahaman masyarakat mengenai penyakit leptospirosis, serta berperanan penting dalam usaha pencegahan penyakit tersebut. Dengan menyediakan maklumat yang jelas, terperinci, dan interaktif, aplikasi ini dapat membantu masyarakat memahami risiko yang berkaitan dengan leptospirosis dan langkah-langkah pencegahan yang perlu diambil. Penilaian positif terhadap kebolehgunaan aplikasi ini menunjukkan bahawa ia berfungsi dengan baik sebagai alat pendidikan kesihatan yang efektif. Penggunaan aplikasi ini tidak hanya memberi manfaat kepada individu, tetapi juga dapat menyokong usaha pihak berkuasa kesihatan dalam menyebarkan maklumat secara lebih efisien kepada masyarakat, terutamanya di kawasan yang mungkin kurang mendapat akses kepada sumber maklumat tradisional.

Walau bagaimanapun, kajian ini juga mengenal pasti ruang untuk penambahbaikan dalam aplikasi e-Leptospirosis. Antara penambahbaikan yang dicadangkan termasuklah menyediakan pilihan dwibahasa untuk memastikan maklumat dapat diakses oleh semua lapisan masyarakat, termasuk mereka yang tidak fasih dalam bahasa utama aplikasi. Dengan ini, pemahaman dan kesedaran tentang leptospirosis dapat diperkukuhkan di kalangan lebih ramai individu. Selain itu, menambah saluran servis pelanggan dan memperkenalkan ruang untuk pengguna memberi maklum balas adalah langkah penting yang dapat membantu meningkatkan pengalaman pengguna dan menjadikan aplikasi lebih mesra pengguna.

Melalui penambahbaikan yang dicadangkan ini, aplikasi e-Leptospirosis akan menjadi lebih berdaya saing sebagai alat pembelajaran dan sumber maklumat kesihatan digital. Pendekatan yang inklusif dan responsif ini bukan sahaja akan memperbaiki keberkesanan aplikasi dalam menyampaikan maklumat, tetapi juga dapat menyokong usaha pencegahan penyakit oleh pihak berkuasa kesihatan. Dengan adanya aplikasi yang lebih baik, diharapkan dapat mengurangkan kadar penularan leptospirosis di kalangan masyarakat.

Lebih jauh lagi, kejayaan aplikasi e-Leptospirosis boleh menjadi model untuk aplikasi pendidikan kesihatan lain di Malaysia. Dengan kebangkitan teknologi digital dalam pendidikan kesihatan, aplikasi seperti ini berpotensi untuk menjadi alat yang berkesan dalam meningkatkan literasi kesihatan masyarakat. Jika disokong oleh polisi yang mempromosikan penggunaan teknologi digital dalam pendidikan kesihatan, aplikasi seperti e-Leptospirosis dapat dimanfaatkan sepenuhnya untuk meminimumkan penularan penyakit berjangkit dan meningkatkan kesedaran tentang kesihatan awam di seluruh negara.

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BRIDGING THE DIGITAL DIVIDE IN MALAYSIA: ENHANCING DIGITAL LITERACY FOR INCLUSIVE STUDENTS IN EDUCATIONAL SYSTEMS

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ABSTRACT

In Malaysia, integrating digital technology into education has become increasingly prevalent. However, there remains a significant gap in addressing the digital literacy needs of inclusive students, who often face additional challenges in accessing and utilizing digital resources effectively. This paper explores the concept of digital literacy specifically tailored to meet the diverse needs of inclusive students in Malaysia. Despite the growing emphasis on digital literacy in education, inclusive students in Malaysia continue to encounter barriers that hinder their ability to develop essential digital skills. These barriers may include inadequate access to technology, limited training and support, and a lack of educational resources designed to accommodate diverse learning needs. Consequently, many inclusive students are at risk of being left behind in an increasingly digitalized society. This conceptual paper draws on a comprehensive review of existing literature related to digital literacy, inclusive education, and educational technology. The method used is observing and analyzing already existing information about digital literacy for inclusive students. The researcher utilized databases such as Scopus, WOS, and Google Scholar and conducted brief interviews with six teachers. There is a clear need for tailored approaches considering individual learning styles, disabilities, and socioeconomic backgrounds. Additionally, teacher training and professional development programs must be enhanced to ensure educators are equipped with the knowledge and skills needed to support inclusive students in developing digital literacy. In conclusion, this paper underscores the importance of prioritizing digital literacy for inclusive students in Malaysia.

Keywords: Digital literacy, Digital skills, Digital divide, Inclusive students, Inclusive education.

INTRODUCTION

Malaysia's dedication to digital literacy is clear through recent programs like the Digital Education Policy and the Digital Literacy Empowerment Program for Persons with Disabilities (PwD). This paper explores the significance of digital literacy for inclusive students in Malaysia, drawing from the country's efforts to guarantee equitable access to digital resources as well as to bridge the digital divide. The Malaysian government's Digital Education Policy, launched in 2023, aims to equip all students with essential digital skills, emphasizing the integration of digital technology into the learning environment (Ministry of Education, 2023). Notably, this policy is essential in a country where proficiency in digital literacy is required to access and utilize digital resources. In particular, the strategy should be comprehensive, focusing on bridging the educational disparities among pupils and guaranteeing that everyone is included (Sharimana et al., 2012).

The Digital Literacy Empowerment Program for PwD aims to promote inclusion by facilitating connections between individuals with disabilities and government entities, thus ensuring their active involvement in government programs (Watch, 2023). This program aims to increase awareness, educate the community on preventing cybercrime, safeguard internet users from online threats, and improve the digital literacy of the disabled community. Furthermore, Malaysia's initiatives to enhance digital literacy extend beyond students and PwD. The government has implemented programs like the #MyDigitalWorkforce movement to enhance the personal digital literacy levels of Malaysians. This initiative is a component of a comprehensive plan to tackle the digital gap as well as to ensure that every Malaysian possesses equitable access to digital resources and government services (Jean Cabico, 2021).

Digital literacy is crucial for students in Malaysia to ensure inclusivity, along with the United Nations Sustainable Development Goals (SDGs) aimed at fostering a digitally adept generation. Malaysia strives for a more inclusive and equitable society by tackling the digital divide as well as ensuring equal access to digital resources (Abiddin et al., 2022). This article will examine the obstacles and advantages related to digital literacy for diverse students in Malaysia, focusing on the country's recent efforts and the wider scope of digital inclusion. Accordingly, this study seeks to analyze the present condition of digital literacy in Malaysia and the initiatives to enhance it. The goal is to contribute to the

discussion on digital inclusion and the significance of digital literacy in promoting a fairer society.

Digital Literacy

Digital literacy is a crucial talent in today's world, involving the capacity to analyze, assess, and produce digital content in various educational settings (Gutiérrez-Ángel et al., 2022). This concept, first introduced by Gilster (1997), has evolved to include a wide range of skills and competencies essential for navigating the digital world. The concept of digital literacy in education can be broken down into three primary categories: i) digital literacy, ii) digital learning, and iii) digital skills for the 21st century's workforce. In order to highlight the significance of information and technology in relation to this subject matter, these streams are supported by technological and informed foundations (Myskova, 2019).

The distinct digital literacy components in the three primary categories are interrelated and mutually reinforcing. Digital literacy is enhanced by information literacy and the continuous advancement of digital skills and competencies, which include analyzing, evaluating, and producing digital content. Notably, these qualities are essential for people to navigate and thrive in the digital world effectively. As such, digital learning involves utilizing digital technology to improve teaching and learning, requiring individuals to possess digital literacy and proficiency in creating and interacting with digital content. Moreover, proficiency in digital literacy serves as the basis for developing crucial 21st-century abilities like teamwork, communication, and critical thinking, which are vital for thriving in the digital era (Timotheou et al., 2023).

A systematic literature review conducted by researchers from Education and Information Technologies identified six key factors that define the literature on digital literacy in learning and education: i) information literacy, ii) developing digital literacy, iii) digital learning, iv) information and communication technology (ICT), v) social media, as well as vi) 21st-century digital skills (Audrin & Audrin, 2022). In addition, the literature review emphasizes the significance of digital literacy in terms of strengthening parental participation, fostering inclusiveness, addressing disparities, and improving educational attainment. Hence, it is possible for educators to build comprehensive and efficient ways to prepare students for success in a digital world if they have a thorough awareness of the major variables and streams connected with digital literacy among pupils (Peng & Yu, 2022).

Malaysia's education system has made strides toward integrating digital literacy, particularly with the introduction of the Malaysia Education Blueprint

(2013-2025). It emphasizes leveraging technology in teaching and learning. However, despite progress, there remains a significant digital divide, particularly for students with disabilities and those from rural or underserved communities. Moreover, many schools, especially in remote areas, lack adequate infrastructure, access to high-speed internet, and updated devices, making it challenging to provide equitable digital learning opportunities (Mohamed et al., 2012; Sulaiman & Halamy, 2021). Additionally, students with disabilities face barriers in accessing adaptive technologies and digital tools tailored to their learning needs.

The level of digital literacy among students in Malaysia varies, often correlated with factors like socioeconomic status, geographic location, and access to technology (Moorthy & Sahid, 2022). On average, students attending schools in urban areas and from higher-income families tend to have greater exposure to technology and higher levels of digital skills (Bidin et al., 2022). However, a significant digital divide still exists between rural and urban schools. Many rural schools lack computers and internet connectivity, leading to less technology experience for these students. Overall, Malaysia is still working to improve digital literacy education across the board (Mohamed Shuhidan et al., 2022). The government has initiatives to provide more educational technology resources to schools. Nevertheless, challenges remain in teacher training on digital skills, outdated school IT infrastructure, and unequal access outside of school. Many students rely primarily on mobile devices over computers for internet access. Furthermore, more equity, updated technology, and digital literacy embedded into curriculums can help improve skills for all Malaysian students. Despite that, digital proficiency is currently highly variable, depending on each student's experiences and access to technology. Therefore, closing the digital divide should be a priority as Malaysia develops its workforce for the 21st century.

To bridge this gap, several steps can be taken. First, there should be greater investment in infrastructure, ensuring that all schools, regardless of location, have the necessary technological tools and internet connectivity (Norman et al., 2022). Secondly, teachers need more professional development focused on digital literacy and inclusive teaching practices, enabling them to effectively integrate technology into their classrooms for all learners (Ella Anastasya Sinambela, Rahayu Mardikaningsih, S. Arifin, 2020; Morgan et al., 2014). Furthermore, the government and private sectors should collaborate to provide affordable or subsidized devices and software, particularly focusing on students with disabilities. This ensures that assistive technologies are available and functional in mainstream education settings (Ayob et al., 2022). Lastly, creating localized digital content that caters to Malaysia's diverse linguistic and

cultural landscape would further support inclusive learning, making digital literacy accessible to all students.

LITERATURE REVIEW

Inclusive Students in Malaysia

The term “inclusive education” describes an ideology and strategy that aims to offer all students, irrespective of their backgrounds, abilities, or disabilities, equal access to education (Black-Hawkins et al., 2022). The goal is to embrace diversity in the classroom and create a supportive and welcoming environment for students from all walks of life. Students who are considered “inclusive” in an educational context include those with physical, developmental, intellectual, or sensory disabilities (Imaniah & Fitria, 2018). Rather than being segregated into separate special education programs, students with disabilities can learn alongside their non-disabled peers when schools adopt an inclusive model. Moreover, inclusion also encompasses students from disadvantaged socioeconomic backgrounds, Indigenous students, students struggling academically, and other marginalized groups (Scullin & Griffin, 2023).

Implementing inclusion in schools requires removing barriers and adapting instruction to meet the needs of all students. This involves changes in policy, culture, and practice. Schools utilize approaches like Universal Design for Learning (UDL), assistive technologies, differentiated instruction, and individualized accommodations to support inclusion (Schaur & Koutny, 2023). Teachers require training and support to effectively educate classrooms with diverse learning styles and needs. Notably, an inclusive curriculum reflects and values diversity. As such, schools must secure adequate resources and facilities tailored to support students with varying requirements (Alsarawi & Sukonthaman, 2023). In Malaysia, inclusive education aims to enable every student, irrespective of their background, abilities, or disabilities, an equal opportunity to education. This indicates embracing diversity in the classroom and ensuring schools are welcoming and supportive environments for all students (Epler Ed., 2018). At the same time, students with disabilities and special education needs are included alongside their non-disabled peers rather than segregated into separate special education programs (Imaniah & Fitria, 2018).

Implementing digital literacy initiatives for inclusive students requires consideration of their diverse abilities and backgrounds. Students with disabilities may need adaptive technologies, accessibility features, and accommodations to develop digital skills equitably (Evmenova, 2020). Furthermore, students from

disadvantaged backgrounds with less exposure to technology should receive more opportunities to build foundational computer and internet proficiency. Thus, digital literacy education must be designed using the principles of UDL to proactively meet the needs of all students (Walsh, 2017). This involves providing information through multiple means, offering diverse options to demonstrate skills, and stimulating interest and motivation for learning. Moreover, educators require training on how to teach digital literacy using inclusive strategies like assistive devices, clear instructions, modeling, modified materials, and flexible pacing (Pendy, 2023).

Significance of Digital Literacy in Education

Digital literacy has become essential in the 21st-century educational landscape, crucial in preparing students for an increasingly digital world. As Ng (2012) argued, digital literacy encompasses the ability to use technology effectively and the capacity to locate, evaluate, create, and communicate information using digital tools. In education, this multifaceted skill set enables students to engage more deeply with learning materials, collaborate effectively with peers, and develop critical thinking skills vital for academic success and future employability (Eshet-Alkalai, 2004).

The significance of digital literacy in education extends beyond mere technological proficiency. It fundamentally transforms the learning process and educational outcomes. According to a study by Fallon (2020), students with higher levels of digital literacy demonstrate improved academic performance across various subjects, enhanced problem-solving abilities, and greater engagement in self-directed learning. Additionally, as educational institutions increasingly incorporate online and blended learning models, digital literacy becomes a prerequisite for students to fully participate in and benefit from these modern educational approaches (Mohammadyari & Singh, 2015).

Furthermore, digital literacy is crucial in bridging educational inequalities and promoting inclusive education. As highlighted by Van Deursen and Van Dijk (2014), the digital divide is not merely about access to technology but also about the skills required to use it effectively. Hence, by fostering digital literacy, educational systems can empower students from diverse backgrounds, including those with disabilities, to access a wider range of educational resources and opportunities. This empowerment is particularly significant in developing countries like Malaysia, where enhancing digital literacy can transform social mobility and economic development (Alam et al., 2018).

Teacher Knowledge in Digital Literacy

For students to develop digital literacy skills that prepare them to navigate the modern world, teachers must have specialized knowledge and competencies in educational technology. Teacher training and professional development are crucial to building pedagogical digital literacy – effectively leveraging technology for student-centered learning (Falloon, 2020). This requires moving beyond just technical proficiency to a deeper understanding of embedding digital tools in teaching. Therefore, teachers need to develop expertise in universal design for diverse learners, equity of access, assistive technologies, customized instruction, multimodal learning, and ethical digital citizenship (Disonglo & Limpot, 2023). With holistic preparation, teachers can facilitate engaging technology-enriched instruction that enables all students to gain digital literacy for academics, careers, and life.

Developing teacher competency in digital skills and Pedagogies

In order to cultivate effective digital literacy among students, it is imperative that teachers possess a robust competency in digital skills and adeptness in utilizing technology for instructional purposes (Kuncoro et al., 2022; Liu et al., 2020). Both pre-service and in-service training programs must focus on several key areas to ensure comprehensive development. This includes technical proficiency, encompassing the ability to operate digital devices, troubleshoot issues, and utilize software and apps effectively while also understanding the strengths and limitations of various technologies (Disonglo & Limpot, 2023; Ronzhina et al., 2021). Additionally, fostering information literacy is crucial, involving skills in searching for, evaluating, and ethically using digital information, as well as verifying the credibility of online sources. Furthermore, teachers need to be equipped with competencies in content creation, online communication, classroom technology integration, customization, and data literacy and privacy to effectively leverage technology in their teaching practices (Basilotta-Gómez-Pablos et al., 2022; Ng et al., 2023).

Moreover, effective technology integration in classrooms necessitates a shift in the mindset of teachers from traditional direct instruction to facilitating digitally-enabled student-centered active learning environments. Therefore, professional training programs should prioritize the development of skills that enable teachers to act as facilitators in such environments, empowering students to engage actively with digital tools and resources (Ibda et al., 2023). This entails enhancing technical competencies and honing pedagogical skills to foster creativity, collaboration, critical thinking, and personalized learning experiences. Accordingly, by embracing a student-centered approach supported by

technology, teachers can better cater to diverse learner needs and abilities. This, ultimately, fosters more engaging and effective educational experiences (Schmid et al., 2022; Spieker, 2021).

In conclusion, developing teacher competency in digital skills and pedagogies is essential for promoting digital literacy among students. Pre-service and in-service training programs should focus on equipping teachers with technical proficiency, information literacy, content creation abilities, online communication skills, classroom technology integration strategies, customization techniques, and data literacy and privacy awareness (Pozas & Letzel, 2023; Roll & Ifenthaler, 2021). Moreover, fostering a shift in teacher mindset toward facilitating digitally-enabled student-centered active learning environments is crucial. By empowering teachers with the necessary skills and mindset, education can be transformed to more effectively fulfill the requirements of students in the 21st century in an increasingly digital world.

Fostering Inclusive Digital Literacy Instruction

Fostering inclusive digital literacy instruction requires teachers to possess specific knowledge and strategies tailored to accommodate diverse classroom learning abilities and backgrounds. This entails adopting principles of universal learning design, which involves proactively designing instruction using digital tools in flexible ways to support learners through multiple means of representation, engagement, and expression (Erwin & Mohammed, 2022; Eutsler & Perez, 2022). Furthermore, teachers must address issues of equity and access, guaranteeing that every student, irrespective of socioeconomic status or background, possesses equal opportunities and support to develop foundational technology skills. This includes bridging digital divides and providing necessary resources and assistance to mitigate barriers to digital literacy (Kateryna et al., 2020).

Furthermore, teachers need to be adept in leveraging assistive technologies to facilitate the full engagement of students with disabilities in digital literacy development (Alsolami, 2022). This involves understanding and implementing specialized technologies tailored to meet the unique needs of individual students (Park et al., 2022). Additionally, accommodations play a crucial role in fostering inclusivity, with teachers tasked with tailoring projects, materials, and pacing to accommodate students requiring modified digital literacy instruction according to their specific needs and abilities (Schaaf, 2018). Note that by receiving training in these key areas, teachers can develop the expertise needed to effectively facilitate inclusive digital literacy instruction that empowers and meets the needs of all students. This includes employing multimodal instruction using multimedia tools and platforms to provide options for how

students access content and demonstrate knowledge. It also fosters digital citizenship by promoting safe, ethical, and responsible technology use within diverse sociocultural contexts. At the same time, establishing strong family and community partnerships is essential. It allows teachers to gain insights into students' technology experiences outside the classroom and collaborate with families to support learning goals effectively.

The literature on digital literacy in Malaysia's education system highlights significant efforts to integrate technology and digital skills into teaching and learning, as envisaged in policies like the Malaysia Education Blueprint (2013-2025). However, challenges remain in ensuring equitable access to digital resources, particularly for marginalized groups such as students with disabilities and those in rural areas. Studies have proven that while digital infrastructure and teacher training have improved, the uneven distribution of resources and lack of inclusive, accessible technologies create barriers to bridging the digital divide (Ismail & Hassan, 2023; Rahman et al., 2022).

A significant gap exists in addressing the unique needs of inclusive students, who require more than just access to technology but also tailored interventions such as adaptive learning tools, accessible platforms, and culturally relevant digital content. Additionally, there is a lack of empirical research assessing the long-term impact of digital literacy initiatives specifically for inclusive students in Malaysia. This gap underscores the need for future studies focusing on developing and implementing inclusive digital literacy strategies supported by emerging technologies like AI and personalized learning platforms to ensure all students benefit from the digital age.

METHODOLOGY

This article is a concept paper that does not follow a specific research methodology. Therefore, researchers observe and analyze already existing information regarding digital literacy for inclusive students. To support the existing information, researchers conduct a simple interview with teachers.

Population and Sampling

The sampling used is purposive. Table 1.0 below summarizes the information of the study participants involved.

Table 1.0: Participants Profile

Participants	Position	Sex	Age	Teaching Experience (Year)
P1	Counsellor	Female	42	18
P2	Academic Teacher	Female	40	15

P3	Academic Teacher	Male	38	12
P4	Senior Assistant Teacher	Female	48	22
P5	Senior Assistant Teacher	Male	54	20
P6	Principal	Male	57	30

Data Collection

Researchers conducted semi-structured interviews with six teachers who teach in special vocational education schools in Malaysia. The protocol interview used is by "adopt and adapt" instruments developed by Madinah Mohd Yusuf (2013).

Data Analysis

All the transcripts were confirmed and rearranged, as well as the note report; the researcher began to organize the data management to get the themes of the research findings with the help of Atlas.Ti 9.0. Once all the data is processed and the overall data and pattern of study findings are produced, the researcher prepares a set of expert consent forms for the themes constructed by the researcher. In addition, the process of obtaining the value of the reliability coefficient will be implemented by calculating the value of the Cohen Kappa agreement coefficient.

DISCUSSION

Challenges of Inclusive Students in Digital Literacy

In today's educational system, literacy in digital media is crucial for academic and professional success. Despite that, there are particular obstacles to digital literacy for inclusive students, including kids from various socioeconomic backgrounds, individuals with impairments, and culturally and linguistically diverse (Loignon et al., 2021). These difficulties arise from various sources, including differences in cultural background and language proficiency, different learning styles and preferences, and inequalities in internet access and accessibility (Torres et al., 2022). In order to promote inclusive digital literacy development and guarantee that every student possesses fair access to digital learning opportunities, it is imperative to tackle these problems. Hence, to promote equal opportunity and engagement in the digital age, this paper analyzes the various challenges faced by inclusive students in the area of digital literacy and suggests ways to overcome them.

Access Disparities

Disparities in the availability of computers and the internet pose substantial challenges to inclusive students' ability to become digital citizens. As such, lack of access to educational resources and participation in online learning activities is a significant barrier for many students from marginalized groups or low-income homes due to a lack of trustworthy digital devices and internet connectivity (Peláez et al., 2022). In addition, pupils in more isolated or rural locations may

not have access to adequate infrastructure, which widens the digital gap and makes it harder for them to acquire the necessary digital skills. In digital learning environments, inclusive students encounter difficulties keeping up with their classmates and fully engaging without equal access to technology.

Accessibility Barriers

Due to a lack of accessibility features and allowances, inclusive students with disabilities encounter specific problems when navigating digital settings, on top of access inequities (Bong & Chen, 2021). Students with disabilities have additional challenges when accessing and engaging with digital materials since traditional platforms and content do not always consider their needs (Subban et al., 2022). Consequently, students with motor disabilities may have trouble navigating and using input methods, while students with vision impairments may have trouble using screen readers. Thus, it might be challenging for inclusive students to acquire necessary digital literacy skills when they are not included in digital learning experiences due to a lack of proper accessibility measures.

Cultural and Linguistic Diversity

Cultural and linguistic diversity also significantly hinder inclusive pupils' digital literacy. Digital information that does not represent the experiences or viewpoints of students from varied cultural and linguistic backgrounds could be challenging for these kids to understand in multicultural classrooms (Shaeffer, 2019). Furthermore, digital learning resources can be challenging for students whose first language is different from the language of instruction due to language obstacles. In addition, students' self-assurance and competence in navigating digital platforms and making good use of digital technologies may be impacted by cultural variations in digital usage standards and practices (Mohamed Shuhidan et al., 2022). Therefore, in order to provide digital learning spaces that are welcoming to all students, regardless of their background or language, it is crucial to eliminate barriers related to culture and language.

Learning Needs and Preferences

To effectively promote digital literacy, it is necessary to suit the different learning requirements and preferences of inclusive students. Due to the wide range of students' backgrounds, interests, and ability levels in inclusive classrooms, it may be impossible to use a cookie-cutter approach to teaching digital skills (Lai & King, 2020). While some kids do better with more guided, one-on-one lessons, others may do better with less structure and more hands-on practice. To compensate for these variations and provide every student with a fair chance to become digitally literate, educators should employ adaptive technology and personalized learning pathways (Falloon, 2020). Additionally, teachers can make

online classes accessible for all students by considering their strengths and weaknesses in learning style and aptitude.

It is critical that schools immediately implement targeted interventions and structural adjustments in response to the difficulties inclusive students encounter while trying to become digitally literate. However, it is challenging to guarantee that every student has equitable access to opportunities for digital learning due to accessibility discrepancies, hurdles, cultural and linguistic diversity, and different learning demands (Safari et al., 2023). A more accessible and inclusive digital learning environment is possible if educators and legislators recognize and resolve these challenges. For inclusive students to succeed in the digital age, educational institutions must work together to close the digital divide, offer personalized assistance, and encourage cultural responsiveness (Kovinthan & McPherson, 2017). Hence, promoting digital literacy that is accessible to all students is crucial for achieving equity, which in turn helps students reach their full potential and builds a more just society.

Strategies to Enhance Digital Skills for Inclusive Students

As the world becomes more digital, it is essential for people from all backgrounds to acquire digital skills. Ensuring fair access and successful learning experiences for all students, regardless of their different origins and abilities, is a complex challenge. A comprehensive approach is required to tackle this difficulty, incorporating various solutions customized to the specific needs and situations of inclusive learners (Mañas-Viniegra et al., 2023). Notably, educational institutions can create inclusive digital learning environments that empower every student to develop essential digital skills by incorporating UDL principles, personalized learning pathways, accessible technology, collaborative learning opportunities, culturally relevant content, continuous feedback and assessment, teacher professional development, and community partnerships (Borin et al., 2022). This paper delves into these tactics, emphasizing their significance in promoting digital literacy and guaranteeing all students' complete involvement and achievement in the digital era. Diagram 1 below displays strategies to enhance digital skills for inclusive students.

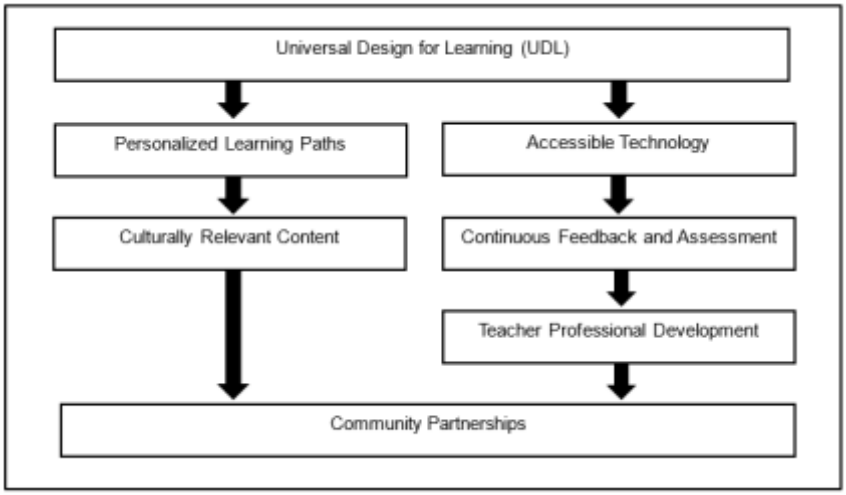

Diagram 1: Strategies to Enhance Digital Skills for Inclusive Students

Universal Design for Learning (UDL)

Utilize UDL principles to build digital classrooms that are accessible and adaptable to each student's unique needs and learning style. To cater to a wide range of demands, offer several ways of being represented, engaging, and expressing oneself.

Personalized Learning Paths

Ensure that each student's digital skill development plans are unique based on their interests, strengths, and career aspirations. To personalize learning and offer targeted assistance where it is required, use adaptive learning technology and data-driven insights.

Accessible Technology

Ensure that students with impairments can easily access digital resources to enhance their skills. Assistive technology, such as screen readers, other input methods, and captioning, to name a few, can be provided to ensure that all users can fully participate.

Collaborative Learning Opportunities

In order to encourage cooperation, communication, and social inclusion, digital projects and learning experiences should be encouraged where students work together. Collaborate on digital assignments as a class and help the students build on one another's talents.

Culturally Relevant Content

Add various viewpoints, cultural allusions, and real-life examples to online course materials. Correspondingly, valuing students' experiences and origins and

helping them comprehend digital skills in varied cultural contexts encourages inclusion.

Continuous Feedback and Assessment

Ensure educators evaluate and comment on progress rather than final results on a frequent basis. To help students improve their digital skills and quickly fill up any gaps in their knowledge, educators should employ formative assessment strategies and adaptive feedback tools.

Teacher Professional Development

Educators can benefit greatly from professional development initiatives that teach them to be more digitally literate and create inclusive online classrooms. Considering the diverse range of digital skills possessed by their students, meeting their demands is imperative. Hence, the teachers must be there to provide support and guidance.

Community Partnerships

Work with local groups, businesses, and other interested parties to provide internships, mentorship programs, and other experiential learning opportunities. Students develop a sense of community and can better apply their digital abilities to potential future jobs.

Ultimately, fostering digital literacy among inclusive students goes beyond basic technical competence. It opens doors to modern-day equity, empowerment, and opportunity. Therefore, educational institutions must ensure that all students possess access to the resources they require to succeed, irrespective of their socioeconomic standing or physical ability, in today's digital world by making digital skill development an inclusive priority (Ronzhina et al., 2021). We can overcome the digital divide and build inclusive classrooms where diversity is valued. Note that every student has a chance to succeed by implementing personalized learning pathways, accessible technology, and collaborative learning opportunities. This also includes culturally relevant content, ongoing assessment and feedback, teacher professional development, and community partnerships. In addition to improving digital literacy, these tactics promote inclusivity, empathy, and innovation, laying the groundwork for a future where everyone can succeed. Table 2.0 provides a comparative analysis of education with and without digital literacy, drawing on findings from existing research.

Table 2.0: Comparative Analysis of Education With and Without Digital Literacy

Study	Education with Digital Literacy	Education without Digital Literacy	Key Findings
Ismail & Hassan (2023)	Increased access to diverse learning materials and resources, enabling personalized learning.	Limited access to resources leads to a one-size-fits-all approach to teaching.	Digital literacy improves engagement and knowledge retention, especially for inclusive students.
Rahman et al. (2022)	Promotes collaboration and critical thinking through interactive tools like online platforms.	Traditional methods focus on rote learning, limiting critical thinking and collaborative opportunities.	Digital tools foster higher-order thinking skills and problem-solving abilities.
Chin & Koo (2021)	Allows for adaptive learning technologies, supporting students with disabilities effectively.	Students with disabilities face significant barriers due to a lack of adaptive and accessible materials.	Digital literacy provides better accommodations for diverse learners.
Musa (2020)	Enhances student engagement through gamified and multimedia content, increasing motivation.	Passive learning models lead to lower engagement and motivation, especially for students in rural areas.	Digital literacy enhances motivation and participation, particularly in underserved communities.
Tan et al. (2019)	Supports the development of 21st-century skills such as communication, collaboration, and creativity.	Limited exposure to digital tools results in gaps in key skills like digital communication and creativity.	Education with digital literacy better prepares students for the modern workforce by developing essential skills.
Ismail & Hassan (2023)	Increased access to diverse learning materials and resources, enabling personalized learning.	Limited access to resources leads to a one-size-fits-all approach to teaching.	Digital literacy improves engagement and knowledge retention, especially for inclusive students.

Table 2.0 clearly indicates that education with digital literacy offers enhanced learning outcomes. This includes better engagement, access to diverse resources, personalized learning, and inclusivity for students with disabilities. In contrast, education without digital literacy tends to rely on outdated methods that lack the flexibility to meet diverse learners' needs and hinder the development of critical skills**.**

CONCLUSION, IMPLICATION AND SUGGESTION

The findings of this study suggest that bridging the digital literacy gap for inclusive students in Malaysia's education system goes beyond technological integration. It is about creating equitable access to opportunities, fostering empowerment, and providing a pathway for all students to thrive in an increasingly digital society. Therefore, by employing strategies such as UDL, personalized learning pathways, and accessible technologies, educational institutions can create environments where diversity is celebrated. Every student, regardless of their background or abilities, has the opportunity to reach their full potential. These approaches enhance digital literacy and promote inclusivity, empathy, and innovation, which are essential in shaping a more equitable future for Malaysia.

However, this study acknowledges its limitations as a conceptual framework. The reliance on existing literature, which may not fully capture the rapid evolution of technology, limits its scope. Additionally, the focus on Malaysia reduces the generalizability of its findings to other contexts. Thus, future research should focus on empirical studies to assess the practical implementation of digital literacy strategies across diverse educational settings, including longitudinal studies to gauge long-term effects. Furthermore, comparative research across different countries could provide valuable insights into best practices, and examining the role of emerging technologies could further support the development of inclusive digital literacy in Malaysia. Nevertheless, these future research directions have the potential to inform more effective policies that empower inclusive students with the skills required to succeed in a digital world.

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Analisis Kadar Pulangan Pendidikan TVET Mengikut Jantina dalam Kalangan Graduan ILKBS

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ABSTRAK

Kerajaan Malaysia telah melabur secara konsisten dalam pembangunan modal insan untuk mencapai status negara maju, berdaya saing dan berpendapatan tinggi menjelang tahun 2025. Selaras dengan usaha ini, kerajaan telah memperuntukkan RM 6.7 bilion di bawah tujuh (7) kementerian utama yang melaksanakan pelbagai inisiatif Pendidikan dan Latihan Teknikal dan Vokasional (TVET) dalam pemerkasaan pendidikan TVET. Oleh itu, kajian ini mengkaji kadar pulangan pendidikan bagi graduan lelaki dan graduan wanita di Institut Latihan Kemahiran Belia dan Sukan (ILKBS) Malaysia. Secara khusus, objektif kajian ini adalah untuk menganggarkan kadar pulangan pendidikan untuk graduan ILKBS dan membandingkan kadar pulangan pendidikan kepada graduan ILKBS mengikut jantina. Kajian ini menggunakan Model Persekolahan Mincer (1974) untuk menganggarkan kadar pulangan pelaburan pendidikan dalam kalangan graduan lelaki dan graduan wanita ILKBS Malaysia. Penyelidikan ini menggunakan tinjauan kuantitatif yang melibatkan seramai 3517 orang graduan ILKBS pada Majlis Konvokesyen kali ke-11 IKBN/IKTBN. Data dikumpulkan dan dianalisis menggunakan Kaedah Penganggaran Kuasa Dua Terkecil (OLS). Dapatan kajian ini menunjukkan bahawa kadar pulangan persendirian pendidikan bagi graduan lelaki dan graduan wanita masing-masing ialah 15.1 peratus dan 18.8 peratus. Selanjutnya, kajian ini juga mendapati bahawa purata pulangan persendirian pendidikan untuk graduan lelaki dan graduan wanita pada peringkat diploma masing-masing ialah 16.9 peratus dan 17.9 peratus. Hasil kajian memberi petunjuk

bahawa pelaburan dalam pembangunan modal insan graduan TVET akan menghasilkan pulangan yang lebih besar pada masa akan datang. Kajian ini juga menunjukkan bahawa kemahiran graduan ILKBS mempunyai nilai yang tinggi serta memenuhi kehendak industri seperti jaminan pekerjaan. Pulangan pendidikan tinggi ini juga membantu meningkatkan sumber pendapatan individu dan membaiki tahap sosial dan ekonomi yang menyumbang kepada kesejahteraan keluarga.

Kata Kunci : Kadar Pulangan Pendidikan, Perbezaan Jantina, Graduan ILKBS, Pendidikan TVET, Pembangunan Modal Insan

ABSTRACT

The Malaysian government has consistently invested in human capital development to achieve developed, competitive, and high-income nation status by 2025. In line with this effort, the government has allocated RM 6.7 billion under seven (7) key ministries that implement various Technical and Vocational Education and Training (TVET) initiatives to empower TVET education. Therefore, this study examines the rate of return on education for male and female graduates at the Institut Latihan Kemahiran Belia dan Sukan (ILKBS) in Malaysia. Specifically, the objectives of this study are to estimate the rate of return on education for ILKBS graduates and compare the rate of return by gender. The study employs the Mincer Schooling Model (1974) to estimate the rate of return on educational investment among male and female graduates of ILKBS in Malaysia. This research utilizes a quantitative survey involving 3,517 ILKBS graduates at the 11th IKBN/IKTBN Convocation Ceremony. Data were collected and analyzed using the Ordinary Least Squares (OLS) estimation method. The findings of this study indicate that the average private return on education for male and female graduates is 15.1 percent and 18.8 percent, respectively. Furthermore, the study also finds that the average private return on education for male and female graduates at the diploma level is 16.9 percent and 17.9 percent, respectively. The results suggest that investing in the human capital development of TVET graduates will yield greater returns in the future. This study also shows that the skills of ILKBS graduates hold high value and meet industry demands, such as job security. These higher educational returns contribute to increased individual income and improve social and economic conditions, ultimately benefiting family well-being.

Keywords: Rate of Return on Education, Gender Differences, ILKBS Graduates, TVET Education, Human Capital Development.

PENGENALAN

Malaysia kini sedang mengorak langkah ke arah ekonomi berasaskan revolusi industri keempat (IR4.0) yang menekankan Teknologi Automasi sebagai perangsang kepada pertumbuhan ekonomi dalam mencapai matlamat Malaysia untuk menjadi negara membangun dan kompetitif serta berpendapatan tinggi menjelang 2020 (Azlina 2020). Sehubungan dengan ini, Program Transformasi

Kerajaan yang di lancarkan pada tahun 2010 telah mengiktiraf kepentingan pendidikan dalam pembentukkan modal insan yang mahir, produktif dan inovatif (Pelan Pembangunan Pendidikan Malaysia 2013-2025). Oleh itu, kerajaan Malaysia telah mendorong institusi Pendidikan Teknikal dan Latihan Vokasional (TVET) untuk menawarkan program dan latihan yang lebih kompetitif serta memenuhi keperluan industri, yang memberikan jaminan pekerjaan kepada para graduan(Rita et.al., 2014). Kini, kerajaan Malaysia juga berusaha untuk mengambil langkah yang sama dalam meningkatkan pelaburan dalam sektor pendidikan TVET yang mensasarkan keberhasilan graduan TVET seramai 650,000 orang tenaga mahir berkualiti menjelang tahun 2025 melalui asas Pelan Pembangunan Pendidikan Malaysia (Pendidikan Tinggi), 2015-2025.

Pelaburan dalam pendidikan dari prasekolah hingga pendidikan tinggi bertujuan untuk menghasilkan tenaga kerja berkualiti, yang tidak hanya memperkukuhkan pembangunan individu, tetapi juga meningkatkan status sosioekonomi (JPM, 2015). Perbelanjaan dalam sektor pendidikan dipandang sebagai pelaburan individu melalui pelbagai bentuk ganjaran seperti upah, elaun, bonus, dan gaji (Naziatul, Rahmah, & Poo, 2012). Pelaburan ini dirancang untuk memberikan pulangan positif dalam bentuk peningkatan pendapatan individu serta, pada tahap yang lebih luas, pendapatan agregat, yang pada gilirannya menyumbang kepada pertumbuhan ekonomi (Psacharopoulos, & Patrinos, 2004).

Walaupun kadar kemasukan ke universiti awam didominasi oleh pelajar perempuan berbanding pelajar lelaki, namun, terdapat kecenderungan yang berbeza di Politeknik dan Kolej Komuniti, di mana kadar pendaftaran bagi pelajar lelaki (50,827) jauh lebih tinggi berbanding pelajar perempuan, yang hanya 11,569 (Kementerian Pengajian Tinggi, 2016). Baru-baru ini, telah diperhatikan bahawa bidang-bidang seperti Automotif, Terapi Sukan, Kejuruteraan Angkasa Aero, Mekanikal, Elektronik, Elektrik, Fotografi, dan lain-lain didominasi oleh pelajar lelaki. Hal ini disebabkan oleh kecenderungan pelajar lelaki yang lebih tertarik kepada bidang-bidang teknikal (Kementerian Belia dan Sukan, 2023).

Kerajaan telah memperuntukan sejumlah RM 6.7 bilion di bawah tujuh (7) kementerian utama untuk menjalankan pelbagai inisiatif dengan tujuan memperkuatkan pendidikan vokasional dan teknikal (TVET). Sebagai contoh, sebanyak RM 180 juta telah diperuntukkan sebagai Dana Latihan TVET kepada Perbadanan Tabung Pembangunan Kemahiran. Dana ini bertujuan untuk memberikan pinjaman kepada 12,000 pelatih yang mengikuti Program Persijilan Kemahiran Malaysia. Selain itu, Kerajaan juga akan meneruskan program Sistem Latihan Dual Nasional dengan peruntukan RM 20 juta untuk menyokong latihan 3,000 pelatih. Langkah-langkah ini secara langsung membantu

memperkukuh ekonomi Malaysia dengan menyediakan tenaga kerja terampil yang diperlukan di pasaran buruh, sambil memenuhi sasaran Transformasi Nasional 2050 (TN50) yang merangkumi peningkatan jumlah pekerja terlatih hingga mencapai 35 peratus menjelang tahun 2020, dan seterusnya, 100 peratus menjelang tahun 2050.

Walaupun kerajaan Malaysia telah melaksanakan pelbagai inisiatif untuk memperkukuh pendidikan Teknikal dan Vokasional (TVET) serta meningkatkan kadar kemasukan pelajar dalam bidang ini, masih terdapat kekurangan kajian empirikal mengenai kadar pulangan pelaburan pendidikan di kalangan graduan lelaki dan wanita di Institut Latihan Kemahiran Belia dan Sukan (ILKBS). Dalam konteks ini, penting untuk mengkaji sejauh mana pelaburan pendidikan TVET memberi pulangan positif terhadap pendapatan individu dan status sosioekonomi graduan. Selain itu, perbezaan jantina dalam kadar pulangan pendidikan juga perlu diteliti untuk memahami faktor-faktor yang mempengaruhi pendaftaran dan kejayaan dalam program TVET, serta langkah-langkah yang boleh diambil untuk meningkatkan penyertaan pelajar perempuan dalam bidang teknikal yang berpotensi tinggi.

Justeru itu, kajian ini bermatlamat bagi meninjau kadar pulangan pelaburan pendidikan dalam kalangan graduan golongan lelaki dan graduan golongan wanita ILKBS bagi menaikkan sumber pendapatan individu dan membaiki tahap sosial dan ekonomi serta mencapai kehidupan yang bertaraf dan kesejahteraan keluarga. Kajian ini membantu menzahirkan sebuah modal insan berkemahiran dan berpotensi menjadi pekerja cekal dan kompeten pada arena globalisasi negara dalam mencapai hasrat negara membangun dan meninggikan pendapatan pada 2025. Secara khusus, matlamat penyelidikan ini terdiri daripada dua (2) matlamat penting iaitu (1) menganalisis kadar pulangan persendirian bagi graduan lelaki dan graduan wanita ILKBS berdasarkan tahun persekolahan di Malaysia; dan (2) membandingkan kadar pulangan persendirian bagi graduan lelaki dan graduan wanita ILKBS berdasarkan tahap pendidikan (Sijil dan Diploma) di Malaysia.

LITERATUR KAJIAN

Model Persekolahan Mincer adalah satu pendekatan standard untuk menilai pulangan pelaburan dalam pendidikan yang diperkenalkan oleh Jacob Mincer pada tahun 1974. Model ini telah menjadi satu tonggak dalam ekonomi empirikal dengan menjelaskan hubungan antara pelaburan dalam bidang ilmu dan hasil berbentuk pendapatan seperti gaji, pendapatan, elaun, dan bonus. Model ini menghubungkan pengalaman persekolahan, pendapatan semasa, dan pelaburan selepas tamat persekolahan (Schult, 1971; Becker, 1962). Konsep ini mengandaikan bahawa individu membuat pilihan mengenai tahap pendidikan

mereka dengan matlamat untuk memaksimumkan pendapatan sepanjang hayat dan mencapai pulangan yang lebih tinggi daripada kos pendidikan. Model ini digunakan untuk menganggar kadar pulangan peribadi, kecekapan pendidikan, dan untuk menilai kesan pengalaman kerja terhadap perbezaan gaji antara graduan lelaki dan graduan wanita (Husaina, 2012).

Model ini bertindak sebagai asas untuk kajian ekonomi pendidikan di negara-negara membangun. Dalam hal ini, kadar pulangan pendidikan seseorang dapat dikira dengan betul dan boleh dijadikan pedoman kepada perangka dasar dalam merangka perbelanjaan dalam pendidikan. Model Mincer digunakan dalam kajian terkini dalam pertumbuhan ekonomi bagi meneliti korelasi di pertumbuhan dan tahap purata persekolahan di seluruh negara. Dalam satu persamaan, kerangka kerja Mincer merangkap dua konsep ekonomi yang berbeza: (a) Log pendapatan yang mendedahkan bagaimana pasaran buruh memberi penilaian kepada atribut produktif seperti persekolahan dan pengalaman kerja dan (b) kadar pulangan persendirian yang boleh dibandingkan dengan kadar faedah untuk menentukan pelaburan modal insan yang optimum. Mincer memperoleh model empirikal dari Teori Model Insan. Menurut model ini, pendidikan (s) dipilih untuk memaksimumkan nilai semasa yang diharapkan dalam aliran pendapatan masa depan, T sebagai tarikh persaraan, diikuti Cs sebagai kos pendidikan (Husaina, 2012). Oleh itu, pada tahap pendidikan optimum (s), nilai semasa yang diharapkan bagi tahun persekolahan pendidikan (sth) ialah seimbang dengan kos yang dibiayai dalam tempoh persekolahan (sth) dan keseimbangan persamaan dicirikan seperti berikut:

$$\sum_{t=1}^{T-S} \frac{Ws - Ws\text{-}1}{(1 + rs)^1} = Ws\text{-}1 + Cs$$

di mana rs disebut sebagai *Internal Rate of Return* (IRR). Individu melakukan pelaburan yang optimum dalam pelanjutan tahun persekolahan pendidikan (sth) apabila pulangan ke sekolah lebih tinggi daripada kadar pulangan pasaran. Keseimbangan ini boleh dinyatakan seperti berikut:

$$\frac{Ws - Ws\text{-}1}{rs} = Ws\text{-}1 + Cs$$

di mana nilai T adalah besar. Jika nilai Cs tidak signifikan, maka ungkapan ini boleh disusun seperti berikut:

$$rs \approx \frac{Ws - Ws\text{-}1}{rs} \approx \log Ws - \log Ws\text{-}1$$

Ini bermakna kadar pulangan tahun persekolahan ialah perbezaan antara upah individu yang meninggalkan sekolah pada tahun s dengan individu yang meninggalkan sekolah pada tahun s-1 tahun. Persamaan Model Persekolahan Mincer (1974) yang digunakan dalam kajian ini adalah sama dengan kajian Husaina (2012) seperti berikut:

$$\text{In } Yi = \beta_o + \beta_1(S_i) + \beta 2(EXP_i) + \beta_3(EXP_i)^2 + \mu$$

Dalam persamaan ini, In Yi log pendapatan bulanan, β ialah parameter yang dianggarkan, S adalah bilangan tahun persekolahan, EXP sebagai tahap pengalaman bekerja individu, EXP^2 sebagai pengalaman kerja yang dikuasa duakan, i merupakan individu dan μ ialah keralatan.

Model Mincer, upah seseorang individu (Yi) sebagai pemboleh ubah bersandar diterima berdasarkan hitung panjang gaji bagi bilangan tahun diperlukan. Pendidikan adalah pembolehubah bebas, dinilai dengan memakai jumlah tahun sistem pendidikan formal (tahun persekolahan, S). Di negara kita, tempoh pendidikan sekolah rendah ialah enam (6) tahun dan lima (5) tahun lagi bagi pendidikan sekolah menengah. Pada amnya, tempoh tahun yang diperlukan bagi tahap pendidikan pada peringkat Sijil Tinggi Pelajaran Malaysia (STPM) adalah selama dua (2) tahun mana kala pada peringkat sijil, diploma dan ijazah memerlukan pengajian selama dua (2) hingga empat (4) tahun. Secara keseluruhannya, seseorang pelajar harus meneruskan pendidikan di Malaysia sekurang-kurangnya 15 tahun.

Pengalaman bekerja (EXP) dihitung melalui pengiraan tolak bilangan umur terkini responden dengan tahun alam persekolahan. Seterusnya, kiraan tersebut ditolakkan dengan tujuh (7) tahun lagi. Dalam erti kata lain, tujuh (7) tahun ini diistilahkan sebagai umur responden sebelum ditempatkan dalam darjah 1 seperti yang ditunjukkan berikut:

EXP = (Umur semasa responden – jumlah tahun persekolahan) – 7 tahun

Tempoh pengalaman bekerja tertakluk pada kadar pulangan berkurang, maka pengalaman bekerja akan dikuasa duakan (EXP^2). Kajian ini menggunakan Kaedah Penganggaran Kuasa Dua Terkecil (*OLS*) dalam proses pengukuran pendapatan jumlah gaji. Walau bagaimanapun, ini adalah usaha untuk memberikan perubahan pendidikan yang komprehensif untuk TVET ILKBS Malaysia. Dalam kajian ini, kaedah anggaran *OLS* akan digunakan kerana keterbatasan data.

Pendidikan merupakan satu unsur mustahak dalam pencapaian dan pembinaan rangka ekonomi yang konkrit, mapan, melonjakkan pendapatan negara serta mempertingkatkan kualiti hidup masyarakat (Ramlee, Mohd, Syed, & Seri, 2014; Nathakumar, Nur, & Mohd, 2009). Teori Modal Insan membuktikan bahawa pelaburan dalam pendidikan meningkatkan pendapatan individu, memantapkan sumber kewangan isi rumah, mengurangkan jurang kemiskinan, menjana pertumbuhan ekonomi serta meningkatkan sumber kewangan negara. Antara cendikiawan-cendikiawan yang melakukan kajian mengenai modal insan di sekitar tahun 1960an dan 1980an ialah Mincer (1974), Becker (1964) dan Dension (1962). Jadual 1 menerangkan perbincangan kajian literatur tentang kadar pulangan pendidikan yang telah dimulakan sejak 2010-2016.

Bil.	Tajuk	Penulis	Tahun	Negara	Saiz Sampel (n)	Metodologi	Dapatan
1.	*The Labour Market Effects of Vocational Education and Training in Australia*	Wang-Sheng Lee and Michael Coelli	2010	Australia	3, 500	*Ordinary Least Square Technique (OLS)*	Graduan Diploma Kemahiran Vokasional yang telah melengkapkan Tahun 12 berpeluang untuk mendapatkan pekerjaan yang jauh lebih baik untuk menguasai pasaran berbanding graduan Sijil Kemahiran Vokasional.
2.	Kadar Pulangan Pendidikan Mengikut Jantina Di Malaysia	Naziatul Aziah, Mohd Radzi, Rahmah Ismail dan Poo Bee Tin	2012	Malaysia	3, 636	*Ordinary Least Square Technique (OLS)*	Hasil penemuan menerangkan penambahan satu tahun alam akan menaikkan jumlah gaji yakni 3.43 peratus. Koefisien 4 pemboleh ubah gender signifikan dan positif menyatakan kesan gaji golongan graduan lelaki lebih tinggi yakni 42.33 peratus berbanding graduan wanita.
3.	*An Economic Analysis of Household Educational Decisions In Malaysia*	Husaina Banu Kenayatulla	2012	Malaysia	38, 083 (Survey, HIS) & 14, 084 (Surve	*Ordinary Least Square Technique (OLS)*	Hasil kajian mendapati pulangan pendidikan jauh lebih tinggi bagi graduan lelaki dan graduan wanita (masing-masing 38 peratus dan 49 peratus) di Zon Wilayah Tengah (Kuala Lumpur dan Selangor), diikuti Zon Selatan (masing-masing 22 peratus dan 27 peratus) dan

					y, HES)		Zon Timur (3 peratus dan 7 peratus, masing-masing) berbanding Zon Utara Malaysia.
4.	*Is School the Best Route to Skills? Returns to Vocational School and Vocational Skills in Egypt*	Caroline Krafft	2013	*United State of America*	8, 368	*Ordinary Least Square Technique (OLS)*	Dapatan kajian menerangkan penambahan satu tahun alam persekolahan akan melonjakkan jumlah pulangan sebanyak 10.20 peratus. Koefisien untuk pemboleh ubah gender signifikan dan positif. Ia memberikan kesan pulangan graduan lelaki lebih tinggi sebanyak 17.90 peratus berbanding graduan wanita.
5.	*Higher Levels of Education for Higher Private Returns: New Evidence from Malaysia*	Husaina Banu Kenayatulla	2013	Malaysia	38, 083	*Ordinary Least Square Technique (OLS)*	Dapatan kajian menerangkan penambahan satu tahun alam sekolah akan menaikkan anggaran pulangan iaitu 6.5 peratus dan 27.2 peratus masing-masing bagi graduan lelaki dan graduan wanita. Penambahan satu tahap sekolah dapat melonjak jumlah pulangan iaitu 15.5 dan 16.1 peratus masing-masing bagi graduan lelaki dan graduan wanita. Oleh itu, graduan harus meneruskan pendidikan sehingga ke peringkat universiti untuk mendapatkan pulangan yang lebih tinggi.

6.	*Higher Levels of Education for Higher Private Returns: New Evidence from Malaysia*	Husaina Banu Kenayatulla	2013	Malaysia	38, 083	*Ordinary Least Square Technique (OLS)*	Dapatan kajian menerangkan, pulangan pendidikan jauh lebih tinggi bagi pekerja graduan lelaki dan graduan wanita di Zon Barat.
7.	Pulangan Pendidikan antara Generasi di Malaysia	Tham Sook Fan, Ishak Yussof dan Rahmah Ismail	2013	Malaysia	7, 037	*Ordinary Least Square Technique (OLS)*	Hasil kajian menerangkan kadar pulangan pendidikan bagi ibu tinggi yakni 11.40 peratus daripada bapa (11.29 peratus) dan anak (8.98 peratus). Oleh yang demikian, anggaran kadar pelaburan modal pertama lebih tinggi daripada kadar pulangan pendidikan generasi kedua. Hasil kajian ini memberi implikasi dasar bahawa kerajaan harus menjana lebih banyak peluang pekerjaan khususnya pekerjaan yang berkemahiran dan berteknologi tinggi untuk generasi kedua untuk mentransformasikan ekonomi ke arah negara berpendapatan tinggi.
8.	*Returns to Education and Wage Differentials in Malaysia*	Mohd Nazhar Mohd Arshad and Gairuza	2014	Malaysia	55, 200	*Ordinary Least Square Technique (OLS)*	Dapatan kajian menerangkan penambahan satu tahun persekolahan akan melonjak anggarn pulangan sebanyak 10.9 peratus dan 13.85 peratus masing-masing bagi graduan lelaki dan graduan wanita. Koefisien pemboleh ubah gender signifikan dan bernilai

		zmi Mat Ghani					positif. Ia memberikan kesan pulangan golongan graduan lelaki tinggi yakni 40.0 peratus daripada graduan wanita.
9.	*The Private Rate of Return to a University Degree in Australia*	Anne Daly, Phil Lewis, Michael Corliss and Tiffany Heaslip	2015	Australia	8,545	*Net Present Value (NPV)*	Dapatan kajian menerangkan penambahan satu tahun alam sekolah akan meningkatkan kadar pulangan iaitu 14.5 peratus untuk golongan graduan lelaki Ijazah Sarjana Muda jauh lebih baik berbanding graduan wanita Ijazah Sarjana Muda iaitu 6.5 peratus.
10.	*Comparing the Labor Market Return to an Associate Degree and to A Bachelor's Degree*	Carol Xiang	2015	*United State of America*	8, 984	*Ordinary Least Square Technique (OLS)*	Dapatan kajian menerangkan kadar pulangan bagi graduan Ijazah Sarjana Muda (62 peratus) lebih tinggi berbanding pulangan bagi graduan Ijazah Bersekutu (33 peratus).
11.	*Return to Education and the Demand for labour in Vietnam*	Seamus McGuinnes, Ellish Kelly, Pham	2015	Vietnam	29, 532	*Ordinary Least Square Technique (OLS)*	Dapatan kajian mengambarkan tambahan satu tahun persekolahan akan meningkatkan kadar pulangan graduan wanita sebanyak 25.1 peratus (peringkat sekolah rendah), 71.9 peratus (graduan Ijazah Sarjana Muda) dan 120.0 peratus

		Thi Thu Phuong and Ha Thi Thu Thuy					(graduan Ijazah Tinggi) jauh lebih baik berbanding graduan lelaki.
12.	*Back to School? Labor-Market Returns to Vocational Postsecondary Education*	Petri Bockerman, Mika Haapanen and Christopher Jepsen	2015	*Finland*	36, 646	*Score Mathcing Method*	Dapatan kajian menunjukkan penambahan satu tahap alam sekolah dapat melonjak anggaran kadar pulangan sebanyak 8.0 peratus serta 8.7 peratus masing-masing bagi graduan lelaki dan graduan wanita. Oleh itu, graduan harus meneruskan pendidikan sehingga ke peringkat universiti untuk mendapatkan pulangan yang lebih tinggi.
13.	*Career Technical Education and Labor Market Outcomes: Evidence from California Community Colleges*	Ann Huff Stevens, Michal Kurlaender and Michel Grosz	2015	California	10, 467	*Score Mathcing Method*	Dapatan kajian menyatakan penambahan satu tahun alam sekolah dapat menaikkan kadar pulangan 23.0 peratus graduan Ijazah Vokasional jauh lebih baik berbanding graduan Sijil Vokasional (12.0 peratus). Pulangan terbesar ialah untuk program- program dalam penjagaan kesihatan bidang CTE yang berkaitan dengan kesihatan yang dianggarkan sebanyak 5 hingga 10 peratus.

14.	*Private Returns in Education in Pakistan: A Statistical Investigation*	Haroon Jamal	2015	Pakistan	9, 846	*Ordinary Least Square Technique (OLS)*	Dapatan kajian menerangkan penambahan satu tahun alam sekolah dapat melonjak anggaran pulangan 5.5 peratus bagi graduan berpendapatan gaji selepas mengawal hetergeneiti di pasaran wilayah di Pakistan. Ia menampilkan kesan pulangan golongan graduan lelaki lebih tinggi iaitu 9.2 peratus daripada graduan wanita.
15.	Pengaruh Latar Belakang Keluarga Terhadap Upah dan Kadar Pulangan Persekolahan Anak	Rahmah Ismail, Siti Mariam Wan Chek dan Ishak Yussof	2015	Malaysia	3, 885	*Ordinary Least Square Technique (OLS)*	Hasil penemuan menerangkan penambahan satu tahun alam sekolah dapat menaikkan jumlah upah yakni 3.4 peratus bagi Model 1. Model 2 dinilai menerusi penambahan pemboleh ubah dami ciri-ciri demografi, yakni gender (GEN), etnik Melayu (M), etnik Cina (C) dan kedudukan perkahwinan (MART). Model 2, koefisien bagi dami gender, etnik Melayu dan kedudukan perkahwinan penting dan mendapati golongan graduan lelaki mendapat gaji anggaran bulan lebih tinggi iaitu 8.1 peratus berbanding graduan wanita. Model 3 mengetengahkan implikasi ciri-ciri keluarga terhadap gaji anak-anak menerusi penambahan pemboleh ubah

							sepanjang alam sekolah bapa, jumlah masa persekolahan bapa, sepanjang tempoh persekolahan ibu dan pendapatan ibu bapa. Keputusan ini menyatakan penambahan satu tahun alam sekolah dengan kenaikan gaji anak iaitu 1.4 peratus
16.	*Higher Education, Changing Labour Market and Social Mobility in the Era of Massification in China*	Ka Ho Mok and Alfred M. Wu	2016	*China*	10, 000	*Ordinary Least Square Technique (OLS)*	Dapatan kajian menyatakan penambahan satu tahun alam sekolah dapat melonjak anggaran pelaburan modal iaitu 13.5 peratus bagi graduan Ijazah Sarjana Muda jauh lebih baik berbanding graduan Ijazah Diploma iaitu sebanyak 7..5 peratus.
17.	*Staying-On After Twenty-One: The Returns to Postgraduate Education*	Pamela Lenton	2016	*United Kingdom*	7, 835	*Roy Type Technique*	Dapatan kajian menerangkan tambahan satu tahun alam sekolah akan menaikkan jumlah pulangan iaitu 27.4 peratus. Koefisien untuk pemboleh ubah jantina ialah signifikan dan bernilai positif. Ia memberikan implikasi bahawa pulangan bagi graduan wanita lebih tinggi sebanyak 29.7 peratus berbanding graduan lelaki sebanyak 23.5 peratus.

18.	*Return To Education By Ethnicity: A Case of Malaysia*	Mohd. Nahar bin Mohd Arshad	2016	Malaysia	55, 220	*Ordinary Least Square Technique (OLS)*	Dapatan kajian menerangkan perbandingan etnik bagi mereka yang memiliki dari ijazah universiti, pulangan bagi etnik India ialah tinggi yakni 24.8 peratus, diikuti Bumiputra iaitu 22.6 peratus dan Cina 14.8 peratus.
19.	*What About Certificates? Evidence on the Labor Market Returns to Nondegree Community College Awards in Two States*	Di Xu and Madeline Trimble	2016	*United State of America*	67, 735	*Individual Fixed- Effects Approach*	Dapatan kajian menerangkan penambahan satu tahun alam sekolah dapat menaikkan meningkatkan jumlah pulangan bidang Penjagaan Kesihatan dan Jaminan Sosial sebanyak 34.0 peratus di North Corolina berbanding 20.0 peratus di Virginia.
20.	*Return To Education By Ethnicity: A Case of Malaysia*	Mohd. Nahar bin Mohd Arshad	2016	Malaysia	55, 220	*Ordinary Least Square Technique (OLS)*	Kadar pulangan pendidikan pekerja di Utara dan Timur lebih rendah daripada di Kuala Lumpur. Di semua model, graduan lelaki Bumiputra di Utara, memperoleh 27 peratus lebih rendah daripada rakan mereka di Kuala Lumpur. Pekerja bandar memperoleh 18.3 peratus lebih banyak berbanding pekerja luar bandar.

METODOLOGI KAJIAN

Sampel kajian ini terdiri daripada semua graduan ILKBS yang menamatkan pengajian di peringkat sijil (Tahap 1 dan Tahap 2), Sijil lanjutan (Tahap 3), Diploma Kemahiran Malaysia (Tahap 4), Diploma Kemahiran Lanjutan Malaysia (Tahap 5). Majlis Konvokesyen IKBN /IKTBN ke-11 di seluruh Malaysia telah disempurnakan oleh YB. Brigadier Jeneral Khairy Jamaluddin, Menteri Belia dan Sukan Malaysia pada 20 April 2015. Analisis empirikal dalam kajian ini menggunakan fungsi pendapatan modal insan untuk menganggarkan kadar pulangan pendidikan di Malaysia. Data dikumpulkan dan dianalisis menggunakan *OLS*.

Untuk soalan pertama, kajian ini bertujuan untuk menganalisis kadar pulangan pendidikan bagi graduan lelaki dan graduan wanita ILKBS berdasarkan tahun persekolahan di Malaysia, seperti yang ditunjukkan di bawah:

$$\text{In } Yi = \beta_o + \beta_1 (S_i) + \beta 2 (EXP_i) + \beta 3 (EXP_i)^2 + \beta 4D1 + \beta 5D2 + \mu$$

Dalam persamaan ini, In Yi log pendapatan bulanan, β ialah parameter yang dianggarkan, S adalah bilangan tahun persekolahan, EXP_i sebagai tahap pengalaman bekerja individu, EXP_i^2 sebagai pengalaman kerja yang dikuasa duakan, D1 ialah graduan lelaki, D2 ialah faktor lain (bangsa Melayu dan Cina) dan μ adalah keralatan.

Untuk soalan kedua, kajian ini bertujuan untuk menganalisis kadar pulangan pendidikan graduan lelaki dan graduan wanita ILKBS berdasarkan tahap pendidikan di Malaysia, seperti yang ditunjukkan di bawah:

$$\text{In } Yi = \beta_o + \beta 2 (EXP_i) + \beta 3 (EXP_i)^2 + \beta\ 4D1 + \beta 5D2 + \beta 6S1 + \mu$$

Dalam persamaan ini, In Yi log pendapatan bulanan, β ialah parameter yang dianggarkan, S adalah bilangan tahun persekolahan, EXP_i sebagai tahap pengalaman bekerja individu, EXP_i^2 sebagai pengalaman kerja yang dikuasa duakan, D1 adalah graduan lelaki, D2 ialah faktor lain (seperti bangsa Melayu dan Cina), S1 ialah tahap Diploma dan μ adalah keralatan.

DAPATAN KAJIAN

Kajian ini meliputi 3517 orang graduan ILKBS dalam Majlis Konvokesyen IKBN/IKTBN se-Malaysia pada tahun 2015, sebahagian besar merupakan graduan lelaki iaitu seramai 2416 orang graduan. Jumlah ini mewakili 68.7 peratus daripada keseluruhan responden. Manakala graduan wanita seramai 1101 orang (31.3 peratus).

Jadual 2 menerangkan kumpulan lingkungan umur 20 hingga 21 tahun adalah seramai 1690 orang. Jumlah ini mewakili 45.8 peratus daripada keseluruhan jumlah responden, diikuti oleh 22 hingga 23 tahun iaitu seramai 1125 orang (32.0 peratus), graduan berumur 24 hingga 25 tahun adalah seramai 608 orang (17.3 peratus), graduan berumur 26 hingga 27 tahun ialah 150 orang (4.2 peratus) dan akhirnya kumpulan lingkungan 28 hingga 29 tahun ialah seramai 25 orang yang bersamaan dengan 0.7 peratus. Jadual ini juga menerangkan kumpulan etnik bumiputera ialah jumlah responden tertinggi iaitu seramai 3390 orang. Jumlah ini mewakili 96.4 peratus daripada keseluruhan jumlah responden, disusuli dengan etnik cina iaitu seramai 72 orang (2.0 peratus) dan etnik India dan lain-lain adalah seramai 55 orang (1.6 peratus).

Jadual 2: ***Taburan Kekerapan dan Peratus Profil Responden***

Pemboleh ubah		Bil. Responden	Peratus (%)
Jantina	Graduan Lelaki	2416	68.7
	Graduan Wanita	1101	31.3
	Jumlah Responden	3517	100
Umur	20	382	10.9
	21	1227	34.9
	22	720	20.5
	23	405	11.5
	24	484	13.8
	25	124	3.5
	26	85	2.4
	27	65	1.8
	28	12	0.3
	29	13	0.4
	Jumlah Responden	3517	100
Bangsa	Bumiputera	3390	96.4
	Cina	72	2.0
	India/Lain-lain	55	1.6

Jumlah Responden	3517	100

Berdasarkan Jadual 3 di bawah, jumlah responden tertinggi memperoleh sijil (n=2946, 83.8 peratus) yang terdiri daripada Sijil Kemahiran Malaysia Tahap 1, Tahap 2 dan Sijil Lanjutan Kemahiran Malaysia Tahap 3. Responden diploma memperoleh Diploma Kemahiran Malaysia Tahap 4 dan Diploma Lanjutan Kemahiran Malaysia Tahap 5, iaitu seramai 571 graduan (16.2 peratus). Bilangan responden untuk sampel penuh secara berasingan, untuk graduan lelaki (n=2416) dan graduan wanita (n=1101) masing-masing 68.7 peratus dan 31.3 peratus.

Jadual 3 ***Taburan Kekerapan dan Peratus Profil Responden Pendidikan Tertinggi***

Pendidikan Tertinggi	Sampel Penuh N (%)	Graduan Lelaki n (%)	Graduan Wanita n (%)
Sijil	2946 (83.8)	1931 (80.0)	1015 (92.2)
Diploma	571 (16.2)	485 (20.0)	86 (7.8)
Jumlah	3517 (100)	2416 (68.7)	1101 (31.3)

Analisis Regresi

Kadar pulangan pendidikan bagi graduan lelaki dan graduan wanita ILKBS berdasarkan tahun persekolahan di Malaysia.

Jadual 4 di bawah menerangkan keputusan statistik ringkasan model penganggaran *OLS* bagi kadar pulangan pendidikan berdasarkan tahun persekolahan di Malaysia bagi sampel penuh (3517 orang) dan sampel penuh secara berasingan untuk graduan lelaki (2416 orang) dan graduan wanita (1101 orang) ILKBS. Soalan kajian ini menggunakan Model Persekolahan Mincer (1974) untuk menentukan pulangan persendirian antara graduan lelaki dan graduan wanita berasaskan tahun persekolahan TVET ILKBS di Malaysia.

Jadual 4

Keputusan Model Penganggaran OLS mengikut Jantina Berdasarkan Tahun Persekolahan dan Tahap Pendidikan

Pemboleh ubah	Tahun Persekolahan			Tahap Pendidikan		
	Sampel Penuh	Graduan Lelaki	Graduan Wanita	Sampel Penuh	Graduan Lelaki	Graduan Wanita
Pengalaman	0.029*	0.036*	0.017*	0.062*	0.069*	0.056*
	(0.004)	(0.005)	(0.006)	(0.006)	(0.008)	(0.010)
Pengalaman Kuasa Dua	0.003*	0.005*	0.002*	-0.007*	-0.009*	-0.005*
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Tahun Persekolahan	0.159*	0.151*	0.188*			
	(0.002)	(0.002)	(0.004)			
Diploma				0.343*	0.339*	0.357*
				(0.009)	(0.010)	(0.021)
Melayu	0.016**	0.034**	0.012**	0.059**	0.101*	0.053*
	(0.017)	(0.020)	(0.029)	(0.026)	(0.030)	(0.049)
Cina	0.023**	0.045**	0.029**	0.042**	0.087**	0.086**
	(0.014)	(0.026)	(0.047)	(0.034)	(0.038)	(0.079)
Graduan Lelaki	0.016*			0.006**		
	(0.005)			(0.007)		
Pemalar	5.219*	5.291*	4.859*	7.206 *	7.176*	7.314*
	(0.029)	(0.034)	(0.056)	(0.027)	(0.031)	(0.050)
Anggaran R^2	0.719	0.716	0.738	0.352	0.383	0.251
N	3517	2416	1101	3517	2416	1101

Nota: (*), signifikan pada aras keertian 1%; (**), signifikan pada aras keertian 5%

Pada lajur tahun persekolahan, pemboleh ubah persekolahan ditakrifkan sebagai pemboleh ubah berterusan (tahun persekolahan) dengan anggapan bahawa pulangan ke atas pendidikan adalah linear (tambahan setiap tahun persekolahan menghasilkan pulangan yang sama). Dalam model *OLS* (untuk graduan lelaki dan graduan wanita) kesan terhadap pengalaman dan pengalaman kuasa dua adalah signifikan serta mempamerkan hubungan langsung dan positif di antara pengalaman dan pendapatan. Koefisien bagi pembolehubah pengalaman kuasa dua yang positif memberikan implikasi bahawa pendapatan akan bertambah apabila pengalaman meningkat.

Jadual 5 *Jadual Nilai Pekali Koefisien Tahun Persekolahan*

Pemboleh ubah	Nilai Koefisien		
	Sampel Penuh	Graduan lelaki	Graduan wanita
Pengalaman	(exp (0.029) -1) * 100 = 2.9%	(exp (0.036) -1) * 100 = 3.7%	(exp (0.017) -1) * 100 = 1.7%
Bumiputera	exp (0.016) -1) * 100 = 1.6%	(exp (0.034) -1) * 100 = 3.5%	(exp (0.012) -1) * 100 = 1.2%
Cina	exp (0.023) -1) * 100 = 2.3%	(exp (0.045) -1) * 100 = 4.6%	(exp (0.029) -1) * 100 = 2.9%

Nilai koefisien yang dilaporkan di atas (Jadual 5) diperoleh selepas mengambil nilai pekali *exponential* (exp) dalam model *OLS* bagi sampel penuh secara berasingan untuk graduan lelaki dan graduan wanita ILKBS, seterusnya tolak dengan 1 dan akhirnya didarabkan dengan 100 peratus. Pendekatan yang sama telah digunakan untuk pekali etnik dalam model *OLS* bagi semua sampel penuh secara berasingan untuk graduan lelaki dan graduan wanita ILKBS. Contohnya, untuk nilai koefisien pengalaman sampel penuh (graduan lelaki) diperoleh seperti berikut:

Nilai Koefisien (Pengalaman) = (exp (Nilai Pekali Koefisien Beta) -1) * 100

= (exp (0.036) -1) * 100

= 3.7%

Tambahan satu tahun pengalaman meningkatkan pendapatan sebanyak 2.9 peratus, 3.7 peratus dan 1.7 peratus, masing-masing, untuk sampel keseluruhan graduan, graduan lelaki dan graduan wanita ILKBS. Dapatan kajian menerangkan bahawa sampel penuh graduan, graduan lelaki dan graduan wanita berbangsa bumiputera memperoleh pendapatan yang signifikan dan tinggi (1.6 peratus, 3.5 peratus dan 1.2 peratus, masing-masing) berbanding dengan kumpulan etnik India dan lain-lain. Dapatan kajian juga menerangkan apabila seorang individu graduan lelaki yang berbangsa Cina ditambah, pendapatan keseluruhan akan bertambah sebanyak 2.3 peratus berbanding daripada anggota kumpulan etnik India dan lain-lain. Dapatan kajian juga menerangkan apabila seorang individu graduan lelaki yang berbangsa Cina ditambah, pendapatan akan bertambah sebanyak 4.6 peratus sedangkan apabila seseorang individu wanita berbangsa Cina yang ditambah

pendapatan akan meningkat sebanyak 2.9 peratus berbanding daripada anggota kumpulan etnik India dan lain-lain. Kesimpulannya, kesan pekali tahun persekolahan ialah positif dan signifikan terhadap pendapatan bagi graduan lelaki dan graduan wanita. Purata pulangan persendirian pendidikan bagi keseluruhan sampel (N=3517) ialah 15.9 peratus. Bagi semua graduan yang terlibat dalam kajian ini, tambahan satu tahun pengalaman akan meningkatkan pulangan pendidikan sebanyak 15.9 peratus pada aras signifikan 0.01 peratus. Purata pulangan persendirian pendidikan bagi sampel penuh secara berasingan, bagi graduan lelaki (n=2416) dan graduan wanita (n=1101) masing-masing ialah 15.1 peratus dan 18.8 peratus pada aras signifikan 0.01 peratus. Purata pulangan persendirian pendidikan diperoleh dengan mendarabkan nilai pekali koefisien beta untuk tahun persekolahan dalam model *OLS* dengan 100 peratus Malaysia bagi sampel penuh dan sampel penuh secara berasingan untuk graduan lelaki dan graduan wanita ILKBS. Contoh pengiraan untuk tahun persekolahan dalam model *OLS* bagi sampel penuh adalah seperti berikut:

Purata pulangan persendirian pendidikan = Nilai Pekali Koefisien Beta x 100

= 0.159 x 100

= <u>15.9%</u>

Kadar pulangan pendidikan bagi graduan lelaki dan graduan wanita ILKBS berdasarkan tahun pendidikan di Malaysia.

Diketahui bahawa kadar pulangan ke atas pendidikan untuk tambahan tahun persekolahan ialah sama tanpa mengira tahap pendidikan di Malaysia. Analisis lebih lanjut telah dilakukan di mana pembolehubah tahun persekolahan berdasarkan tahap pendidikan sijil (Tahap 1, Tahap 2 dan Tahap 3) dan diploma (Tahap 4 dan Tahap 5). Dalam analisis ini, kategori sijil digunakan sebagai kumpulan rujukan untuk analisis dalam Jadual 3. Dalam model *OLS* (untuk graduan lelaki dan graduan wanita), pengaruh pengalaman terhadap pendapatan adalah positif dan signifikan. Pekali untuk pengalaman kuasa dua adalah negatif pada tahap 1 peratus dan ini menunjukkan bahawa pengalaman meningkat tetapi tidak dalam bentuk linear atau berterusan.

Tambahan satu tahun pengalaman meningkatkan pendapatan sebanyak 6.3 peratus, 7.1 peratus dan 5.8 peratus, masing-masing, untuk sampel keseluruhan graduan, graduan lelaki dan graduan wanita ILKBS. Dapatan kajian menerangkan bahawa sampel penuh graduan, graduan lelaki

dan graduan wanita berbangsa bumiputera memperoleh pendapatan yang signifikan dan tinggi (6.1 peratus, 10.6 peratus dan 5.4 peratus, masing-masing) berbanding dengan kumpulan etnik India dan lain-lain. Dapatan kajian juga menerangkan apabila seorang individu graduan lelaki yang berbangsa Cina ditambah, pendapatan keseluruhan akan bertambah sebanyak 2.3 peratus berbanding daripada anggota kumpulan etnik India dan lain-lain. Dapatan kajian juga menerangkan apabila seorang individu graduan lelaki yang berbangsa Cina ditambah, pendapatan etnik Cina graduan lelaki akan bertambah sebanyak 9.1 peratus sedangkan apabila seseorang individu wanita berbangsa Cina yang ditambah pendapatan akan meningkat sebanyak 9.0 peratus berbanding daripada anggota kumpulan etnik India dan lain-lain.

Jadual 6 *Jadual Nilai Pekali Koefisien Tahap Pendidikan*

Pemboleh ubah	Nilai Koefisien		
	Sampel Penuh	Graduan lelaki	Graduan wanita
Pengalaman	(exp (0.062) -1) * 100 = 6.3%	(exp (0.069) -1) * 100 = 7.1%	(exp (0.056) -1) * 100 = 5.8%
Bumiputera	exp (0.059) -1) * 100 = 6.1%	(exp (0.101) -1) * 100 = 10.6%	(exp (0.053) -1) * 100 = 5.4%
Cina	exp (0.042) -1) * 100 = 4.3%	(exp (0.087) -1) * 100 = 9.1%	(exp (0.086) -1) * 100 = 9.0%

Nilai koefisien yang dilaporkan di atas (Jadual 6) diperoleh selepas mengambil nilai pekali *exponential* (*exp*) dalam model *OLS* bagi sampel penuh secara berasingan untuk graduan lelaki dan graduan wanita ILKBS, seterusnya tolak dengan 1 dan akhirnya didarabkan dengan 100 peratus. Pendekatan yang sama telah digunakan untuk pekali etnik dalam model *OLS* bagi semua sampel penuh secara berasingan untuk graduan lelaki dan graduan wanita ILKBS. Contohnya, untuk nilai koefisien pengalaman sampel penuh (graduan lelaki) diperoleh seperti berikut:

Nilai Koefisien (Pengalaman) = (exp (Nilai Pekali Koefisien Beta) -1) * 100

= (exp (0.069) -1) * 100

= 7.1 %

Kesimpulannya, kesan pekali tahun persekolahan ialah positif dan signifikan terhadap pendapatan bagi graduan lelaki dan graduan wanita. Purata pulangan persendirian pendidikan bagi keseluruhan sampel (N=3517) ialah 17.2 peratus. Bagi semua graduan yang terlibat dalam kajian ini, tambahan satu tahun pengalaman akan meningkatkan pulangan pendidikan sebanyak 17.2 peratus pada aras signifikan 0.01 peratus. Purata pulangan persendirian pendidikan bagi sampel penuh secara berasingan, bagi graduan lelaki (n=2416) dan graduan wanita (n=1101) masing-masing ialah 16.9 peratus dan 17.9 peratus pada aras signifikan 0.01 peratus. Purata pulangan persendirian pendidikan diperoleh dengan kaedah berikut:

Kadar Pulangan Pendidikan (Sampel Penuh) $r_i = (\beta_i - \beta_i) \div (S_i - S_i) * 100$

$= (0.343 - 0) \div (15.5 - 13.5) * 100$

= 17.2%

β_i ialah tahap pendidikan di pusat bertauliah ILKBS iaitu SKM Tahap 2, SKM Tahap 3, DKM Tahap 4 dan DLKM Tahap 5. S_i ialah tahun bersekolah di peringkat pendidikan i (SKM Tahap 1 (11.50 tahun), SKM Tahap 2 (12.25 tahun), SKM Tahap 3 (13.50 tahun), DKM Tahap 4 (14.50 tahun) dan DLKM Tahap 5 (15.50 tahun).

PERBINCANGAN

Kadar pulangan pendidikan bagi graduan lelaki dan graduan wanita ILKBS berdasarkan tahun persekolahan di Malaysia.

Hasil keputusan statistik ringkasan model anggaran *OLS*, menjelaskan purata pulangan pendidikan berdasarkan tahun persekolahan di Malaysia untuk keseluruhan sampel (N=3517) adalah 15.9 peratus. Dapatan ini jauh lebih baik daripada kajian yang dilakukan oleh Naziatul, Rahmah, dan Poo (2012) di mana peningkatan dalam satu tahun pendidikan membantu menghasilkan pulangan sebanyak 13.4 peratus. Kajian yang dilakukan oleh Tham, Ishak, dan Rahmah (2013) mendapati bahawa peningkatan dalam satu tahun pendidikan meningkatkan pulangan sebanyak 11.52 peratus. Ini bermakna bahawa tambahan tahun persekolahan dapat membantu para graduan mendapat pulangan pendidikan tinggi secara berterusan. Dengan kata lain, semakin tinggi tahun persekolahan, semakin tinggi pulangan yang diperoleh oleh setiap graduan (Psacharopoulos, & Patrino 2004). Untuk sampel penuh secara

berasingan, pulangan pendidikan bagi graduan lelaki (n=2416) dan graduan wanita (n=1101) masing-masing adalah 15.1 peratus dan 18.8 peratus. Dapatan ini seiring dengan kajian Pamela, 2016 di mana pulangan bagi graduan wanita lebih tinggi (29.7 peratus) berbanding graduan lelaki sebanyak 23.5 peratus di negara United Kingdom. Penambahan satu tahun alam sekolah dapat melonjak pulangan sebanyak 8.0 peratus (lelaki) serta 8.7 peratus (wanita) di negara Finland (Petri, Mika, & Christopher, 2015). Ini menjelaskan bahawa dengan tambahan tahun persekolahan, peluang pekerjaan tambahan pekerja wanita dipertingkatkan sejajar dengan pembangunan dasar baru untuk menampung pekerja perempuan yang sudah berkahwin, termasuk memberi intensif cuti bersalin dan penjagaan anak perkhidmatan (Husaina, 2016). Kajian yang dilakukan oleh Caroline (2013) membuktikan bahawa graduan Kolej Vokasional jauh lebih baik daripada Sekolah Vokasional khususnya untuk meningkatkan pendapatan individu dan memperbaiki status isi rumah dengan stabil kerana graduan dapat menikmati pulangan pendidikan sebanyak 18.6 peratus dari industri berkaitan.

Kadar pulangan pendidikan bagi graduan lelaki dan graduan wanita ILKBS berdasarkan tahap pendidikan di Malaysia

Penemuan model anggaran *OLS* menjelaskan bahawa purata pulangan pendidikan berdasarkan pendidikan tertinggi mereka untuk keseluruhan sampel (N=3517) adalah 17.2 peratus. Di samping itu, penemuan menunjukkan bahawa pulangan pendidikan diploma untuk graduan lelaki dan graduan wanita masing-masing 16.9 peratus dan 17.9 peratus. Anggaran pelaburan modal graduan Ijazah Diploma iaitu sebanyak 7.5 peratus di negara China (Ka, & Alfred, 2016). Kajian Ann, Michal dan Michel (2015) menyatakan penambahan satu tahun alam sekolah dapat menaikkan kadar pulangan 23.0 peratus graduan Ijazah Vokasional jauh lebih baik berbanding graduan Sijil Vokasional (12.0 peratus) di negara California. Di negara Pakistan, penambahan satu tahun alam sekolah dapat melonjak anggaran pulangan 5.5 peratus bagi graduan diploma berbanding graduan sijil (Haroon, 2015). Ini menjelaskan bahawa pulangan pendidikan graduan diploma jauh lebih baik daripada graduan sijil. Penemuan sedemikian juga menunjukkan bahawa pulangan pasaran pekerja lebih tinggi bagi wanita berbanding lelaki dengan pendidikan diploma. Vincent dan Cornel (2014) berpendapat bahawa siswazah yang mengikuti latihan teknikal memperoleh pendidikan pulangan 14.8 peratus berbanding sekolah menengah.

KESIMPULAN, IMPLIKASI DAN CADANGAN

Penemuan kajian ini memberi pandangan kepada pembuat dasar mengenai kepentingan pelaburan dalam sektor TVET. Kerajaan Malaysia membuka peluang kepada graduan kemahiran untuk melanjutkan pelajaran ke peringkat ijazah dengan kerjasama Universiti Teknikal Malaysia (UTeM) dan Universiti Kuala Lumpur (UniKL). TVET memainkan peranan penting dalam menyediakan tenaga kerja mahir yang diperlukan untuk pertumbuhan dan transformasi ekonomi Malaysia. Penemuan ini memberi pandangan kepada ibu bapa bahawa sektor TVET memberikan pulangan positif dan ibu bapa harus mempertimbangkannya sebagai jalan alternatif untuk pengembangan kemahiran dan meningkatkan taraf hidup. Ibu bapa perlu memberi lebih banyak keyakinan dan sokongan kepada anak-anak mereka untuk mendapat ilmu dan kemahiran dalam bidang TVET kerana bidang ini mampu menghasilkan modal insan yang berpengetahuan, tenaga kerja yang berkemahiran tinggi, berakhlak mulia, intelektual dan berdaya saing (Kementerian Pendidikan Malaysia (KPM), 2015) untuk meningkatkan pendapatan isi rumah, memperbaiki status sosio ekonomi dan mencapai negara berpendapatan tinggi yang dapat meningkatkan ekonomi (Abdul, 2004) serta mengatasi cabaran Revolusi Industri 4.0.

Secara keseluruhan, hasil kajian menunjukkan terdapat pulangan positif terhadap tahap pendidikan ILKBS. Pulangan pelaburan yang lebih tinggi menunjukkan bahawa terdapat peluang pekerjaan yang lebih baik dan berkualiti untuk graduan TVET. TVET akan menjadi pemacu utama bagi usaha kerajaan untuk menghasilkan pekerja yang sangat berkemahiran, berintelektual dan bersahsiah tinggi sehingga mengurangkan pergantungan negara kepada buruh asing. Kerajaan Malaysia mendorong untuk menawarkan program latihan yang lebih kompetitif dan memenuhi keperluan industri, dengan jaminan pekerjaan melalui peruntukan yang besar khususnya dalam meningkatkan kompetensi dan pembangunan belia.

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Interplay Exploration of Problematic Internet Usage, Social Isolation and Attitudes: A Quantitative Study Among University Students in Malaysia

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ABSTRACT

Internet overuse is a growing global concern, with addiction and social isolation becoming increasingly prevalent. This study aims to examine the problematic Internet usage and its link to social isolation among the students by assessing their attitudes towards Internet use, its purpose, social isolation, and Internet addiction. A quantitative approach utilizing a questionnaire survey was employed and 440 students from University Putra Malaysia was selected using a stratified random sampling method. The majority of participants (78.3%) fell within the younger age bracket of 18 to 23 years. The study sample predominantly comprised Malay (66.8%) and Muslim (68.9%) students. Chinese students constituted 25% of the sample, while Indians represented 3.9%. The largest religious minority were Buddhists (19.1%), followed by Christians (7.5%). 30% of respondents reported a monthly income between 2100 to 3000 Malaysian Ringgit. Significant associations were found between attitudes towards Internet use and both social isolation and Internet addiction. Similarly, statistically significant relationships were observed between the purpose of Internet use, social isolation, and Internet addiction. However, no significant correlations were found between age, income, Internet addiction, and social isolation. Additionally, ANOVA results indicated no significant mean differences between religion and Internet addiction, although a significant difference was noted for social isolation. This study provides valuable insights for educators, counselors, and

policymakers to develop effective programs combating internet addiction among students. By understanding the link between internet use, attitudes, and social isolation, targeted interventions can be created to promote healthy online habits and student well-being.

Keywords: Internet Addiction, Social isolation, Attitudes and Purpose of using Internet, Religion, Age and Income

INTRODUCTION

The Internet has revolutionized how we communicate, work, and interact globally (Golwala, 2024). Its value in education, entertainment, and information dissemination makes Internet use an indicator of societal progress (Lozano-Blasco et al., 2022). Providing access to vast information resources, the Internet fosters collaboration, democratizes knowledge, and enables remote work (Jelleli et al., 2024).

However, alongside its benefits, concerns have arisen regarding the potential for addictive behaviors associated with excessive Internet use, akin to substance addiction, as highlighted in both media discourse and clinical studies (Berdin & Saules, 2019; Gregory, 2019; Hematababd, 2022; Saadati et al., 2021). Despite offering connection and numerous benefits, excessive digital media use can ironically lead to increased feelings of isolation and loneliness, especially when it displaces face-to-face interaction and real-world engagement (Primack et al., 2017).

The American Psychiatric Association (2013) defines Problematic Internet Use (PIU) as a cluster of symptoms including preoccupation with the internet, loss of control over its use, withdrawal symptoms when not online, negative impacts on daily functioning (such as neglecting responsibilities or relationships), and attempts to deceive others about the extent of use. This definition highlights the potential for internet use to become problematic and disrupt an individual's life. In addition, PIU is characterized by excessive or poorly controlled preoccupations, urges or behaviors regarding computer use and Internet access that lead to impairment or distress (Wartberg et al., 2016). Moreover, Internet addiction can lead individuals to neglect real-life responsibilities, jeopardizing their well-being and relationships. Excessive Internet use can lead to a decline in face-to-face interactions, which can worsen feelings of isolation, especially for those already experiencing social difficulties (Chadha et al., 2024; Strand et al., 2020). This decline in real-world social engagement can have broader negative consequences, impacting psychological well-being, academic performance, and occupational success (Saletti et al., 2021).

Individuals who spend excessive time online may find it difficult to maintain healthy relationships, perform well in school or work, and manage their emotional health. This highlights the importance of balanced Internet use and prioritizing in-person social connections to mitigate potential negative outcomes.

Although we live in an increasingly connected world, loneliness is prevalent and considered a "modern behavioral epidemic." (Jeste et al., 2020, p. 1). It's important to distinguish between social isolation, which is an objective lack of social ties, and loneliness, a subjective feeling of disconnection (Gorji et al., 2019). While social isolation can contribute to loneliness, it's not the sole cause. Loneliness can arise even when surrounded by people if those relationships lack meaning or depth. This highlights the need to foster genuine social connections and address the growing gap between individuals and their social environment, despite the prevalence of digital communication tools (Çiçek, 2021). We need to go beyond simply increasing connectivity and focus on cultivating meaningful relationships to combat this pervasive issue.

Problematic Internet Use (PIU) is a growing global concern, with a recent meta-analysis indicating a worldwide prevalence of approximately 7% (Pan et al., 2020). This issue is particularly alarming in Malaysia, where increased access to digital devices and Internet connectivity has contributed to a rise in Internet addiction among students. Excessive online engagement often leads to detrimental effects on academic performance, psychological well-being, and social relationships (Li Ping Wong et al., 2021; Mohamad et al., 2021).

Internet addiction among Malaysian students has become a significant public health issue, characterized by obsessive online behaviors and negative consequences. Research indicates a substantial proportion of Malaysian students fall into the categories of problematic or addicted internet users. A survey conducted at a Malaysian public university revealed that 7.8% of students were classified as internet addicts, while a staggering 56.5% were identified as problematic users (Rosliza et al., 2018). These findings underscore the urgent need for interventions to address this growing problem and promote healthy internet use habits among Malaysian students.

Research has shown a strong link between problematic Internet use (PIU) and increased feelings of loneliness and boredom. A study by Orsolini et al. (2023) found that individuals with PIU reported significantly higher levels of these emotions compared to those without PIU. This finding is supported by a comprehensive meta-analysis of 26 articles (Costa et al., 2019; Saadati et al.,

2021) which revealed a moderate but significant correlation between loneliness and PIU.

The analysis concluded that excessive Internet use can contribute to social isolation and a lack of fulfilling real-life experiences, leading to increased feelings of loneliness. Against this backdrop, the present study aims to explore the interplay between attitudes toward the Internet, its purpose, Internet addiction, and social isolation among Malaysian youth, considering factors such as age, income, and religion.

Building upon existing research, this study seeks to address the following objectives:
1. Investigate the impact of attitude toward Internet on social isolation and Internet addiction.
2. Examine the relationship between the purpose of Internet use, social isolation, and Internet addiction.

To this end, the following hypotheses are proposed to explore potential associations among Internet usage patterns, addiction, and social isolation:

H1: Religion positively correlates with social isolation and Internet addiction.
H2: Age and income positively correlate with Internet addiction and social isolation.

LITERATURE REVIEW

Attitudes and purpose of using Internet and Internet addiction

In the digital age, comprehending individual attitudes towards Internet usage is paramount for deciphering online behaviors and interactions. Attitudes, as defined by Perloff (2017), are learned predispositions towards an entity, encompassing an evaluative dimension that elicits either favorable or unfavorable sentiments. These sentiments subsequently influence cognitive processes and behavioral patterns.

It is crucial to distinguish attitudes from values and beliefs. Values, serving as guiding principles in life, shape attitudes, while beliefs,

representing specific cognitions about the world, constitute the building blocks of attitudes (Perloff, 2017). Therefore, analyzing attitudes towards Internet usage provides valuable insights into individuals' navigation and engagement within the digital realm. This understanding is essential for researchers and practitioners alike in fields such as psychology, sociology, and communication studies.

Social media and communication applications, as essential components of modern life in Malaysia, play significant roles in community building, expressing ideas, and business marketing. Understanding the prevalence and patterns of Internet use, including online activities and preferences, provides a context for investigating its impact on individuals (Kamel, 2019). In Malaysia, Facebook is known to be the most popular social network followed by Instagram, YouTube, Google+, Twitter and finally LinkedIn respectively. Many people also use the Internet to do their online banking transactions, or to purchase things online. 84.9% of online banking users check their account balance, history of banking transactions, and other related data (Kamel, 2019).

Internet addiction and social isolation

Internet addiction, a multifaceted construct encompassing various manifestations such as cybersex addiction, compulsive Internet use, addiction to online relationships, uncontrollable information seeking, and gaming addiction, represents a spectrum of problematic behaviors associated with internet activities (Hoeg & Parisi, 2019). This complex phenomenon has garnered significant attention from researchers due to its potential impact on individuals' psychological well-being and social functioning.

One critical area of investigation within the realm of Internet addiction is its relationship with social isolation and loneliness. Social isolation, characterized by an objective lack or scarcity of social contact and infrequent interactions with others (Badcock et al., 2022; Donovan & Blazer, 2020), can have profound effects on individuals' mental and physical health. Loneliness, a related but distinct concept, is defined as the subjective, negative feeling of inadequate meaningful connections stemming from an unmet need or discrepancy between desired and actual social relationships (Prohaska et al., 2020).

Loneliness encompasses two key components: an emotional component, characterized by unpleasant, negative feelings, and a social cognition component, involving the perception of social disconnection from others

coupled with a desire for connection (Badcock et al., 2022). It is important to acknowledge that loneliness can manifest as both a transient, normative experience and a chronic condition with detrimental consequences for physical and mental health (Akhter-Khan & Au, 2020).

A growing body of research has explored the intricate link between Internet addiction and loneliness. A 2021 systematic review and meta-analysis by Saadati et al. (2021)revealed a moderate association between these two constructs. Furthermore, studies have demonstrated a linear relationship, indicating that individuals with a higher degree of Internet addiction exhibit greater levels of loneliness compared to those with lower levels of Internet addiction (Saadati et al., 2021)

Nowland et al. (2018) in their comprehensive review of the literature on the relationship between Internet use and loneliness, proposed the "displacement hypothesis." This hypothesis posits that when the Internet is utilized to enhance existing social relationships and cultivate new social connections, it serves as a valuable tool for mitigating loneliness. However, when Internet use becomes a means of escaping the social world and withdrawing from social interactions, it can exacerbate feelings of loneliness.

The displacement hypothesis suggests that lonely individuals who turn to the Internet as a refuge from social interaction may inadvertently reduce their engagement in offline social activities. This highlights the need for psychological support to help these individuals manage their Internet use in a way that fosters existing relationships and facilitates the formation of new ones (Smith & Alheneidi, 2023).

Empirical evidence supports the complex interplay between Internet use, loneliness, and individual characteristics. A survey conducted in Kuwait and Saudi Arabia involving over 500 participants found that loneliness was associated with both problematic Internet use and the number of hours spent online (Smith & Alheneidi, 2023). Notably, younger participants reported greater loneliness compared to older participants, and those experiencing higher levels of loneliness frequently obtained news about the pandemic from social media. The quality of relationships with individuals with whom participants spent their time during lockdown was also correlated with loneliness.

According to a study conducted by Choi (2021), using social media has both direct and indirect influence on individuals' negative feelings through social isolation and risk perception which in turn have a direct impact on negative emotions with their mediating role between the variable of using social media and negative emotions. In another study, Mak, Chan, Lee, & Chen (2022) stated that following the news via all sorts of social media had a positive and indirect effect in one's life indicating that users who have greater concerns for expressions, rely on social media more.

In a recent study, Shi, Yu, Wang, Cheng, & Cao (2020) concluded that according to the stressor–strain–outcome model, information, communication, and social overloads can affect students' behavioral outcome and academic performance ,confirming the fact that social media overload are significant stressors that can cause techno-stress. Sun & Wilkinson (2020) mentioned that inappropriate parenting styles can lead users towards Internet addiction to a great extent. Moreover, personality constructs of introversion, tendency to lie, neuroticism, and psychoticism are positively associated with Internet addiction. Sun & Wilkinson (2020) also reported that there is a positive relationship between poor interpersonal relationships and Internet addiction as Internet addicts tend to keep their distance from the other people. In other words, people who have trouble communicating with the society are more prone to become Internet addict.

Religion, age and Internet addiction

Religiosity, defined as "the self-perceived importance of religion and the degree to which religious beliefs and identities translate into secular attitudes" (Kiang et al., 2020, p. 1), has emerged as a significant factor in understanding individuals' engagement with the digital world. Specifically, the influence of religion on internet use has attracted considerable attention from scholars across various disciplines.

Hasan and Haron (2019) explored the impact of religious knowledge on social and religious changes in Malaysian society, emphasizing the Internet's role as a platform for accessing religious information and facilitating communication among Muslims. This highlights the internet's potential to foster religious engagement and community building. Furthermore, recent research indicates a substantial increase in internet use for religious purposes and the pursuit of spiritual information

(Zaluchu, 2024) suggesting a growing trend of individuals seeking spiritual nourishment online.

The relationship between religiosity and Internet addiction has also been a focal point of inquiry. Grubbs and Grant (2020), investigated the links between religion/spirituality and various Internet-related addictions, while Utomo and Marianta (2023) focused on the interplay between spiritual well-being, perceived social support, and Internet addiction among seminarians. Their findings revealed a significant negative correlation between perceived social support, spiritual well-being, and Internet addiction, suggesting that fostering strong social connections and promoting spiritual growth may serve as protective factors against excessive internet use.

Utami (2024) examined the multifaceted impact of Internet use on students' faith, recognizing its potential to act as both a threat and an opportunity for religious development. The study identified challenges associated with the transition to online religious education, including technical difficulties and reduced learning effectiveness, which can hinder students' understanding, motivation, and ultimately, their faith. These findings underscore the need for careful consideration and effective strategies to ensure the successful integration of technology in religious education.

Warnock (2024) explored the relationships among communication apprehension, Internet addiction, social media use, and religious communication apprehension. The study revealed significant positive relationships between social media use and Internet addiction, and between communication apprehension and Internet addiction. This suggests that individuals who experience anxiety in social situations may be more susceptible to developing problematic Internet use patterns.

Several studies have highlighted the protective role of religiosity against Internet-related addictions (Dossi et al., 2022). In the context of Islam, technology is generally viewed as permissible for the pursuit of knowledge and beneficial purposes, provided it does not violate Islamic principles. Islamic scholars emphasize the importance of moderation, balance, and avoiding excess in internet use (Masya et al., 2020). They advocate for enhancing spiritual fulfillment as a key strategy for addressing technology addiction (Kahiruldin et al., 2023).

Spiritual interventions, such as the practice of muraqabah (Islamic mindfulness or self-monitoring), have been proposed as effective tools for combating social media addiction and promoting spiritual growth (Harianti et al., 2022). These interventions not only address problematic Internet use but also contribute to self-actualization and reinforce the potential of an Islamic approach in navigating the challenges of the digital age. Furthermore, research suggests that Islamic religious coping can directly influence self-control, which in turn can indirectly impact problematic Internet use (Roudhotina & Uyun, 2022).

In the Malaysian context, religious commitment, especially among women, appears to mitigate the risk of Internet addiction associated with sexual motivations (Grey, 2020; Grubbs et al., 2019). This finding aligns with Young's (1998a) assertion that escape incentives, such as sexual desires, contribute to Internet addiction. Sexual desires conciliated the relationship between Internet addiction and religiosity for female religious groups. Such conciliating effects (for Muslim and Hindu women) were having great influence on escape reasons. This is to some extent surprising as using Internet for sexual reasons is attributed more to men than women (Grey, 2020; Grubbs et al., 2019). Furthermore, for decades anti-pornography sentiment and campaigns were driven largely by religious conservatives citing pornography's "contaminating" moral effects (Perry, 2022).

The present findings distinctively revealed that religious people do not face the need to take resort to Internet, as much as other people, to escape from life pressure and problems. They might have greater social support compared to the more secular people(Hasan & Haron, 2019). Overall, religious beliefs appear to influence Internet usage and addiction tendencies, particularly regarding motivations and social support structures. Understanding these dynamics can inform interventions aimed at reducing Internet addiction, particularly among younger populations, by leveraging religious norms and values.

The prevalence of Internet addiction varies by age, with younger individuals showing higher rates of addiction (Mooi et al., 2019). Among women between the ages of 16-29, were considered to be Internet-related addict, and 13.1 % were defined to be at risk of addiction. Among men of the same age group, 4.1% were defined to have Internet addiction and 19% were considered to be at risk of addiction (Mooi et al., 2019). In the year 2018, the average age of Internet users reached to 36.2 years old in comparison to 33 years old in the year 2016. This fact reveals that more people of older ages are also becoming a member of the online society. Internet users were mostly adults in their

twenties and thirties including 30% and 25.9% of the community respectively (Malaysian Communications and Multimedia Commission, 2018).

In Malaysia, Generation Z (individuals aged 16-24) demonstrates a pronounced inclination towards social network addiction, with a higher prevalence observed among young women. This demographic spends an average of 3 hours and 11 minutes per day engaged in online activities, surpassing their male counterparts by approximately 30 minutes (Lifestyle Asia, 2022). This trend reflects a broader societal phenomenon in Malaysia, where a significant proportion of the population across various platforms perceive social media as a source of happiness and express difficulty in abstaining from its use.

Previous research has explored the addictive nature of technology-driven activities, including social network games (Chatterjee et al., 2022) and broader technology addiction (Chopdar et al., 2018). Sun & Wilkinson (2020) posit a direct correlation between addiction levels and individual social skills, suggesting that individuals with lower self-confidence and communication difficulties may be more susceptible to internet addiction. Interestingly, their research indicates that income and age do not significantly influence internet addiction and social isolation.

This phenomenon warrants further investigation to understand the underlying factors contributing to the heightened prevalence of social network addiction among Malaysian Generation Z, particularly females. Future research should explore the interplay of psychosocial factors, cultural influences, and individual differences in shaping this trend. Such insights could inform the development of targeted interventions aimed at promoting healthy technology use and mitigating the potential negative consequences of excessive social media engagement.

Theoretical Framework Uses and gratification theory

This study employed the uses and gratifications theory (U&G) as its theoretical framework. Several studies have explored the complexities of Internet usage motivations, including escapism, entertainment, and attachment. Research suggests that habitual Internet use may exacerbate negative consequences, but motivations for escapism and entertainment are particularly significant in predicting Internet addiction (Islam, 2024; Mostad, 2024). Additionally, concerns over excessive Internet use need to be balanced with the potential positive outcomes, such as increased responsibility and social support (Utomo & Marianta, 2023; Wang & Fu, 2024).

Overall, we believe that the Internet has become part and parcel of people's life to the extent that it is being viewed as something ordinary. The more people become interested in the Internet community, the more they behave responsibly and sensibly. The result is that people can more readily and collectively provide social support (Cheng et al., 2024). Contrary to popular belief, being active in the new media and using cyberspace can have positive effect.

There has been some concern over excessive use of the Internet and social networking as it is generally believed that there is a correlation between the amount of time spent on the net and one's degree of involvement in social life such as participating in local communities. It is maintained that social networking can have some positive influence on local activities. For example, Internet users like everyone else tend to visit their neighbors in person. It is interesting to note that Internet and cell-phone users, not to mention bloggers, are more likely to volunteer for local community activities, such as a youth group or a charitable organization.

It goes without saying that certain networking services (e.g., Facebook, Myspace, and LinkedIn) can function as substitute platforms for neighborhood activities as they are basically designed to promote social involvement. Internet use does not discourage people from frequenting public places. On the contrary, being on the net encourages people to go out and visit more public places such as parks, cafes, and restaurants where they are more likely to meet new people and come in contact with different views and opinions, according to research results.

In fact, having access to the Internet is one common denominator among people who meet in various public places (AlKhudari et al., 2024). It seems that social networking promotes people's social interactions. The more frequently a person use the Internet, the more they tend to share their secrets or private matter with a person of a different race (Hart et al., 2024). Similarly, those who publicly post their pictures and photos are more likely to exchange political views with others from a different party (Moore, 2024).

In the light of uses and gratification theory (UG), escape motivations and Internet addiction are correlated with Internet addiction and social isolation. The amount of time spent online and Internet addiction proved to be positively related. The time individuals spend on the Internet in an ordinary life, could have negative effects on their lives; not during the Covid-19 pandemic era though.

Despite initial concerns, Internet use during the COVID-19 pandemic has demonstrated the potential for online connections to decrease isolation when used for virtual social interactions and physical activity (Ellis et al., 2020; Pancani et al., 2021). Hence, this study aims to explore the relationships between attitudes toward the Internet, its purpose of use, Internet addiction, and social isolation, utilizing a comprehensive theoretical framework depicted in Figure 1.

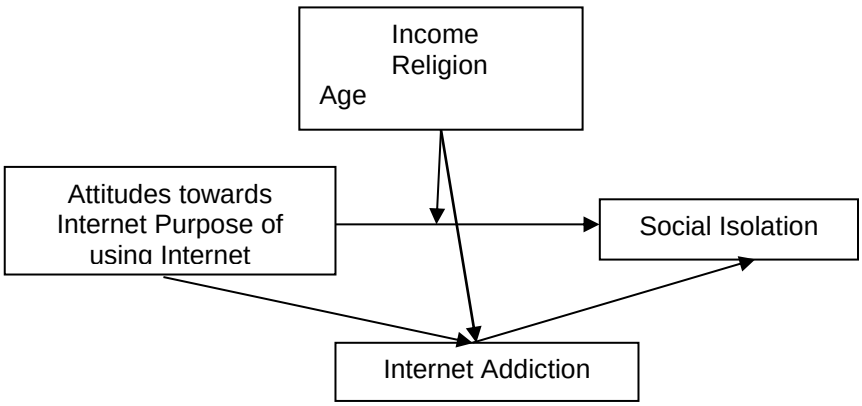

Fig. 1 *Relationship between Internet usage, Internet addiction and social isolation*

METHODOLOGY

The survey questionnaire was administered to a diverse group of local male and female students at University Putra Malaysia (UPM), selected using a stratified sampling technique. Following the Malaysian definition of youth, which involves individuals aged 15 to 40 (Yunus, 2007), participants in this study ranged from 18 to 40 years old.

Stratified random sampling has been a type of probability sampling by using Israel (1992) formula: n= $\frac{\mathrm{N}}{1+\mathrm{N}\,(\mathrm{e})^2}$ n=Sample size, N=Population (postgraduate and undergraduate), e=Precision level (when confidence level was %95 or 0.05). Therefore, we collected the data from 440 students from 16 faculties of University Putra Malaysia (UPM), forming part of a broader investigation into the Internet's impact on youth development in Malaysia.

The sample size for each faculty was determined by dividing the student population of each faculty by the total population and multiplied by 440. For instance, for the Faculty of Agriculture, $n = \frac{\text{Undergarduate Population}}{\text{Population of faculty}} * 440$ calculated for undergraduate and for postgraduate $\frac{\text{Postgraduate Population}}{\text{Popilation of faculty}} * 440$, therefore we add two numbers and the total number of questionnaire we should fill in the faculty of agriculture be achieved.

This study adhered to strict ethical protocols to ensure participant confidentiality and autonomy. All questionnaires were administered anonymously, safeguarding respondents' identities. Furthermore, participation was entirely voluntary, with individuals retaining the right to withdraw from the study at any point without penalty. This approach ensured informed consent and respect for individual autonomy throughout the research process.

The participants included undergraduate and postgraduate students pursuing various degrees at UPM, representing the three major racial groups in Malaysia: Malay, Chinese, and Indian. Based on the Malaysia definition of youth the age of the participants were between 18 to 40 years old (Deros et al., 2008). The students older than 40 years were omitted from the analysis. The race of the respondents of this study showed that 66.8 % were Malay (n=294) and 25 % were Chinese (n=111), with 3.9 percent Indian (n=17). In addition, the sample included 68.9% Muslim, 19.1 Buddhist, 7.5% Christian and 3.9% Hindu. Income in this study was measured in two groups of below 1000 RM and higher than 5000, thirty percent respondents were from the income level of 2100 to 3000 Malaysian Ringgit (RM) per month followed by 1000 to 2000 RM

per month. The age of the students in the current study ranged from 23 to 40 and the majority 78.3% was younger group of 18-23 years old.

The selection process utilized simple random sampling. The instrument comprised 83 items and covered topics such as attitudes toward the Internet, purposes of Internet usage, social isolation, Internet addiction, and demographic information (age, religion, and income). Responses were collected using a 5-point Likert scale ranging from “strongly agree” to “strongly disagree” including negative and positive points of view towards the Internet. The data was coded from 1 to 5 for analyzing.

Purpose of using Internet was measured by 23 items on a five-point Likert scale. Respondents were asked to check their purposes ranging from 1= “not at all” to 5= “very frequent”. This scale was operationalized as an interval measurement. Respondents' attitudes toward the Internet were evaluated through 19 items, utilizing a five-point Likert scale, where individuals expressed their viewpoints and sentiments regarding Internet usage, varying from 1= “Strongly Disagree” to 5= “Strongly Agree” for each statement. This scale was operationalized as an interval measurement.

Internet addiction was measured by 19 items on a five-point Likert scale ranging from “not at all” to “always”, by interval scale. Internet addiction mostly included “stay online more than intended”, “lose your sleep”, “grade decrease at school”, “feel moody and depressed when you are offline”. For measuring social isolation 19 items were measured on a 5-point Likert interval scale ranging from “strongly agree” to “strongly disagree”. Most of the items asked about “pretend to be someone else”, “prefer to communicate online”, “share intimate online”, “anonymity”. Demographic of the respondents were measured by three items of religion, age, income. This study is part of a larger project measuring the impact of Internet usage on negative and positive youth development among university students in Malaysia.

Descriptive and inferential statistics were employed using the Statistical Package for Social Sciences (SPSS). Descriptive analysis included measures such as frequency, percentage, mean, and standard deviation

to examine various aspects, including attitudes toward Internet usage, purposes of Internet usage, social isolation, Internet addiction, and demographic characteristics. Inferential analysis, including correlation analysis and ANOVA, was conducted to explore relationships between variables. Normality tests were performed to ensure data met the assumptions of normality.

To ensure the questionnaire's validity and reliability, a pilot test was conducted with 30 students, focusing on social isolation and Internet addiction. Cronbach's Alpha was used to assess reliability, with values exceeding 0.7 for all dimensions: attitudes toward Internet usage (α = 0.833), purposes of Internet usage (α = 0.880), Internet addiction (α = 0.960), and social isolation (α = 0.823). This comprehensive methodology facilitated a detailed investigation into the relationships between attitudes toward Internet usage, purposes of Internet usage, income, age, social isolation, and Internet addiction among university students in Malaysia.

RESULTS AND INTERPRETATION

This section begins with a descriptive analysis of the collected data, followed by an examination of the study hypotheses using inferential analysis techniques. Regarding to the attitudes towards Internet "Internet is the fastest way to research knowledge" was a dominant opinion toward the use of the Internet (M= 4.47, SD=0.77), followed by "Internet is a universal library" (M= 4.41, SD= 0.81). The statements, "Internet is a way to provide learning for the people in order to do research", "It is exciting to get information from the Internet" and "Internet provides endless freedom to people" were also three major opinions about the Internet. The item "Internet makes people to be alone" got the lowest mean (M= 3.01, SD= 1.09); the next low mean score was related to the item "Internet destroys societies" (M= 3.05, SD= 0.97). Respondents had positive attitudes towards using Internet, because all the positive items got the highest mean. Additionally, respondents displayed predominantly positive attitudes toward Internet use, emphasizing its utility for research and learning.

Regarding the purposes of using the Internet by the respondents, “Checking my Facebook” had the highest mean” (M =4.50, SD =0.87) followed by “Finding information relevant to research” (M =4.22, SD =0.82), and “Sending and receiving E-mail” with (M =4.21, SD =0.87); “Shopping (e-commerce)” had the lowest mean score (M=2.36, SD=1.20). These findings align with previous research by Ni et al., (2024) and Lin and Lin (2024) others, indicating information search as the primary purpose among users.

The highest mean score of the term Internet addiction belonged to “How often do you find that you stay on-line longer than you intended” with (M=3.50, SD=1.17), followed by “How often do you find yourself saying “just a few more minutes” when on-line” with (M=3.28, SD=1.10). The last mean score, based on the responses of the students, belonged to the statement “How often do you feel depressed, moody or nervous when you are off-line, which goes away once you are back on-line” and “How often do you snap, yell, or act annoyed if someone bothers you while you are on-line” with (M=2.48, SD=1.03), and (M=2.45, SD=1.11) respectively.

Based on the student’s responses, the most important mean score belonged to the statement “I have pretended to be somebody of the opposite sex while online” with (M=3.24, SD=1.04) followed by “I feel less connected interpersonally when I communicate online” with (M=3.10, SD=1.11). The last and least mean belonged to “Most of my friends I know from online” and “Going online has made it easier for me to make friends” with (M=2.19) and “I prefer telephoning to communicating online” (M=2.06, SD=1.05).

Mean Differences between religion, social isolation and Internet addiction

H1: Religion positively correlates with social isolation and Internet addiction.

The one-way ANOVA procedure was employed to examine the potential differences between religion and Internet addiction among the respondents. The results indicated non-significant differences between

religion and Internet addiction (F=0.688, p>0.05). However, notable disparities were observed in the mean scores between religion and social isolation, which were found to be significant (F=4.503, p<0.5) (Table 1). Consequently, the hypothesis regarding the positive influence of religion on Internet addiction was rejected, while the hypothesis concerning the positive influence of religion on social isolation was supported.

Table 1 Relationship between religious and Internet addiction and social isolation (n=440)

Variable	Mean	Internet addiction	Sum of Square	df	mean2	F	p
Islam	53.6337						
Christian	52.9091						
Hindu	48.5882						
Buddhist	52.5238	Between Groups	510.997	4	127.749	.688	0.600
Others	57.3333	Within Groups	80736.801	435	185.602		
Total	53.1977	Total	81247.798	439			
Islam	50.3102	**Social Isolation**					
Christian	45.0909						
Hindu	42.2353						
Buddhist	45.7976	Between Groups	2661.068	4	665.267	4.503	0.001
Others	45.6667	Within Groups	64262.851	435	147.731		
Total	48.7136	Total	66923.918	439			

*p<.05

Relationship between Attitudes towards Internet, Purpose of using Internet, Income and Internet Addiction

RQ: 1. what is the effect of attitude toward Internet on social isolation and Internet addiction? 2. Are there any relationships among the purpose of using Internet, social isolation, and Internet addiction?

H2: Age and income positively correlate with Internet addiction and social isolation.

Correlation analysis revealed significant relationships among attitude towards the Internet, purpose of using the Internet, income, age, Internet addiction, and social isolation. Specifically, a significant and positive correlation was found between attitude towards the Internet and Internet addiction ($r=0.160$, $p<0.5$), indicating that individuals with more positive attitudes toward the Internet were more likely to exhibit addictive behaviors. Similarly, a positive and significant correlation was observed between attitude towards the Internet and social isolation ($r=0.112$, $p<0.5$), suggesting that individuals with more positive attitudes towards the Internet may also experience higher levels of social isolation.

Furthermore, a significant positive correlation was identified between the purpose of using the Internet and social isolation ($r=0.246$, $p<0.5$), indicating that individuals who reported using the Internet for specific purposes were more likely to experience social isolation. Additionally, a positive and significant correlation was observed between the purpose of using the Internet and Internet addiction ($r=0.278$, $p<0.5$), suggesting that individuals who reported specific purposes for Internet use were more likely to exhibit addictive behaviors.

However, no significant relationships were found between income, age, social isolation, and Internet addiction, leading to the rejection of hypothesis H2, which posited a positive impact of age and income on Internet addiction and social isolation. Overall, attitudes towards the Internet and purposes of using the Internet demonstrated positive and significant associations with social isolation and Internet addiction (Table 2).

Table 2 Pearson Correlation between IVs and DVs (n=440)

Variables	**Internet addiction**		**Social isolation**	
	r s	**P**	**r s**	**P**
Attitudes toward Internet	0.160**	0.009	0.112*	0.019
Purposes of Internet usage	0.278**	0.00	0.246**	0.000
Income	-0.045	0.351	-0.036	0.453
Age	0.022	0.648	0.064	0.181
Social Isolation	0.478**	0.001		

*p<.05, **p<.01

DISCUSSION

This study investigated the relationship between attitudes towards Internet use, purpose of use, Internet addiction, and social isolation among Malaysian youth, considering age, income, and religion as potential moderating factors. A key finding was a positive correlation between the purpose of Internet use, social isolation, and Internet addiction. This suggests that specific online activities and purpose of using Internet may contribute to both problematic Internet use and feelings of social disconnection. Secondly, attitudes toward the Internet were positively associated with social isolation and Internet addiction. Thirdly, no statistically significant relationship was found between age, income, and social isolation or Internet addiction, however, a significant difference in Internet addition among different religion.

The positive and significant association between the purpose of Internet use, social isolation, and Internet addiction underscores their interplay. This result is consistent with the Choi (2021) who found association between purpose of using Internet and social isolation.

There was no significant relationship between income, age and social isolation and Internet addiction. In addition, the result has inconsistency with Matthews et al., (2019), Haque et al. (2016) and Mooi et al., (2019) who found the relationship between age and Internet addiction. Also, Sun and Wilkinson (2020) found that income and age do not have any influence on Internet addiction and social isolation.

In addition, the observed positive and significant association between social isolation and internet addiction aligns with existing literature. Saadati et al (2021), Nowland et al (2018), Smith and Alheneidi (2023) and Sun and Wilkinson (2020) have all documented similar relationships between internet addiction and loneliness, underscoring the potential for excessive Internet use to contribute to social disconnection.

This study identified a significant mean difference in internet addiction across various religious affiliations within the Malaysian context. This finding diverges from previous research, including studies by Utami (2024), Warnock (2024),

Grubbs and Grant (2020), Harianti et al (2022) and Dossi et al (2022), which reported significant correlations between religiosity and addiction.

This discrepancy may be attributed to the unique sociocultural context of Malaysia, where religion plays a multifaceted role in shaping individual behavior and social interactions. In Malaysia, religion appears to mitigate Internet addiction and social isolation by fostering strong community bonds, providing a moral framework for balanced living, and promoting mindful engagement in real-world activities. Diverse faiths encourage social interaction through religious gatherings and interfaith collaborations, while religious teachings emphasize purpose and self-reflection, potentially reducing reliance on excessive screen use. Furthermore, religious practices and youth programs often promote self-awareness and disciplined technology use, contributing to a more balanced lifestyle.

CONCLUSION AND RECOMMENDATION

Grounded in the uses and gratifications theory (U&G), this study highlights the potential for media consumption, particularly Internet use, to lead to excessive engagement and social isolation. Individuals engage with media to experience gratification, driven by the pleasure and satisfaction derived from its use. However, the pursuit of these gratifications can inadvertently contribute to Internet addiction and a preference for online interaction over face-to-face communication, particularly among students who heavily rely on the Internet for academic and social purposes.

This trend raises concerns as these students represent the future of society. While the Internet has become indispensable in modern life, responsible and mindful usage is crucial to mitigate the risks of internet addiction and its associated consequences, such as social isolation and loneliness. Promoting balanced Internet habits and fostering healthy social interactions are essential for individual well-being and societal development.

Future research should explore different media-use orientations and user characteristics to understand why some individuals are more prone to addictive behavior. Encouraging effective time and behavior management strategies online, alongside fostering open communication between parents and children, can mitigate Internet-related harms. Additionally, promoting participation in physical activities through

university clubs can help prevent Internet addiction, particularly among students (Kabadayi, 2020).

This study underscores the importance of empowering adolescents to become responsible online participants through active discussion and mutual understanding. Various strategies have been proposed to achieve this goal, including integrating digital citizenship lessons into school curricula, where educators can utilize real-life scenarios to illustrate the rights and responsibilities associated with online interactions (McAfee, 2020).

The findings of this study hold practical implications for policymakers, educational authorities, and university administrators seeking to address Internet addiction and social isolation among youth. Furthermore, religious leaders across various faiths can play a crucial role in guiding individuals towards balanced internet use and fostering social connections through religious communities. Future research employing a mixed-methods approach could provide richer insights into the complex interplay of factors contributing to Internet addiction and social isolation, ultimately informing more effective interventions.

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AUTHOR CONTRIBUTION

The authors confirm contribution to the paper as follows: study conception and design, data collection, analysis and draft manuscript preparation by Toktam Namayandeh Joorabchi: Ramin Armat reviewed the results and paper, write comments and Mehdi Qorbanian Qohroudi: write comments, approved the final version of the manuscript and paraphrased and edited the paper.

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LEARNING MANAGEMENT THROUGH CULTURALLY RESPONSIVE TEACHING (CRT) APPROACH BASED AN ETHNOMATIC TO IMPROVE STUDENTS' CREATIVE THINKING

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ABSTRACT

Human resources are an important instrument for national development. Education is a key factor in building the quality of human resources. Through CTR learning, students can improve their creative thinking according to their respective abilities, talents and interests. Recognizing the diversity of cultures and backgrounds of students. This study aims to improve the creative thinking of elementary school students through CRT based an ethnothematic learning and describe students' responses to learning using CRT approach based on ethnothematic. This study uses a mixture of quantitative and qualitative methods with experimental methods. The sample of this study was 28 students of Grade IV Elementary School. Sampling using purposive technique. Data collection techniques in this study used tests, observations, and interviews. Interactive qualitative data analysis refers to the formulation of Miles, Huberman, and Saldana (2014) which consists of three stages: data condensation, data presentation, and drawing conclusions. While quantitative research was conducted using experimental methods The results of the study provide recommendations to teachers to be able to manage learning in a fun way by accommodating differences in student backgrounds and cultures by empowering local potential. The conclusion of this study is that the CRT approach by empowering local potential can improve students' creative thinking.

Keywords: culturally responsive teaching, ethnothematics, creative thinking

INTRODUCTION

Problem they face in learning. The reality on the ground is that learning in elementary schools still does not optimally direct students to think creative Education in the 4.0 era requires students to be creative, critical, able to collaborate and communicate the results of their work. A creative young generation is the hope of all countries to be able to hold the government relay for the sustainability of a nation and state. Hoicka, Mowat, Kirkwood, Kerr, Carberry, and Bijvoet-van den Berg (2016) say that creativity is an essential human ability, allowing adaptation and survival. To be able to make the younger generation creative, we must prepare a curriculum that makes students creative. Creative students are able to find ideas to solve learning problems. Creative creates something that has never been done before. Creatively developing something so that it becomes newer. Through creative thinking, students can produce new ideas or thoughts in solving problems, essentially, the core component of design thinking helps nurture creative confidence of anyone involved in any disciplines such that he or she will ultimately be able to develop a sound solution to a complex problem (Johansson Sköldberg et al. 2013). Mulet et al. (2017) argue that there is a strong correlation between creativity and design outcome, thus necessitating designers to be given ample opportunities and appropriate mechanisms to induce creativity. The synergy of design and creativity helps produce designs that are high in quality, novelty, and usefulness (Balakrishnan, 2022).

Teachers are the spearhead of the success of learning quality. For this reason, teachers have an important role in creating quality learning. One of the quality learning is being able to direct students to think creatively. Thinking to find new ideas or designs. In this way, learning comes alive. Students are not passive and bored. Creative thinking is a habit of thinking that is trained by paying attention to intuition, activating imagination, revealing new possibilities, opening up surprising points of view, and generating unexpected ideas (Ananda, 2019). In line with Ananda's opinion, Haryanti and Saputra (2019) also said that the teacher's role in developing creative thinking abilities can be done through habituation in the learning process so as to achieve educational goals. There are five stages in the creative thinking process, namely: 1) preparation stage, 2) concentration stage, 3) knowledge stage, 4) solution stage, and 4) verification stage. Within the stages of creative thinking there is a solution stage. At the solving stage, students are expected to be able to use their minds to obtain a solution to a ply. Learning still tends to memorize theories or concepts. Students are not accustomed to developing, finding or creating a solution to solve a problem.

To get more perfect results, it is better to complete learning tasks in groups through collaboration between students. As Simanjuntak, Hutahaean, Marpaung, and Ramadhani, (2021) argue, the ideas expressed by each group member could stimulate others to build their ideas and further improve their

creative skills. Strengthened by the opinion of Sternberg, R. J. (2006) that intrinsic, task-focused motivation is also essential to creativity. to creatively create or develop learning tasks in groups. There are steps to plan and complete projects in the project method. In accordance with the opinion of Zulyusri, Elfira, Lufri, and Santosa (2023) that the syntax of the project-based learning method can be done. assist students in optimizing their creative and critical mindsets by starting learning with essential questions, working together to plan, develop project completion schedules, timelines, and deadlines.

Ethnomatic learning is very appropriate to introduce students to various cultures and regional potential. The word ethno in the Big Indonesian Dictionary relates to the culture of living ethnic groups. Meanwhile, thematic are themes that are related to forming a concept. Several subject matters from different and related subjects support a theme. Thematic mapping can be thought of as an extension of thematic analysis, where the themes that have been uncovered are collated together to form a visual representation of a broader concept. Urfany, Fadhillah, and Yulyawan (2024) explained that thematic learning can be interpreted as a learning activity that integrates material from several subjects into one particular theme or topic of discussion.

Thematic learning focuses on student involvement so that students are challenged to be active and creative. As stated by Setiawan (2020), thematic learning is integrated learning that emphasizes student involvement in learning. The thematic learning process focuses on finding ideas by connecting various appropriate materials (Alam, Ramadhani, & Patmaniar 2023). So, thematic learning is learning by combining interrelated material from various subjects. Thematic learning by empowering local potential is very meaningful for increasing students' creative thinking. Students can be directed to utilize the local potential of their region through learning. When the word thematic is combined with ethno, it becomes ethnothematic, which means uniting several related materials into a theme based on the local culture or potential of the region. The reality in the field is that thematic learning materials have not explored the local potential of the region. Learning material is still general. The material is national. Therefore, through a Culturally Responsive Teaching approach, learning will direct students to become more familiar with the potential of their region.

Culturally Responsive Teaching (CRT) is an approach that accommodates differences in characteristics and cultures that students believe in. Culture can serve as a way to enhance the motivation of learners because it can create culturally responsive teaching, which is characterized by respect for diversity; engagement of the motivation of all learners; creation of a safe, inclusive, and respectful learning environment; teaching practices that cross disciplines and cultures; integration of culturally responsive practice into all subject areas (Wlodkowski & Ginsberg, 1995). Teachers who utilize CRT practices value students' cultural and linguistic resources and view this knowledge as capital

to build upon rather than as a barrier to learning (Aceves, & Orosco, 2014). Through an ethnothematic-based CRT approach, it can improve students' creative thinking. Students are given the opportunity to exploit the potential of their region which has not yet been developed or empowered. Students are given the opportunity to discover or create something from the potential of their region that has selling value. Students are heavily involved in learning to find solutions to problems in everyday life. In accordance with the opinion of Chen & Yang (2017) that the implementation of culturally responsive teaching strategies increased the frequency of students' classroom participations. Student involvement in learning is a very valuable experience.

Based on the background above, it can be formulated that the objectives of this research are to: 1) improve the creative thinking of elementary school students through ethnomatic-based CRT learning; and 2) describe students' responses to learning using an ethnothematic-based CRT approach. The results of this research can make a contribution to educators about the importance of learning by accommodating the local potential of the region in the student environment. In addition, the results of this research provide information and examples of the importance of learning by accommodating various students' different cultural backgrounds.

LITERATURE REVIEW

One of the learning demands that is in accordance with the characteristics of 21st century learning is creative thinking. Creative thinking has the potential for everyone. Therefore, creative thinking skills must be empowered in learning so that students are accustomed to developing or finding new ways to solve life's problems. Individuals use creative thinking to communicate and solve problems. This concept refers to the conclusions of the research results of Dilekçi & Karatay (2023) that creative thinking includes a multi-faceted cognitive process and is present at different levels in everyone.

Creative thinking in learning can be stimulated through the Project Based Learning (PjBL) learning model. Through PjBL, students are directed to solve problems through group work in the form of projects. This concept is in accordance with the research results of Sutaphan & Yuenyong (2023) which states that assessing creative thinking in PjBL could do as a part of teaching methods and learning environments such as portfolio assessment – a method based on records of students' activities. The portfolio manifests how they question, analyze, and solve problems, what students have learned as well as the new ideas throughout their learning. Strengthened by the opinion of Karimov Imamov & Imamov (2023) who stated that creativity (or creativity in English) by definition, it characterizes a person's creative. abilities, manifested in his thinking, feelings, communication, and certain types of activities. Furthermore, Karimov Imamov & Imamov (2023) also said that creativity

characterizes a person as a whole or its individual sides, or products of activity, or the process of their creation.

In addition to the learning process in the classroom, teaching materials are also an important part of improving students' creative thinking skills. In line with Rubiyanti (2020), Badengo (2019), and Achmad (2020) students need teaching materials to improve their creative thinking and teachers need mathematics teaching materials in the form of module-based learning that can increase the creativity of students. In addition to teaching materials, the PjBL model, through the CRT approach, can also improve students' creative thinking. Students are confident in developing their local culture so that learning is thematically based on local potential (ethnothematic). This is also supported by the theory of Young & Young (2023) which states that embedding culturally responsive teaching practices is aimed at characterizing teachers' culturally responsive teaching self-efficacy.

The research results of Hilaski (2020) stated that the principles of culturally responsive teaching as well as students' linguistic, social, and cultural knowledge. Participating teachers found ways to enact culturally responsive teaching in their Reading Recovery instruction. So, learning will be more meaningful and able to improve students' creative thinking through cultural responsiveness by teachers to their students.

Haniko et.al (2024) research findings show that there are various strategies that teachers can employ to create inclusive learning environments, such as acknowledging andvaluing cultural diversity, implementing relevan tanddiverse curricula,and using teaching methods that are responsive to students' needs. Through a series of training sessions, working group discussions, and presentations, participants were provided with practical knowledge and skills in developing culturally responsive learning tools, utilizing CRT principles to strengthen and promote the richness and value of local cultural heritage (Tapung, 2024). Thus, based on several previous theories and research, it can be stated that ethnothematic-based CRT can improve students' creative thinking.

RESEARCH METHODOLOGY

This research uses a mixed-methods design. Experimental methods are used for quantitative research. Fraenkel, and Wallen (2009) state that to experiment is to try, to look for, to confirm. Patzer (1996) states that causal relationships are the heart of experiment. Thus, cause and effect relationships are at the heart of experimental research. The experimental method is used to trial the CRT approach in ethnomatic-based learning to improve students' creative thinking in elementary schools. Meanwhile, qualitative methods are used to analyze changes in student behavior in respecting the culture of their peers in elementary schools and student responses. The experimental method used in

this research is a Quasi Experiment design. Pretest-posttest nonequivalent control group design.

Interactive qualitative data analysis refers to the formulation of Miles, Huberman & Saldana (2014) which consists of three stages: data condensation, data presentation, and drawing conclusions. Meanwhile, quantitative research was carried out using experimental methods. Fraenkel and Wallen state that experimenting is trying, searching, confirming (Fraenkel & Norman, 2009). Patzer stated that cause and effect relationships are the heart of experiments (Patzer, 1996). This research uses Quasi Experimental Design in the form of a pretest-posttest nonequivalent control group design.

The nonequivalent pretest-posttest control group design research design (Sugiyono, 2011) can be illustrated in below:

Eksperimental	$O_1 X O_2$
Kontrol	$O_3 X O_4$

Informasi:

0_1: Average pretest score of experimental group
0_2: Average posttest score of the experimental group
0_3: Average pretest score of control group
0_4: Average posttest score of the control group
X : Treatment is based on CRT

The dotted line shows the study average between the experimental group and a control group that was not randomly selected (Cohen et al., 2007). The sample of this study was 28 students of Grade IV Elementary School. Sampling using purposive technique. Data collection techniques in this research used test and questionnaire. This method is used to evaluate the increase in students' creative thinking. Evaluation was carried out in the experimental and control classes. The test consists of two stages, namely pretest and posttest which will be given to the experimental group and control group. The test form used is multiple choice with 20 questions and essay with 5 questions. Apart from using tests, data collection also uses questionnaires to see students' responses to learning in the experimental class. Table 1 shows the criteria for interpreting student response scores.

Table 1. Score Interpretation Criteria

Score Percentage	Interpretation
81% - 100%	Very Strong
61% - 80%	Strong
41% - 60%	Medium
21% - 40%	Weak
0% - 20%	Very Weak

To measure the increase in the extent to which the target is achieved from the beginning before treatment (initial ability test) to the target learning outcomes after treatment (posttest) using the N-Gain formula. Calculating the normalized Gain score based on the formula according to Archambault (Archambault, 2008), namely

$$N - Gain = \frac{Skor\ Postest - Skor\ Pretest}{Skor\ Maksimal - Skor\ Pretest} \times 100$$

Meanwhile, to see the effectiveness of treatments using CRT compared to those not using CRT, this research used effect size analysis. Effect Size is an indicator that measures the magnitude of the effect of a treatment (Becker, 2000).

$$\text{Effect Size d Cohen} = \frac{\text{Average Difference}}{\text{Standard Deviation}}$$

The standard deviation is the standard deviation of their mixture s_p. If the sample standard deviation is s_1 and s_2 with sample sizes n_1 and n_2 then s_p is:

$$Sp = \sqrt{\frac{(n_1 - 1)s_1^2 + (n_2 - 1)s_2^2}{n_1 + n_2 - 2}}$$

Information :
S_p: Standard Deviation
S_1: Sample average 1
S_2: Sample average 2
Source: (Cohen et al., 2007)

RESEARCH FINDINGS

The results of learning management using an ethnothematic-based CRT approach, material for building diversity identity to improve students' creative thinking, show progress. Apart from the results of the creative thinking test, observations were also made of students regarding student involvement in the learning process using the CRT approach before and after learning. The learning process was observed before carrying out learning with CRT and after carrying out learning with CRT. The differences in these processes are examined for their influence on students' creative thinking. Observation findings are presented in table 2 below.

Table 2. Increasing Creative Thin

king through Ethnomatic-Based CRT

	Stages of Creative Thinking									
	Preparation	Percentage	Concentratio	Percentage	Knowledge	Percentage	Solution	Percentage	Verification	Percentage
Before Treatment	10	35.71	20	71,43	21	75	8	28,57	24	85,27
After treatment	22	78,57	26	92,85	27	96,4	20	71,42	28	100

Table 2 shows that there are differences in each aspect of creative thinking which are reflected in the steps between before differentiation learning is implemented and after differentiation learning with CRT is implemented. Before the teacher carried out learning with CRT, only 10 out of 28 students showed that they had prepared 35.71%. After learning with CRT, it has shown an increase to 22 out of 28 students who prepared well, 78.57%. At the concentration stage, before the teacher carried out learning with CRT, 20 out of 28 students showed concentration of 71.43%. After the teacher carried out learning with CRT, it showed an increase to 26 out of 28 students who had concentrated in ethnomatic based learning at 92.85%. At the knowledge stage, before the teacher carried out learning with CRT, 21 out of 28 students showed that they had gained new knowledge amounting to 75%. After the teacher carried out learning with CRT, it showed an increase to 27 out of 28 students whose new knowledge was 96.4%. At the problem-solving stage, before the teacher carried out learning with CRT, only 8 out of 28 students showed that they were able to solve problems at 28.57%. After the teacher carried out learning with CRT, it showed an increase to 20 out of 28 students who were able to solve problems well at 71.42%. At the verification stage, before the teacher carried out the lesson, there were 24 out of 28 students who were able to verify the problem solving as much as 85.71%. After the teacher carried out learning with CRT, it showed an increase to 28 out of 28 students who were able to verify problem solving results by 100%.

After carrying out calculations from the results of observing the process in the field through observation, the N-Gain calculation is continued by obtaining information regarding the difference value between before carrying out differentiation learning with CRT and after carrying out differentiation learning with CRT. N-Gain test data is presented in table 3.

Table 3. N-Gain Test Results for Increasing Pancasila Student Profile Aspects

		Rata-rata Nilai N-Gain	Category
Control Group	Pretest-Posttest 1	0,13	Low
	Pretest-Posttest 2	0,28	Low
	PretestPosttest 3	0,62	Medium
Treatment Group	Pretest-Posttest	0,86	High

The results of the N-Gain calculation show that there is a difference between before differentiation learning with an ethnothematic-based CRT approach and after learning with an ethnothematic-based CRT (pretest results compared with post-test results) in the treatment group of 0.86, which is in the high category. Meanwhile, in the control group, the N-Gain results of the first pretest and post test were 0.13 (low), the second pretest and post test were 0.28 (low), the third pretest and post test were 0.62 (medium).

Furthermore, additional analyzes are needed to measure how effective differentiation learning with CRT is. This analysis uses Cohen's effect size as in table 4

Table 4. Effect Size Test Results

Class	N	Mean	Variant	Standard Deviation	Cohen's d	Effect size
Experimental class	28	90,0	52,30	7.288	0,488	Medium effect
Control Class	20	77,30	180,06	14.395		

Table 4 shows that the average value, variance and standard deviation in the two groups/classes produce different values, and the influence value (Cohen's value) reaches 0.4828 or can be categorized as moderate. A significant difference can be seen in the mean value between the experimental class and the control class with a difference of 14.41. These differences data show that the average level of creative thinking in the experimental class is much better than the control class. So, learning using the CRT approach based on ethnothematics can be said to be effective in improving students' creative thinking.

To determine changes in students' behavior regarding respecting the culture in their environment, the results of observations and interviews show better differences after learning using an ethnothematic-based CRT approach. Of the 28 students, 26 students were able to throw away rubbish in the right place, share food with their colleagues without discriminating against religious or ethnic backgrounds. Students demonstrate good group work and are willing

to appreciate the work or opinions of their colleagues. Students are also creative in proposing problem-solving solutions based on problems shown through videos in learning. Meanwhile, 2 students still need special guidance and approaches related to behavior changes related to the matters mentioned above.

To find out student responses, a questionnaire was distributed regarding learning using an ethnothematic-based CRT approach. The results of distributing student response questionnaires to learning with ethnomatic-based CRT to improve creative thinking can be seen in Table 5.

Table 5. Student Responses to Learning with the Ethnomatic-Based CRT Approach

Aspect		Indicator	Student Response	
			Percentage Score	Category Score
Response	Supporting facilities	Media use	80,5	Strong
	Meaningfulness	The benefits of learning in everyday life	87.6	Very strong
Average response to the response aspect			85,05	Very strong
Reaction	Interest	Interesting, boring, curiosity,	88	Very strong
	Satisfaction	Positive student satisfaction	85	Very strong
	Self-confident	Student are optimistic about succeeding	82	Strong
Average response aspect of reaction			84,4	Very strong
Overall average			83,8	Very strong

Table 5 informs that in general students responded positively to learning with ethnothematic-based CRT. The student responses obtained were categorized as very strong because the average score was above 80%. These categories have been adjusted to the criteria for interpreting questionnaire scores. Thus, it can be concluded that students feel happy with ethnomatic-based CRT learning. This is because learning emphasizes the potential of the region for development and accommodates students' cultural backgrounds.

DISCUSSION

1. Increasing Creative Thinking Through Ethnomatic-Based Learning with CRT
The research results show that differentiation learning with CRT can improve students' creative thinking abilities from preparation to verification. This increase is also influenced by the family's treatment of their children. The findings showed that there were two students who were not used to thinking

creatively. This is because parents still often help in solving their children's problems and do not direct their children to find solutions to the problems that befall them. As a result, children become passive. Children who are less creative usually have a high dependency on other people which ultimately results in low test scores. Apart from that, the ability to think creatively is also influenced by the learning process that students receive in their class. The main thing is the strategy, methods and media used. Choosing these three aspects correctly can maximize learning achievement targets at that time. This is in accordance with the achievement targets in the curriculum on creative thinking.

In 21st century learning, teachers are required to implement learning that leads students to be able to think creatively. Therefore, the learning process must be interesting and creative. Learning with the CRT approach can be maximized by linking regional potential so that students are challenged to be able to think creatively to solve problems regarding their regional potential. According to the definition, CRT is a construction design that can help teachers connect learning objectives, evaluation and steps, making it easier for students to gain comprehensive and maximum understanding (McTighe & Willis, 2019). According to the definition, using the CRT approach can help students to construct something collaboratively. In line with this, research findings also state that the CRT approach provides a clear picture of learning objectives, evaluation and interrelated learning steps so that students are able to overcome learning weaknesses independently (Minbiole, 2016; Tshering, 2022).

This is different from the findings at the problem-solving stage by students. The research results show evidence of an increase in students' problem-solving abilities. Students seem happy when working on tasks to solve problems in collaboration with their colleagues so that they complement each other in completing group assignments. This attitude is obtained as a result of habituation carried out by parents towards their children. This is also influenced by the child's learning process in class with the teacher and friends. Teachers' habituation in group learning can strengthen attitudes of respect for students' abilities. This finding is in line with the background of CRT design which focuses on students' learning and understanding of the surrounding culture (Pertiwi et al., 2019). CRT design emphasizes unconventional learning steps. If teachers usually design learning without paying attention to the culture of the students and the potential of their region, on the other hand, through CRT based on ethnothematics, the design starts from the learning objectives, then prepares an evaluation, then plans the learning steps by accommodating the various cultures that exist in the students (McTighe & Willis, 2019). Previous research findings show that the CRT approach is considered effective in learning, especially in improving students' skills and attitudes (Almaseid, 2017). Apart from that, previous research also stated that the use of CRT designs can improve the collaboration abilities of fourth grade elementary school students (Agustiani et al., 2023).

Meanwhile, students' abilities at the verification stage were proven to have increased by 28 students or 100%. Through differentiated learning, all students are given responsibility for completing assignments and solving problems, thereby requiring students to think more creatively. The findings of this research are in line with the results presented by previous researchers that the pre-test before using CRT and after using CRT obtained improved results (Yurtseven & Altun, 2016). This is because it is influenced by the advantages of CRT, namely that teachers can ensure there is a link between learning objectives, learning evaluation and learning steps so that by paying attention to the habits or culture inherent in each and understanding the potential of their region, so that in the end they are creative to be able to develop the potential of their region in accordance with learning objectives.

Then, the results of the N-Gain calculation stated that there was a high difference (0.86) after learning was carried out using the ethnomatic-based CRT approach. Thus, it can be said that there was a high increase in creative thinking abilities at the knowledge (literature search) and verification stages in the treatment class. Learning with an ethnomatic-based CRT approach contributes 0.48 or the medium category to increasing creative thinking abilities. This is supported by the research results of Hanratty and Aydin (2023) which state that the use of CRT provides students with the opportunity to develop skills in the intensity of their knowledge and be able to compete globally. Apart from that, other research concludes that the application of CRT in learning proves that there is an increase in students' understanding of mathematics (Pramesti & Dewi, 2023). This is because students are actively involved and learning is not centered on the teacher. Designing with a CRT approach can produce learning tools that lead to increasing students' cultural literacy attitudes (Asari, 2015). Apart from that, other research shows that the CRT approach can increase students' interest in learning and students become more active in class (Ozyurt et al., 2021; Sumandya et al., 2023). So, it can be concluded that the ethnothematic-based CRT approach is very good to use as a basis for developing learning tools.

2. Student responses to learning using an ethnothematic-based CRT approach to improve students' creative thinking

The results of distributing questionnaires regarding student responses to learning using the ethnomatic-based CRT approach obtained results in the very strong category. This means that students respond positively and are happy with learning using the ethnomatic-based CRT approach. The strongest response was found in the interest indicator. This means that students have a high interest in learning with the CRT approach. This is influenced by the development of the maximum CRT approach. This opinion is supported by Burson (2011) who states that the CRT approach is able to build positive student behavior in class (including discipline in doing assignments), as well as student attention and participation. Apart from that, in terms of the benefits of

learning that accommodates students' cultural backgrounds, the students' learning process becomes more enjoyable and meaningful (Bai & Guo, 2021). This focus makes students more enthusiastic in learning by showing an enthusiastic attitude in learning. Indirectly, students' enthusiasm for learning can spread to other attitudes such as being independent, critical and creative towards learning problems. Apart from that, it becomes easier for students to collaborate with friends who have the same learning interests (Roberts & Inman, 2023).

The very strong student response is also supported by the research results of Tomlinson et al (2003) which stated that learning by paying attention to students' cultural backgrounds and being academically differentiated occurs widely and is an effective method. In line with this, Setiyawati and Septiani (2023) produced findings that the results of students' learning responses with CRT were seen from the ability to explain, the ability to interpret or interpret, the ability to apply or apply, the ability to have a perspective, the ability to empathize, and the ability to have self-knowledge. Then previous findings stated that students' responses regarding questions in the questionnaire discussing the use of the CRT approach in learning were that students had the perception that the CRT approach was effective to use, and could increase students' motivation and learning activities (Gloria et al., 2018; Ostinelli, 2016; Furthermore, other findings show that the application of CRT provides effective results in learning related to the continuity of the learning system, educators and the parties involved (Uluçinar, 2021). This can be followed up at the next opportunity for teachers to implement learning management with a potential-based CRT approach local to improve students' creative thinking.

CONCLUSION

Based on the results and discussion above, it can be concluded as follows: a) Learning management using an ethnothematic-based CRT approach has been proven to improve students' creative thinking abilities. The results of the N-Gain calculation show that the difference before and after treatment is 0.86 (high category). The effect size test results show the number "0.48" that there is effectiveness of learning with the CRT approach to improve the creative thinking abilities of elementary school students in the medium category; b) Student responses to learning using an ethnomatic-based CRT approach to improve creative thinking abilities in 5th grade elementary school students are very strong.

IMPLICATION AND SUGGESTION

Based on the conclusion above, it can be implied that teachers can use the ethnothematic-based CRT approach in elementary school learning in order to empower students' creative thinking. The local potential-based CRT approach can increase students' self-confidence so that they are able to solve problems creatively. Creative thinking is one of the characteristics of 21st century learning. Therefore, teachers should always try to improve students' creative

thinking in learning. Teachers must be creative in preparing media and developing teaching materials to support the implementation of learning with the ethnothematic-based CRT approach.

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AUTHOR CONTRIBUTION

The authors confirm their contributions to the paper as follows: conception and design of the study: Author 1, Author 2; data collection: Author 3; analysis and interpretation of results: Author 1, Author 2, Author 3; preparation of the draft manuscript: Author 1, Author 2, Author 3. All authors reviewed the results and approved the final version of the manuscript.

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THE EFFECT OF PROBLEM BASED LEARNING ASSISTED BY VIRTUAL REALITY "*MUSEUM SUMPAH PEMUDA*" ON CRITICAL THINKING TENDENCIES AND LEARNING MOTIVATION IN SOCIAL STUDIES LEARNING

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ABSTRACT

The Industrial Revolution 4.0 is reshaping social studies to address real-life problems and foster critical thinking skills. Problem-Based Learning (PBL) focuses on resolving actual issues, while Virtual Reality (VR) provides an immersive virtual learning environment within the classroom. This study investigates the effect of VR-assisted PBL, specifically the "Museum Sumpah Pemuda", on critical thinking tendencies and learning motivation in social studies education. Utilizing a quasi-experimental approach with a pretest and posttest design, the study population consisted of 75 eighth-grade students aged 13-15 years, divided into three classes. Cluster random sampling was applied to select the control class (VIIIB) and the experimental class (VIIIC), each comprising 25 students. The research utilized a critical thinking self-assessment questionnaire developed by Masured Reasons LLC, featuring 20 questions, alongside Facione & Gittens's critical thinking indicators. Additionally, the learning motivation questionnaire was based on criteria from Hamzah B. Uno and included 24 questions. Results from the MANOVA hypothesis test ($p<0.05$) indicate a significant effect of VR-assisted PBL "Museum Sumpah Pemuda", on both critical thinking tendencies and

learning motivation in social studies learning. These findings suggest that VR-assisted PBL not only cultivates 21st-century skills but also resonates with students' experiences in the technology-driven era of 4.0.

Keywords: Problem Based Learning, Virtual Reality, Critical Thinking, Learning Motivation, Social Studies

INTRODUCTION

The Industrial Revolution 4.0 has brought significant changes to social studies, enabling the integration of real-world problems into the curriculum (Safitri et al., 2023). By merging social studies with technology 4.0, we can transform learning for students and teachers, making abstract concepts more effective and engaging (Sujarwo et al., 2024). One innovative approach is to leverage advanced technologies such as virtual reality (VR) to increase the relevance of learning, providing a more interactive and immersive learning experience for students.

The Youth Pledge Museum, one of the important historical sites in Indonesia, is now utilizing VR technology to create an innovative learning experience. The Youth Pledge Declaration on October 28, 1928, is a symbolic milestone in Indonesia's struggle for independence. Through VR technology, students can interactively explore historical artifacts and learn about the nation's struggle, increasing learning motivation and 21st-century skills, as Maghfur et al. (2023) noted.

In the context of the Industrial Revolution 4.0 and the challenges of 21st-century education, social studies have a vital role in fostering responsible citizens equipped with 4C skills—critical thinking, communication, collaboration, and creativity. Critical thinking and problem-solving are essential for making informed decisions and addressing social issues in the digital era (Sudrajat et al., 2023). Enhancing critical thinking among students is supported through carefully designed teaching strategies and classroom experiences (Kawuryan et al., 2022). Such initiatives aim to prepare young people to become empowered and adaptable citizens.

However, Indonesia faces challenges in developing students' critical thinking skills. According to PISA results, Indonesia ranks 74th out of 79 countries, with an average score of 396, indicating students' struggles with analytical and higher-order thinking questions (Suresman et al., 2023). The nature of examination questions, which emphasize higher-order thinking skills

(HOTS), highlights the gap in students' critical thinking abilities across educational levels (Lestari et al., 2024). This gap necessitates adopting effective learning strategies to enhance students' critical thinking and problem-solving skills, enabling them to effectively address challenges.

The national data above shows that the low level of critical thinking is also supported by a survey of student responses to social studies learning, which is an important catalyst for critical thinking. Table 1 below shows that an average of 51% of students reported a lack of enthusiasm for social studies learning, low interest in the media used, and a lack of motivation to learn. These data highlight the need for innovative approaches to increase student motivation in social studies learning so that social studies can encourage students' critical thinking levels.

Table 1. *Students' Responses to Social Studies Learning*

Indicator	Response/Answer			Number of students
	Yes (%)	No (%)	Neutral (%)	
Enthusiasm for Learning	36	44	20	25
Interest in Learning Media Used	28	56	16	25
Encouragement to Learn	40	52	8	25
Average	35	51	15	

Transitioning from teacher-centered to student-centered learning is an effective strategy to address these challenges (Permatasari et al., 2019). Traditional learning media, such as pictures, maps, and globes, often fail to engage students actively (Tohari et al., 2019). Despite advancements in digital technology, many educators still rely on conventional teaching methods, with the teacher as the primary source of information (Marini et al., 2023).

The Problem-Based Learning (PBL) model has been shown to enhance critical thinking skills, particularly among Generation Z students meaningful (Lestari et al., 2024). PBL encourages students to address real-world problems relevant to their lives, making learning more meaningful (Kumalasari et al., 2024). By tailoring PBL to align with the digital proficiency of Generation Z, the educational experience can be significantly enhanced (Seibert, 2021). This modification not only increases the relevance of the curriculum but also fosters greater engagement and deeper meaning for students, effectively leveraging their inherent technological fluency.

The integration of Virtual Reality (VR) into educational frameworks has gained substantial traction as an innovative digital medium (Radianti et al., 2020). Empirical studies have consistently demonstrated that VR significantly enhances student motivation for learning (Makransky et al., 2019). By employing VR technologies, educators can effectively convey complex concepts that may be challenging to illustrate through traditional methods, thereby augmenting students' motivation and engagement in social studies.

Previous research has highlighted how PBL continues to evolve alongside emerging technologies like VR. Recent studies offer insights into these developments: (1) VR-integrated PBL in nursing education showed mixed results on critical thinking but significantly enhanced problem-solving and self-efficacy (Song & Kim, 2023); (2) PBL with VR in high schools improved problem-solving skills significantly (Wahjusaputri et al., 2023); (3) STEM-based PBL with VR in high schools led to increased critical thinking (Khairunnisa et al., 2022); (4) Combining VR with contextual-based learning improved students' interest, participation, and understanding (R. Liu et al., 2020); and (5) VR in science education provided immersive learning experiences that fostered emotional engagement and interest (Filter et al., 2020). However, a gap remains in exploring the combined effects of VR-assisted PBL on critical thinking and motivation in social studies education.

To address this gap, this study investigates the effects of VR-assisted PBL, specifically the "Museum Sumpah Pemuda," on students' critical thinking tendencies and learning motivation in social studies. By leveraging the problem-solving strengths of PBL and the immersive experiences of VR, this research seeks to enhance our understanding of their combined impact on critical thinking and motivation in social studies.

LITERATURE REVIEW

Critical Thinking

According to the American Philosophical Association, critical thinking is defined as purposeful and self-regulatory judgment that leads to interpretation, analysis, evaluation, and inference, along with an explanation of the evidential, conceptual, methodological, criterion, or contextual considerations that underpin the judgment (Facione & Gittens, 2016). This concept has roots in the early 20th century, inspired by John Dewey's advocacy for reflective and rational thought processes aimed at arriving at accurate beliefs (Kawuryan et al., 2022). Philosophical definitions of critical thinking highlight its reflective and

idealistic dimensions, while psychological perspectives emphasize observable skills like problem-solving and decision-making (Leach et al., 2020). Critical thinking is not limited to cognitive processes but also involves dispositional aspects, such as curiosity, open-mindedness, and the ability to evaluate problems from multiple perspectives (Le & Chong, 2024).

Despite its importance, research highlights Indonesia's struggles with fostering critical thinking skills among students. PISA results indicate a low performance ranking for Indonesian students, which reflects their difficulties with higher-order thinking questions (Suresman et al., 2023). This gap underscores the need for innovative learning approaches that target both cognitive and dispositional aspects of critical thinking.
Learning Motivation.

In the realm of education, motivation serves as the driving force that encourages, propels, and guides students throughout their learning journey (Tohari et al., 2019). It encompasses both internal drives and external influences that shape an individual's desire to learn, playing a crucial role in initiating, directing, and sustaining learning efforts in pursuit of specific objectives (E. T. Lestari, 2020). According to Marilyn K. Gowing as referenced by Cahyani dkk. (2020), the four essential components of learning motivation include goal attainment, commitment, initiative, and optimism. Therefore, learning motivation can be succinctly defined as the impetus that inspires individuals to participate in learning activities aimed at achieving defined goals.

Motivation plays a critical role in social studies education, where abstract and complex concepts can often hinder student enthusiasm (Sujarwo et al., 2023). Problem-Based Learning (PBL) has been identified as a strategy to enhance learning motivation by engaging students in solving real-world problems that spark curiosity and personal relevance (Rotgans & Schmidt, 2019).

Problem-Based Learning

PBL is a student-centered instructional model that employs real-world problems to drive the learning process. According to Sudrajat et al. (2023), PBL encourages students to develop problem-solving and critical thinking abilities while constructing new knowledge. Arends (2015) outlines five key stages of PBL : (1) orientation of students to the problem, (2) organization of students for learning, (3) facilitating independent and group investigations, (4) developing and presenting artifacts and exhibits, and (5) analyzing and evaluating the problem-solving process. However, research indicates that the application of

PBL can vary significantly across different disciplines and contexts (Dabbagh, 2019).

PBL is recognized as a suitable learning model for Generation Z, who are encouraged to tackle real-world problems that pertain to their lives. Born between 1995 and 2010, this generation experiences distinct contexts of mobility, reality, and social networking and has grown up as digital natives (Kumalasari et al., 2024). By integrating the latest technologies in education, teachers can design more creative and engaging lessons that effectively capture the attention of Generation Z students, who are known for their shorter attention spans (Mukul & Büyüközkan, 2023). While generalizations about generational characteristics can sometimes lead to stereotypes, an awareness of these traits can be beneficial. Teachers who understand the characteristics of Generation Z can tailor their teaching strategies to enhance the effectiveness of PBL for this generation, as further elaborated in Table 2 (Seibert, 2021).

Table 2. Generation Z and PBL

Generation Z	PBL
Prefers real-world, practical learning and hands-on experience	Engages with actual social issues or problems relevant to daily life.
Exhibits technology literacy	Utilizes online resources such as research journal websites, government portals, and databases to enhance information gathering.
Requires development of communication skills and teamwork practices	Involves small group discussions, class debates, and simulations that facilitate effective discussion and argumentation.
Seeks feedback and validation, often lacking confidence	Incorporates group presentations and class discussions that allow for peer evaluation and instructor feedback.
Necessitates the development and practice of critical thinking	Engages students in higher-order thinking and critical analysis of information.

Source : Seibert (2021)

The distinct attributes of Generation Z align well with the use of virtual reality (VR) in education. VR technology has the potential to enhance Gen Z's motivation, confidence, and comprehension throughout the learning process, making it a powerful resource for contemporary education. Key traits of Gen Z that favor VR-assisted problem-based learning include their strong engagement and interaction, adaptability to technology, and a preference for exploratory and playful learning experiences (D. Liu & Li, 2024; Rai et al., 2019).

Integration of VR and PBL in Education

In 1916, Dewey defended the argument that students should learn through hands-on experiences, participating in authentic learning environments, and practicing practical tasks. This concept can still be realized today through VR, which aligns well with Dewey's educational philosophy (Coban et al., 2022). The integration of VR in PBL presents significant opportunities for enriching collaborative competencies, fostering self-directed learning, and improving learning outcomes (Abdullah et al., 2019). By embedding VR technology within educational frameworks, we can advance toward Dewey's experiential learning paradigm, allowing students to engage in immersive, contextually rich experiences that enhance comprehension and retention of knowledge (Mutrofin, 2022).

VR offers a computer-generated environment where scenes and objects appear realistic, creating a sense of user immersion. This immersive experience can be categorized into three types: non-immersive, semi-immersive, and immersive (Ifanov et al., 2023). There are three primary systems for interacting in virtual reality (VR): (1) Desktop VR, which allows users to interact with VR content using input devices such as keyboards, mice, gamepads, or touchscreens; (2) VR HMD (Head Mounted Displays), users wear glasses that contain two LCD screens positioned in front of their eyes; and (3) VR CAVE (Cave Automatic Virtual Environment), A room that projects VR images on all walls and floors (Coban et al., 2022).

Research indicates that VR development in social studies education yields practical results, serving as a compelling medium that enhances learning outcomes by captivating students' interest in the subject (Safitri et al., 2023). Using case-based virtual reality within social studies instruction significantly improves educational results, suggesting implications for modern classroom innovations aligned with the technological advancements of the Industrial Revolution 4.0 era (Sujarwo et al., 2023). Integrating virtual reality technology into the educational process can create an immersive learning environment that boosts interest and motivation during face-to-face instruction (Ariatama et al., 2021).

VR is an advanced technology that significantly enhances educational strategies by offering immersive and interactive learning experiences. For instance, students can explore both nearby and distant locations through the geographical landscapes presented in VR, all without leaving the classroom—and sometimes even from home (Oje et al., 2023). VR offers numerous

advantages in history education by visualizing complex topics and enabling exploration of environments that are often challenging to access. For example, experiencing the ancient Roman domus alongside the daily life of the Roman period can be more engaging and effective for learners (Boffi et al., 2023) In China, the potential of VR technology to create captivating and immersive experiences for museum visitors is being increasingly recognized. This advancement enhances the functionality of digital museums and reinforces their role in connecting the past, present, and future of society (Quan et al., 2024). While existing studies demonstrate the benefits of VR-assisted PBL, research gaps still need to be discovered regarding its application in social studies education. Further studies are needed to evaluate how VR technology can be effectively implemented to support critical thinking and motivation in real-world classroom settings.

The integration of VR provides compelling and engaging learning opportunities that enrich historical education and museum experiences. By combining PBL's problem-solving framework with VR's immersive capabilities, educators can create innovative learning experiences tailored to Generation Z students. However, further research is required to explore the full potential of VR-assisted PBL in social studies education, particularly in fostering higher-order thinking skills and sustaining student motivation.

RESEARCH METHODOLOGY

This study employs a quantitative, quasi-experimental research design featuring both pre-test and post-test assessments (Creswell & Guetterman, 2019). The independent variables in this research are the learning models and media, specifically VR-assisted PBL, while the dependent variable is the tendency for critical thinking. The primary objective of this study is to evaluate the effect of VR-assisted PBL in enhancing critical thinking tendencies within the context of social studies learning.

Table 3. *Pre-test and Post-test Design*

Group	Test	Treatment	Test
Controls	Pre-test	Picture and Picture assisted Picture	Post-test
Experiment	Pre-test	VR-assisted PBL	Post-test

Source: Creswell & Guetterman (2019)

The study's population comprised all eighth-grade students enrolled at SMP Negeri 2 Badau, totaling 75 individuals across three distinct classes. Participants were between 13 and 15 years old, characteristic of early adolescence and typical of junior high school demographics in Indonesia. The

categorization of the subjects by age is presented in Table 4, aligning with existing literature on youth studies. A cluster random sampling technique was employed to determine the sample population (Fraenkel et al., 2023). Specifically, class VIII B was assigned as the control group, consisting of 25 students, while class VIII C served as the experimental group, comprising 25 students. A sample of 50 students was selected to achieve sufficient statistical power. With 25 students per group, it slightly exceeds the ideal of 24 participants, ensuring reliable comparisons between the control and experimental groups (Besekar et al., 2024).

Table 4. *Characteristics of Study Participants*

Characteristic	Category	Total	Percentage (%)
Gender	Male	46	61.33
	Female	29	38.67
Age (Year)	13	28	37.33
	14	39	52.00
	15	8	10.67

Data collection employs non-test instruments, specifically a critical thinking self-assessment questionnaire comprising 20 questions developed by Measured Responses LLC. This questionnaire is organized into five critical thinking indicators to evaluate individual tendencies in critical thinking, as referenced by Facione & Gittens (2016), with details presented in Table 5. The criteria for the critical thinking self-assessment can be found in Table 6. Scoring for the self-assessment involves assigning 5 points for each statement, with "Yes" responses to odd-numbered statements receiving 5 points, and "No" responses to even-numbered statements also receiving 5 points.

Table 5. *Indicators and Self-Assessment of Critical Thinking Tendencies*

Skill Indicator from Facione & Gittens	Critical Thinking Self-Assessment Statement from Measured Responses LLC
Interpretation	Question 15: Do you read reports, newspapers, book chapters, or watch world news or documentaries to learn something new? (Yes/No) Question 16: Do you put zero effort into learning something new until you see the immediate utility? (Yes/No)
Analysis	Question 7: Do you make a serious effort to be analytical about the foreseeable outcomes of your decisions? (Yes/No) Question 11: Do you organize a thoughtfully systematic approach to a question or issue for yourself? (Yes/No) Question 19: Do you pay attention to variations in circumstances, contexts, and situations when making decisions? (Yes/No)

	Question 20: Do you refuse to reconsider your position on an issue due to differences in context, situations, or circumstances? (Yes/No)
Inference	Question 5: Do you try to think ahead and anticipate the consequences of various options? (Yes/No) Question 13: Do you approach a challenging problem with confidence that you can think it through? (Yes/No) Question 12: Do you jump in and try to solve a problem without first considering how to approach it? (Yes/No)
Evaluation	Question 3: Do you show tolerance toward the beliefs, ideas, or opinions of someone you disagree with? (Yes/No) Question 9: Do you encourage your peers not to dismiss the opinions and ideas offered by others out of hand? (Yes/No) Question 17: Do you demonstrate strength by being willing to honestly reconsider a decision? (Yes/No)
Explanation	Question 1: Are you courageous enough to ask tough questions about some of your longest-held and most cherished beliefs? (Yes/No) Question 4: Do you try to find information to support your side of an argument but not the opposing side? (Yes/No) Question 18: Do you show strength by refusing to change your mind? (Yes/No)
Self-Regulation	Question 2: Do you back away from questions that might undermine some of your longest-held and most cherished beliefs? (Yes/No) Question 6: Do you laugh at what other people say and make fun of their beliefs, values, opinions, or points of view? (Yes/No) Question 8: Do you manipulate information to suit your purposes? (Yes/No) Question 10: Do you disregard the possible adverse consequences of your choices? (Yes/No) Question 14: Instead of working through a question for yourself, do you take the easy way out and ask someone else for the answer? (Yes/No)

Source: Facione & Gittens (2016)

Table 6. *Criteria for Assessing Independent Critical Thinking Ability*

Score	Critical Thinking Abilities
70 or above	Critical thinking tendencies
Between 50 and 70	Ambivalent or mixed critical thinking tendencies
50 or less	A tendency that opposes or disfavours critical thinking

Source: Facione & Gittens (2016)

In the meantime, data collection was conducted using a non-test instrument designed to assess learning motivation, comprising a questionnaire with 24 questions aligned with the indicators of learning motivation proposed by Hamzah B. Uno, as illustrated by Lestari (2020) in Table 7. Below is a grid

representing the instruments used to measure students' learning motivation in social studies learning through VR-assisted PBL :

Table 7. *Learning Motivation Instrument Overview*

No	Indicator	Number of Questions		Total Questions
		Positive	Negative	
1.	Desire and drive to succeed	2	2	4
2.	Encouragement and learning needs	2	2	4
3.	Future hopes and aspirations	2	2	4
4.	Rewards associated with learning	2	2	4
5.	Engaging activities in the learning process	2	2	4
6.	A conducive environment that supports effective study	2	2	4
	Total Number of Questions	**12**	**12**	**24**

Learning motivation data is assessed through a questionnaire comprising 24 questions. This questionnaire aims to evaluate students' learning motivation in response to the VR-assisted PBL experience titled "Museum Sumpah Pemuda" within the context of social studies education. The Likert scale is used to measure the level of student agreement with the statements in the learning motivation questionnaire. This scale encompasses a spectrum of responses ranging from "strongly disagree" to "strongly agree," which are subsequently translated into numeric values to assess student learning motivation in the VR-assisted PBL experience, "Museum Sumpah Pemuda." The results are scored using a Likert scale, as detailed in Table 8.

Table 8. *Likert Scale Learning Motivation Instrument*

Positive Questions		Negative Questions	
Answer	**Score**	**Answer**	**Score**
Strongly agree	5	Strongly Disagree	1
Agree	4	Do not agree	2
Neutral	3	Neutral	3
Do not agree	2	Agree	4
Strongly Disagree	1	Strongly agree	5

Source : Widodo dkk. (2023)

In this study, content validation was carried out via expert judgment alongside product moment analysis. The validity of the instrument was assessed through product moment correlation, which involved correlating individual item scores with the total score. The correlation coefficient (r) was calculated, and its significance was evaluated according to Guilford's criteria. An item was deemed valid if its score surpassed the critical value of 0.361 at the 5% significance level (Rosalina et al., 2023). The majority of items in the

students' critical thinking ability questionnaire demonstrated sufficient validity, though several required deletion or modification. Reliability was quantified using Cronbach's Alpha, with scores above 0.60 indicating acceptable reliability. The obtained Cronbach's Alpha of 0.809 reflects high reliability. Furthermore, item-total correlations exceeding 0.30 indicate strong measurement accuracy (Hendryadi, 2021).

Numerous studies indicate that the implementation of PBL varies across different disciplines and contexts (Dabbagh, 2019). In light of this, Arends (2015) provides a comprehensive summary of PBL in five stages, detailing the necessary teacher behaviors associated with each stage, in conjunction with the VR museum of the “Sumpah Pemuda”. Integrating the Youth Pledge VR Museum will transform PBL into a more interactive, immersive, and reflective experience, increasing engagement and understanding. The syntax of PBL, as enhanced by the VR museum of the “Sumpah Pemuda”, is outlined in Table 9.

Table 9. *Syntax of VR-assisted PBL of Museum Sumpah Pemuda*

Stages	Learning Steps	Teacher Behavior
1.	Orient students to real problems.	The teacher articulates the learning objectives, outlines essential logical prerequisites, and motivates students to engage in problem-solving activities, using the VR Museum's rich historical context.
2.	Organize students to learn.	The teacher assists students in defining and structuring learning tasks pertinent to the problem. VR enables exploration of relevant elements and questions.
3.	Assist/guide independent and group investigations using the VR media of the Museum Sumpah Pemuda.	The teacher encourages students to gather relevant information, conduct experiments, and seek explanations and solutions artifacts within the VR of the Museum Sumpah Pemuda.
4.	Develop and present work.	The teacher aids students in planning and creating suitable artifacts such as reports, videos, and models, and supports them in sharing their work with others.
5.	Analyze and evaluate the problem-solving process.	The teacher facilitates reflection, allowing students to revisit investigative processes in the VR environment.

Source: Arends (2015)

The Virtual Reality Museum Sumpah Pemuda, or “Museum of the Youth Oath”, offers an immersive museum experience that you can explore online. Visit the Museum Sumpah Pemuda virtually by accessing the website

https://360vpro.id/museumsumpahpemuda/ or https://indonesiavirtualtour.com/storage/ destination/museum-sumpah-pemuda/src/index.htm. The Sumpah Pemuda / Youth Pledge is a national declaration by Indonesian youth that solidified their commitment to unity during the second youth congress, which took place in this building on October 27-28, 1928 at 106 Kramat Raya Street, Central Jakarta.

This building is offered in virtual reality and comprises eight rooms that can be explored as follows: (1) Introduction Room, (2) Organization Room before the Youth Oath, (3) Congress I Room, (4) Congress II Room, (5) Scouting Room, (6) Organization Room after the Youth Oath, (7) History Room of the Indonesia Raya Song, and (8) Contemplation Room. The virtual tour of this building features dioramas, video explanations, authentic sounds (including radio broadcasts and national anthems), as well as informative texts and photographs. Illustrations and explanations of the virtual reality experience at the Museum Sumpah Pemuda are depicted in Figure 2 (Museum Sumpah Pemuda, 2024).

Figure 1. *Floor Plan of VR Museum Sumpah Pemuda*

Figure 2 . *VR Appearance of the Museum Sumpah Pemuda*

The image above showcases a virtual reality representation of the Museum Sumpah Pemuda, which will be used as a learning medium to support PBL. Figure 1 outlines the layout of the virtual museum, enabling users to navigate through rooms and exhibitions related to the Youth Pledge event. Meanwhile, Figure 2 illustrates significant historical scenes, artifacts, and interactive videos. This immersive and visually engaging format is likely to capture students' interest and foster a deeper appreciation for history. The immersive and visually appealing format can arouse students' interest and appreciation for history. Then, through museum exploration, students can develop critical thinking skills, information evaluation, and problem-solving.

N-Gain, which stands for "normalized gain" or normalized increase, is a widely accepted metric used to assess the effectiveness of learning initiatives or interventions in enhancing student learning outcomes (Sukarelawa et al., 2024). This assessment was conducted to evaluate the impact of the treatment provided (Maknun et al., 2022). The criteria for N-Gain are detailed in Table 10, while the effectiveness categories are presented in Table 11. To calculate N-Gain, the following formula (1) is utilized:

$$\text{N-gain (g)} = \frac{\text{Posttest score-Pretest score}}{\text{Max score-Pretest core}} \quad (1)$$

Table 10. *N-Gain Criteria*

N-Gain Value	Criteria
0.70 ≤ g ≤ 100	High
0.30 ≤ g < 0.70	Moderate
0.00 < g < 0.30	Low
g = 0.00	No increase observed
-1.00 ≤ g < 0.00	Decline observed

Source : Sukarelawa et al., (2024)

Table 11. *Effectiveness of N-Gain Categories*

Percentage (%)	Interpretation
< 40	Ineffective
40-55	Less effective
56-75	Sufficiently Effective
> 75	Highly Effective

Source : Sukarelawa dkk., (2024)

The data analysis conducted in this study includes the prerequisite test analysis, specifically the normality test utilizing the Shapiro-Wilk test for datasets with fewer than 50 observations. Hypothesis testing uses MANOVA for a multivariate approach involving two groups and two dependent variables. MANOVA was selected for its ability to analyze multiple dependent variables together, reducing error risk. It effectively examines the independent variable's effects (group) effects on critical thinking tendency and learning motivation, revealing patterns not seen in univariate analysis.

Before this, a covariance matrix homogeneity test was executed using Box's M, which serves as a necessary condition for multivariate analysis. MANOVA compares the group means between the experimental and control classes regarding critical thinking tendencies and learning motivation. The decision-making criteria for the MANOVA test are as follows:

- If the significance value (sig) for any of the Pillai's Trace, Wilks' Lambda, Hotelling's Trace, or Roy's Largest Root analyses in the MANOVA table is less than or equal to 0.05, then the null hypothesis (H_0) is rejected.
- Conversely, if the significance value (sig) for any of these analyses is greater than 0.05, then the null hypothesis (H_0) is accepted (Sutrisno & Wulandari, 2018).

The study adhered to ethical guidelines by obtaining informed consent, ensuring confidentiality, minimizing risks, debriefing participants, and providing educational resources.

RESEARCH FINDINGS

This study implemented PBL in conjunction with the virtual reality experience "Museum Sumpah Pemuda" for the experimental class, while the control class utilized a picture-assisted approach. Both classes underwent a pretest to assess their initial levels of critical thinking and learning motivation prior to treatment. Following the intervention, posttests were administered to evaluate

the impact of the treatment on enhancing critical thinking tendencies and learning motivation. Figures 3 and 4 illustrate the average pretest and posttest scores, along with the N-gain for both the experimental and control classes, focusing on critical thinking tendencies and learning motivation.

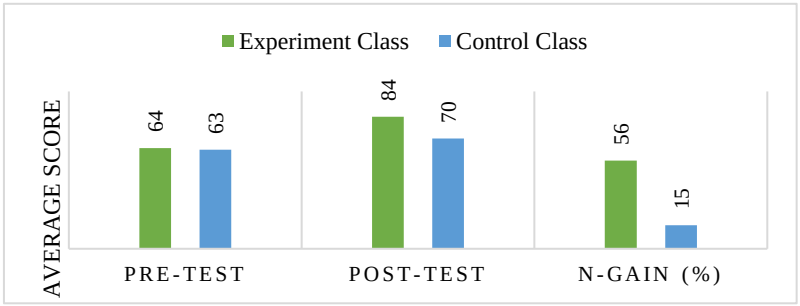

Figure 3. *Comparative Analysis of Critical Thinking Tendencies Between the Experimental Class and the Control Class*

According to the critical thinking self-assessment criteria outlined by Measured Reasons LLC in Facione & Gittens (2016), students in both the experimental and control classes initially exhibited critical thinking tendencies categorized as "ambivalent." However, following the intervention, students in the experimental class progressed to the "critical thinking tendency" category, demonstrating an improvement from their pretest scores. In contrast, students in the control class remained in the "ambivalent" category on the posttest, indicating no enhancement in their critical thinking tendencies, despite a rise in their scores from the pretest. This suggests that the learning intervention effectively promoted an increase in students' critical thinking tendencies.

The data indicated that the average tendency for critical thinking improved in both the experimental and control classes. The pre-test scores for the experimental and control groups were quite similar, suggesting that both sets of students began with relatively comparable levels of critical thinking. However, the average critical thinking tendency score for the experimental class was higher than that of the control class, demonstrating that the students in the experimental group experienced a more significant increase in their scores compared to their counterparts in the control group.

Table 12. *N-Gain Results for Critical Thinking Tendencies*

		Descriptive Statistics			
Experiment Class	**N**	**Minimum**	**Maximum**	**Mean**	**Std. Deviation**
N-Gain Score	25	-0.25	1.00	0.5601	0.6875
N-Gain %	25	-25.00	100.00	56,011	6.8748
Valid N	25				

Control Class	N	Minimum	Maximum	Mean	Std. Deviation
N-Gain Score	25	-1.50	0.75	0.1499	0.9101
N-Gain %	25	-150.00	75.00	14.99	9.1014
Valid N	25				

According to the statistical data presented in Table 12, the mean N-gain value stands at 56.011, or 56%. This indicates that the enhancement in critical thinking tendencies falls within the moderately sufficiently effective category for the experimental class. In comparison, the control class, as shown in Table 12, has a mean N gain value of 14.99, or 15%, which classifies the increase in critical thinking tendencies as ineffective. This contrast highlights the effectiveness of PBL supported by the virtual reality experience of the "Museum Sumpah Pemuda" in social studies instruction for enhancing critical thinking skills. While the improvement is categorized as moderately effective, it also underscores the potential for further enhancement and development in the future.

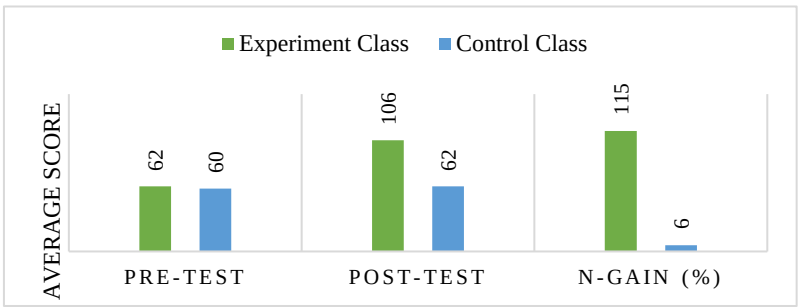

Figure 4 . *Comparative Analysis of Learning Motivation Between the Experimental Class and the Control Class*

The results from the learning motivation pre-test indicate that both the experimental and control classes saw an average increase in scores. The pre-test scores for both classes were similar, suggesting that both groups shared a comparable level of initial learning motivation. However, the average post-test score for the experimental class was higher than that of the control class, demonstrating that students in the experimental class experienced a more significant improvement in their scores compared to those in the control class.

Table 13 . *N-Gain Results for Learning Motivation*

	Descriptive Statistics				
Experiment Class	**N**	**Minimum**	**Maximum**	**Mean**	**Std. Deviation**
N-Gain Score	25	-0.03	2.60	1.1468	0.10985
N-Gain %	25	-3.03	260.00	114.68	10.98

Valid N	25				

Control Class	N	Minimum	Maximum	Mean	Std. Deviation
N-Gain Score	25	0.00	0.49	0.0607	0.02760
N-Gain %	25	0.00	49.00	6.07	2,760
Valid N	25				

According to the statistical data presented in Table 13, the mean N-gain value is 114.68, or 115%. This result indicates that the increase in student learning motivation within the experimental class falls into the Highly Effective. In contrast, the control class, as shown in Table 13, has a mean N-gain value of 6.07, or 6%, which categorizes the increase in student learning motivation as ineffective. These figures highlight the effectiveness of PBL (Problem-Based Learning) supported by the VR "Museum Sumpah Pemuda" in enhancing student learning motivation in social studies.

Table 14. *Normality Test Results*

Shapiro-Wilk	Group	Statistics	df	Sig.
Critical Thinking Tendencies	Experimental Class	0.935	25	0.114
	Control Class	0.961	25	0.441
Motivation to learn	Experimental Class	0.943	25	0.170
	Control Class	0.952	25	0.277

According to the results of the Shapiro-Wilk test displayed in Table 14, the significance values (sig) for the experimental class are greater than 0.05, specifically 0.114 for critical thinking tendencies and 0.441 for learning motivation. Similarly, the significance values for the control class are 0.170 for learning motivation and 0.277 for critical thinking tendencies. Thus, both the experimental and control class data on critical thinking tendencies and learning motivation can be considered as normally distributed.

In this study, students completed a pretest and posttest questionnaire utilizing a critical thinking self-assessment instrument. This instrument comprised 20 questions based on the Measured Responses LLC framework from Facione & Gittens (2016) , along with 24 questions regarding learning motivation sourced from Hamzah B. Uno in Lestari (2020). Additionally, a normality test was conducted to assess whether the data followed a normal distribution, ensuring that the appropriate statistical methods could be selected for analysis.

The analysis of the critical thinking class data suggests that it is likely normally distributed, as evidenced by the Q-Q plot shown in Figure 5. The data

points in the Q-Q plot closely align with the diagonal line. Additionally, the shape of the diagram resembles a bell curve and exhibits minimal deviations to the right or left. This further supports the conclusion that the data is most likely normally distributed.

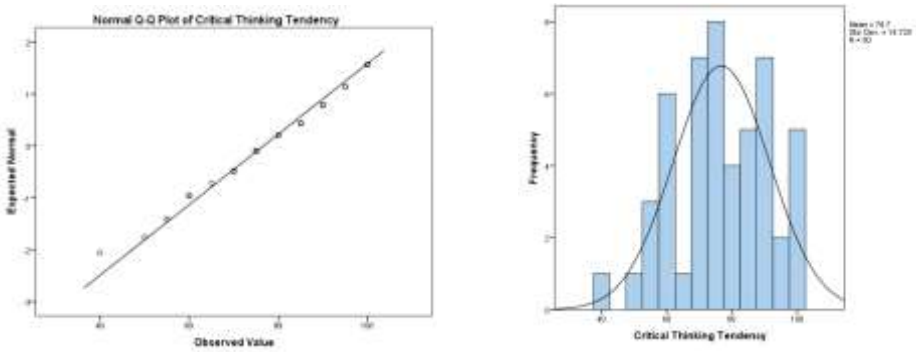

Figure 5. *Q-Q Plot and Histogram of the Normal Distribution for Critical Thinking Tendency*

The Q-Q Plot in Figure 5 demonstrates the distribution of learning motivation data. The data points are positioned around the diagonal line, creating a symmetrical bell-shaped pattern with no significant tilt to the right or left. This suggests that the posttest data follows a normal distribution.

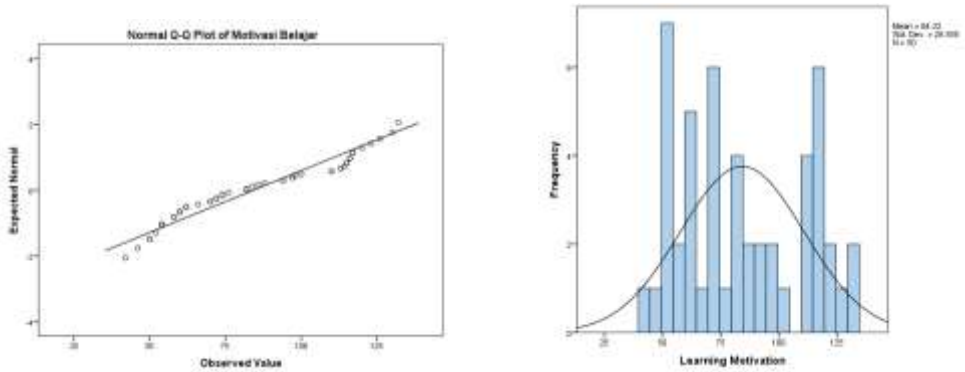

Figure 6. *Q-Q Plot and Histogram of the Normal Distribution for Learning Motivation*

The results of the homogeneity of variance test presented in Table 15 indicate the following: if the significance value (sig) is greater than 0.05, we accept the null hypothesis (H0), suggesting that the data distribution is homogeneous. Conversely, if the significance value (sig) is less than 0.05, we accept the alternative hypothesis (H1). In this case, the significance value (sig) is 0.295, which is greater than 0.05 for the data concerning critical thinking

tendencies and learning motivation. Therefore, according to the established criteria, we accept H0, concluding that the data distribution is homogeneous, allowing us to proceed with the MANOVA analysis.

Table 15. *Results of the Homogeneity Test for Critical Thinking Tendency and Learning Motivation Data.*

Box's Test of Equality of Covariance Matricesa	
Box's M	3,882
F	1,236
df1	3
df2	414720,000
Sig.	0.295

Table 16. *MANOVA Test on Critical Thinking Tendencies and Learning Motivation*

Multivariate Tests	Value	F	Hypothesis df	df error	Sig.
Pillai's Trace	0.707	56,606	2,000	47,000	0,000
Wilks' Lambda	0.293	56,606	2,000	47,000	0,000
Hotelling's Trace	2,409	56,606	2,000	47,000	0,000
Roy's Largest Root	2,409	56,606	2,000	47,000	0,000

According to Table 16, the statistical analyses presented in the Multivariate Test table reveal that Pillai's trace, Wilks' lambda, Hotelling's trace, and Roy's largest root all yield an F value of 56.606, with independent degrees of numerator 2 and denominator 47. The significance value (Sig.) for all tests is 0.000, which is below the alpha levels of both 0.05 and 0.01. Therefore, we reject the null hypothesis and accept the alternative hypothesis. These test results indicate the presence of significant differences among the compared groups regarding the measured variables. This suggests that the VR-assisted PBL "Museum Sumpah Pemuda" has a notable impact on students' critical thinking tendencies and motivation in social studies learning.

DISCUSSION

The implementation of PBL enhanced by VR in the "Museum Sumpah Pemuda" setting has yielded positive outcomes in terms of critical thinking tendencies and student motivation in social studies. This is supported by significant MANOVA results and a noteworthy increase in N-gain, categorized as

moderately effective for critical thinking tendencies and effective for learning motivation. Furthermore, the average score for students' critical thinking reached the criteria for "critical thinking tendency." These findings suggest that VR-assisted PBL offers a viable solution to address the challenges of 21st-century social studies education by being adaptive and integrating with authentic problems (Safitri et al., 2023); moving away from abstract concepts (Sujarwo et al., 2024); fostering critical thinking in students as engaged citizens (Sudrajat et al., 2023); promoting a student-centered approach (Permatasari, Gunarhadi, & Riyadi, 2019); and encouraging active student participation (Tohari, Mustaji, & Bachri, 2019).

This research further supports the findings related to the application of PBL with media, particularly the Virtual Reality (VR) "Museum Sumpah Pemuda", in enhancing critical thinking and learning motivation within social studies education. Particularly, problems in PBL that relate to real-life situations are essential in boosting students' motivation to learn (Rotgans & Schmidt, 2019). In summary, Sulistyaningrum et al. (2022) identify five key benefits of using VR: (1) delivering enjoyable lessons, (2) creating an interactive learning environment, (3) boosting student motivation, (4) enhancing critical thinking skills, and (5) providing authentic learning materials.

Moreover, this study reinforces PBL as an effective model for developing critical thinking skills (Y. Liu & Pásztor, 2022). It expands the scope of VR applications in social studies learning in Indonesia, including the development of VR to improve learning outcomes (Safitri et al., 2023), the effectiveness of VR in assessing social studies learning outcomes (Sujarwo et al., 2024), and the use of VR in case-based learning (Sujarwo et al., 2023) Additionally, it highlights the role of VR in enhancing motivation and interest in the learning process (Ariatama et al., 2021) . VR applications also extend to history education (Boffi et al., 2023)ducation (Boffi et al., 2023); and museum experiences (Quan et al., 2024).

The relationship between increasing critical thinking tendencies and motivation cannot be separated from PBL as a learning strategy. PBL is a learning that presents authentic and meaningful problem situations to students that can be the basis for investigation and inquiry (Arends, 2015). Problems in PBL, especially those relevant to everyday life, have a very important role in increasing students' learning motivation

Several factors within PBL contribute to the cultivation of critical thinking among students, including scenario clarification, brainstorming, active student participation, group discussions, care planning, evaluation and reflection, continuous collaboration, teacher facilitation, limited reliance on lectures, unstructured problems encouraging deeper exploration, questioning and dialogue, as well as feedback exchange. Additionally, teacher support in group communication, information gathering, data analysis, building consensus, motivation, and resource utilization also play a significant role (Santos-Meneses et al., 2023). These elements collectively enhance both critical thinking and learning motivation during the social studies learning process utilizing PBL.

Implementing PBL for Generation Z, or current junior high school students, requires minimal intervention to effectively foster critical thinking and enhance learning motivation. VR a cutting-edge technology of the 21st century, serves as a powerful strategy in PBL for social studies, promoting both critical thinking and learning engagement. The benefits of VR in delivering immersive 360-degree experiences in educational settings support PBL to examine real-world issues in this research. VR creates an experience that allows users to feel as though they are completely surrounded by a computer-generated realistic environment (Ifanov et al., 2023). The authentic experiences provided by virtual reality enhance learning outcomes by positively influencing cognitive, affective, and social learning processes (Lowell & Tagarand soci. Furthermore, the new paradigm in VR that offers a sense of immediacy and control in educational, training, and simulation applications can increase motivation, engagement, and enthusiasm for learning (Lei et al., 2022).

Previous studies have analyzed various applications of virtual reality (VR) across different fields. This study further explores the role of VR in education, particularly in social studies. Based on a review of 219 empirical studies on the use of VR for educational purposes, five distinct VR learning design approaches were identified: passive observation of the VR environment, responding to prompts or commands, problem-solving, collaborating with other avatars, and independently exploring the virtual world (Won et al., 2023). Additionally, an analysis of 30 relevant research articles comparing the effectiveness of VR-based learning and its impact on student engagement indicated that VR is particularly effective in environments that encourage active participation from students and practical applications, such as active manipulation and constructive creation (Conrad et al., 2024). The degree of engagement in VR is influenced by its interactivity level, which is also

determined by the quality of the hardware used. A higher level of interactivity combined with advanced hardware capabilities leads to a more immersive experience. When this immersion reaches an appropriate threshold, users can fully engage, experiencing a strong sense of presence and involvement. For example, 360-degree technology allows for changes in orientation without altering location, while roller coaster simulations can track head movements (Wiepke & Heinemann, 2024).

This research demonstrates that PBL augmented by Virtual Reality in the "Museum Sumpah Pemuda" serves as an effective educational strategy for enhancing students' critical thinking skills and learning motivation in social studies. By implementing PBL with VR in social studies instruction, students can reach an optimal level of both critical thinking and motivation, equipping them to tackle the challenges of the 21st century. Continuously updated social studies education enables students to stay aligned with current trends and cultivates their potential.

Despite its strengths, this study acknowledges certain limitations. For instance, the reliance on high-quality VR hardware may pose accessibility challenges, especially in under-resourced schools. Additionally, the moderate effectiveness of the N-gain for critical thinking suggests that further refinement of the PBL scenarios or additional teacher training might be necessary. Educators may require support to effectively integrate VR into their teaching practices, which could include professional development workshops or instructional guidelines tailored to VR-PBL methodologies.

CONCLUSION, IMPLICATION AND SUGGESTION

This research demonstrates that integrating the PBL model with virtual VR technology in the “Museum Sumpah Pemuda” significantly enhances students' critical thinking abilities and learning motivation. By combining the immersive and authentic experiences of VR with the problem-solving framework of PBL, this approach creates an effective and engaging learning environment. The immersive nature of VR presents authentic challenges in a realistic and captivating context, promoting higher-order thinking and enthusiasm for studying social studies.

A key challenge in social studies education is maintaining relevance in the constantly evolving 21st-century landscape. VR-assisted PBL addresses this challenge by offering realistic and meaningful learning experiences that engage students in critical thinking while solving problems and understanding

abstract social studies concepts. The use of affordable VR technology, such as the VR "Sumpah Pemuda" museum, mitigates limitations in presenting genuine problems during PBL investigations. This innovation enables students to explore the museum's offerings within the classroom, providing an immersive experience that allows them to navigate historical spaces, examine artifacts, and interact with representations of historical figures. By presenting information tangibly and interactively, VR-assisted PBL effectively caters to the learning preferences of today's technology-savvy students.

To maximize the benefits of VR-assisted PBL in social studies, targeted teacher training and workshops are essential. These sessions should equip educators with the skills needed to integrate VR technology into the PBL framework effectively. Workshops can include hands-on demonstrations, lesson planning strategies, and best practices for addressing potential challenges such as technical issues and student accessibility. By building teacher competency, the education system can broaden the implementation of VR-assisted PBL across schools, ensuring consistency and quality in its adoption.

However, ensuring the long-term viability of this learning model requires addressing potential obstacles such as technological obsolescence, maintenance costs, and accessibility disparities. Periodic evaluations should be conducted to assess learning effectiveness, teacher and student satisfaction, and the challenges encountered. Strategies to address these challenges include establishing partnerships with technology providers for updates and maintenance, providing subsidies for schools with limited resources, and developing adaptable content to accommodate diverse learning needs.

Additionally, VR-assisted PBL can be tailored to accommodate diverse student populations. For instance, adaptive features can ensure that students with varying learning styles, abilities, or levels of access to technology benefit equally from the approach. Examples include providing alternative formats for VR experiences, such as desktop simulations or guided video tours, and ensuring content aligns with inclusive educational practices.

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AUTHOR CONTRIBUTION

The authors affirm their respective contributions to this paper as follows: study conception and design by Parulian Irwansyah and Nurul Khotimah; data collection by Parulian Irwansyah; analysis and interpretation of results by Parulian Irwansyah, Nurul Khotimah, and Desy Safitri; and draft manuscript preparation by Parulian Irwansyah and Desy Safitri. All authors were involved in revising the manuscript, providing critical feedback, and approving the final version.

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