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The Impact of Student Attitude on Information, Communication, Creation Skills and Student Engagement

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Abstract: The Malaysian education system is guided by the Malaysia Education Blueprint, which drives the overall quality and effectiveness of education in the country. This study provides insights and assists in forming informed guidelines for the Ministry of Education regarding the impact of skill factors such as information skills, communication skills, and creation skills on student engagement, mediated by student attitudes toward learning. The relationship between the direct effects of these three primary skills and attitudes is supported by Self-Efficacy Theory (SET). The indirect relationship, where attitude mediates the effects of these skills on student engagement, is supported by Self-Determination Theory (SDT) and Social Cognitive Theory (SCT). A questionnaire was distributed to local university students currently in their fourth semester and analyzed using the Structural Equation Model using Partial Least Square (PLS). The structural model results direct relationship between attitude and student engagement and between information skills and attitude. In addition, the mediation analysis shows that the relationship between information skills and student engagement, mediated by student attitude, was significant. Based on these results, it is recommended that the Ministry of Education focus on providing supportive resources, such as learning environments and training for educators, in the upcoming Malaysia Education Blueprint for 2026 to 2036. Additionally, offering Digital Literacy Programs to equip students with information skills can positively influence student attitudes and thereby increase the level of student engagement, which is crucial for improving the academic performance and achievement of Malaysia's educational system. Future research should include a cross-cultural comparison to reconsider educational theories for Asian countries, as many theories are currently based on Western educational settings and contexts.

Keywords: *Malaysia Education Blueprint, Student Engagement, Student Attitude, Information Skills, Communication Skills, Creation Skills.*

1. Introduction and Background

Research Background

This study focuses on educational research in Malaysia, specifically examining factors influencing student engagement, a key determinant of academic quality and educational success. The primary factors investigated include information skills, communication skills, and creation skills, while also exploring how attitudes serve as mediating variables in this relationship. The Malaysia Education Blueprint (2013-2025) outlines a vision for the education system, evaluating Malaysia's past performance against international benchmarks. Based on these evaluations, the Ministry of Education suggests strategic moves and operational shifts necessary to achieve this vision. Essentially, the Blueprint serves as a roadmap and guide for the entire education system, identifying areas for reform to achieve specific educational objectives (FMT Reporters, 2024).

In its latest version, the Blueprint highlights significant issues affecting Malaysian students from preschool to post-secondary and higher education levels, emphasizing that student engagement is a critical factor influencing educational outcomes in Malaysia (Ministry of Education Malaysia, 2015). Table 1 summarizes the relevant issues related to student engagement, particularly highlighting the three primary factors (information, communication, and creation skills) and the attitude-related issues affecting student engagement as identified in the Blueprint. It also outlines initiatives suggested by the Ministry of Education for each issue aimed at achieving the Blueprint's objectives.

Table 1: Issues and Initiatives of the Malaysia Education Blueprint (2013-2025)

Issues on Attitude	Initiative
Low Motivation and Engagement: Students may not feel motivated to engage in learning activities due to a lack of relevance and connection to their future aspirations.	**Student-centered Learning:** Promote student-centered and personalized learning approach to make education more relevant and engaging. **Career Guidance:** Integrate a career guidance program to help students see the relevance of their education to their future goals.
Negative Perceptions of Learning: Students may have negative attitudes towards learning due to experience or a lack of supportive learning environments.	**Transformative Teaching and Learning Environments:** Create positive, supportive and inclusive classroom environments to shift negative attitudes toward learning.
Issues with Information Skills	**Initiative**
Inadequate Information Literacy: Students may lack the skill to effectively find, evaluate and use information	**Improving Structures:** Improve infrastructures and resources, particularly in rural and underserved areas to ensure equitable access to information.
Limited Access to Information Resources: Unequal access to libraries, digital resources and other information tools can hinder student's ability to engage fully in their study.	
Issues with Communication Skills	**Initiative**
Language Proficiency Barriers: Students struggling with proficiency in Bahasa Melayu and English may find it difficult to participate fully in class	**Language Proficiency Programs:** Implement a program to ensure all students are proficient in both Bahasa Melayu and English including additional support for those struggling with language skills.
Poor Communication Skills: Students may lack effective verbal, nonverbal and written communication skills affecting their engagement.	**Holistic Education**: Develop students holistically with a balanced focus on academic skills, communication, creativity and critical thinking.
Issues on Creation Skills	**Initiative**
Lack of Opportunity for Creative Expression: A rigid examination-focused curriculum may limit opportunities for creativity and innovation.	**Balance Curriculum:** Promote a balanced curriculum that includes creative and critical thinking skills.
Insufficient Encouragement for Innovation: Students may not be encouraged to innovate or think critically, leading to passive learning experiences.	**High-Order Thinking Skills:** Encourage the development of higher-order thinking skills and creativity to prepare students for future challenges.

Problem Statement

Many researchers focus on the relationship between student attitudes and study engagement, but there is a lack of investigation into the root causes, specifically the deficiency in essential skills, that impact student attitudes. Due to the limited research, this study examines how information skills, communication skills, and creation skills influence student attitudes. Additionally, there are insufficient studies on how attitudes mediate the relationship between these primary skills and student engagement. Understanding this relationship can provide valuable evidence-based insights for long-term policies in Malaysia, aiding educators and policymakers in refining the upcoming Malaysia Education Blueprint (2026-2036) (Rajaendram, 2024). By focusing on building essential skills in students, these policies can drive positive student attitudes towards learning, leading to high student engagement and thereby improving Malaysia's academic achievement. Hence, there are four research questions developed for this study as follows:

RQ1: How do information skills influence student attitudes?
RQ2: How do communication skills affect student attitudes toward learning?
RQ3: What is the impact of creation skills on student attitudes?
RQ4: How does student attitude mediate the relationship between these skills and student engagement?

2. Literature Review

Student Engagement

Student engagement is the combination of internal thoughts and external behavior. Other researchers simplify it as a student's willingness to participate, be involved, interact, and commit to being successful in the learning process (Gray & DiLoreto, 2016). Researchers further detailed student engagement in three dimensions: cognitive engagement refers to the level of concentration a student is willing to invest in self-learning activities; behavioral engagement demonstrates the student involvement and participation rate in learning activities; and emotional engagement is the mental health support provided by the institution or community, giving a sense of belonging and love (Fredricks, Bluemenfeld, & Paris, 2004). Ginting (2021) proves that the more satisfied students are with these three dimensions, the higher their learning motivation, making them more likely to engage in class. Hence, educators need to keep track of the active level of student engagement in class, as studies have further proven that student engagement determines educational achievement by reflecting student learning outcomes and levels of interest (Li & Xue, 2023).

Skills: The meaning of digital skills has shifted from a technical orientation toward a broader perspective that considers content-related or higher-order skills (Claro et al., 2012). The importance of these skills to fulfilling the demands of workers in the 21st century has been well established; research has identified comprehensive knowledge about skills and based on major researchers identified seven core skills supported using ICT consisting of technical, information management, communication, collaboration, creativity, critical thinking, and problem-solving However, in this study limit to investigate the information skills, communication skills and creation skills.

Information skills, the ability of individuals to recognize specific information needs, find, evaluate, and use information effectively, assist students in satisfying changing information needs and contribute to the development of self-directed and lifelong learning (Laar, Deursen, Dijk, & Haan, 2017). According to the Malaysian Qualification Agency (2007), information skills are a desirable learning outcome, especially for higher education students, as they are not only knowledge that can be proven with a certificate, but also skills and attitudes that require demonstration and application in the ability to research, access credible sources, and apply information searches to various contexts (Karim, Din, & Razak, 2011).

Communication is not just about language and is often misinterpreted (Lynch, 1996). Instead, communication skills are the ability to convey ideas through verbal (spoken or written) and non-verbal (emotional expression) methods, from the person sending (speaker or writer) the information to the person receiving (listener or reader) the information, sometimes with feedback (Gioiosa & Kinkela, 2019). Effective communication is crucial in education as the repetition of the communication process creates knowledge by delivering meaningful information (Khoiriah, Suyatna, Abdurrahman, & Jalmo, 2023). From an educational perspective, communication skills are often applied in group work involvement, presentations, and writing assignments, expressing students' thoughts and communicating learning outcomes with educators (Iksana, et al., 2012). However, researchers highlight that communication skills are not only academically necessary but are also everyday life skills that can be used to make a significant impact (Rayna & Striukova, 2021).

Creation skills are broadly known by their synonym, 'creative skills.' Some researchers define them as the ability to generate new ideas and think creatively, while others view them as the ability to look at problems and situations from different perspectives, or simply as thinking outside the box (Parkhaust, 1999). Torrance (1974) suggests that to be creative, an individual must be sensitive to problems and capable of facing challenging and difficult situations where information is scarce and solutions are needed. This can be exemplified by the creativity of Steve Jobs, the CEO of Apple Inc., who defined creativity as "just concerning things" (Henriksen & Mishra, 2014).

Surprisingly, creation skills need to be accompanied by the two primary skills previously mentioned (information and communication). Being a good communicator is one of the main characteristics of a creative thinker, as individuals must be able to express their creativity through listening and communicating. Additionally, creativity plays a role in handling information, requiring information skills to identify relevant information, obtain new viewpoints, and make unusual connections (Birgili, 2015). From an educational

perspective, creativity is an essential asset used in problem-solving activities and project-based learning (Mizal & Al-Noori, 2020).

Attitude: Sabel (2006) viewed attitude as a psychological internal factor that leads to the manner of acting, feeling, and thinking. It can reflect individual behavior, perception, judgment, and opinion toward situations and environments. (Bizer, Barden, & Petty, 2006). For instance, liking or disliking, favoring or disfavouring, approving or disapproving – any psychological tendency can be shown in a person's attitude (Haddock & Maio, 2008). In this study, an attitude refers to students' behavior towards learning and influences their beliefs about learning. Researchers highlight that a positive attitude will not only affect the amount of time a student is willing to spend on learning but also their desire and interest in education, as seen in their level of attention and extra effort (Blazar & Kraft, 2017). This is further concluded by other researchers, who found that positive attitudes can, in turn, drive academic performance and educational success by increasing students' well-being in the classroom (Bangkok, Dino, Aspacio, & Moneva, 2019).

Hypothesis Development

Skills and Attitude: Gungor (2021) defined attitude as the mental preparedness provided by the skills equipped and viewed education as a process of individuals acquiring new skills that drive the attitude and behavior of future life. Self-efficacy theory, proposed by Albert Bandura in 1977, explains that an individual's belief in their ability to succeed or accomplish certain tasks and carry out necessary actions to manage future situations has a significant impact on their behavior and attitude. Pintrich & Schunk (2022) summarize it simply as students asking themselves, "Do I have the ability to complete the task in this situation?" Hence, the stronger the belief or the higher the self-efficacy, the better the predictor of their actions and the feelings of a high level of success. Consequently, the greater the motivation and resilience to face challenges, the more positive the individual's attitude (Sardegna, Lee, & Kusey, 2018). Zimmerman et al. (2019) specifically highlight self-efficacy in the educational context, noting that students with high self-efficacy are confident in understanding lessons, willing to solve educational problems, and tend to select more difficult courses. However, when students find that the situation exceeds their coping skills, they do not believe they can overcome the issue and tend to avoid such threatening situations or are not eager to carry out the activities due to perceived failure and fear of not producing the expected outcome. This is also known as response-outcome expectancies (Bandura, 1977, Zimmerman, Bandura, & Poons, 1992, Pintrich & Schunk, 2002).

Odewole (2023) highlights the importance of academic libraries to the academic achievement of students but notes that they are only useful to those students with information skills, who know how to access relevant resources that meet their information needs. With a supportive academic environment and strong information skills, students' feelings and attitudes can shift from unfavorable to favorable, leading to competence in conducting research and higher confidence in academic tasks. As a result, students are more likely to have a positive attitude toward learning (Odewole, 2023). Many researchers have proven that communication skills are essential for individuals not only in their academic journey but throughout every stage of life. When students can communicate effectively, articulate their thoughts clearly, and receive, understand, retain, and apply constructive feedback, they become more confident in class discussions. This sense of enhanced self-efficacy from assurance in interpersonal interactions helps them achieve educational goals, thereby fostering a more positive attitude towards participation. This conclusion is further supported by Toomnan & Intaraprasert (2015), whose research found that individuals with trained oral communication skills displayed higher self-efficacy than those who did not. Dörnyei (1995) also found that students who effectively use communication strategies and techniques tend to have positive attitudes toward learning (Toomnan & Intaraprasert, 2015, Dornyei, 1995)

Mukhopadhyay (2013) highlighted that physics, a branch of science involving numerous concepts and practice questions, requires more than just memorization. Instead, students must think creatively to solve problems during observation and experimentation to achieve satisfactory results. When it comes to tracking task completion, students with creative potential, who can contribute solutions and ideas to solve complex and poorly defined problems, can experience satisfaction and pride from successfully creating new and valuable contributions. This leads to a positive attitude towards taking on new challenges (Julianto, et al., 2022, Mukhopadhyay, 2013)

Delich & Roberts (2017) found that enactive mastery experiences, which refer to individuals who have successfully practiced a skill, are crucial as individuals reach a self-supporting level. Applying self-efficacy theory, we suggest that when students are equipped with three primary skills (information, communication, and creation), it can enhance self-efficacy from personal mastery experiences, granting emotional and physiological states of satisfaction. In turn, this empowers students throughout their educational journey, leading to a positive attitude towards learning. However, without effective coping skills, individuals may deem the situation insurmountable, regardless of their efforts or persistence, leading to no obvious incentives, lack of initiation and persistence, and a negative attitude towards the learning process (Erdem, 2015). This is further proven in the study by Baldwin et al. (1999), which found that prior knowledge and experience can shape the learning process and affect students' attitudes. Therefore, we propose the following hypotheses: (Baldwin, Ebert-May, & Burns, 1999, Delich & Roberts, 2017).
H1: Information skills positively affect student attitudes towards learning
H2: Communication skills positively affect student attitudes toward learning
H3: Creation skills positively affect student attitudes toward learning

Skills, Attitude and Student Engagement: Researchers highlight that a positive attitude leads to a desire to participate and engage in the learning process. (Marton & Saljo, 1997). The motivation for engagement is based on perceived ability, where "ability" refers to the mastery level of the three primary skills: information, communication, and creation (Dweck, 1986). This idea is supported by two key theories: Self-Determination Theory (SDT) and Social Cognitive Theory (SCT). Self-determination theory (SDT) explains that attitudes need to fulfill basic psychological needs – autonomy, competence, and relatedness – to develop positive attitudes that can lead to higher engagement (Reeve, 2012). Guay (2021) found that students equipped with skills are more likely to engage in class. In this study, skills refer to (1) mastering information skills boosts students' confidence, driving positive attitudes and intrinsic motivation towards the learning process, making them more likely to actively participate in studies, engage in discussions, and complete assignments; (2) students equipped with effective communication skills can express their thoughts clearly and feel valued and understood, thereby enhancing their attitude towards collaborative learning. (Grenier, Gagné, & O'Neill, 2024). This improvement in attitude leads to increased participation in class, effective teamwork, and deeper engagement with learning materials; (3) students are more engaged when encouraged to be creative, as this empowerment allows them to explore and innovate, fostering more positive and proactive attitudes towards learning. The development of information, communication, and creation skills fulfills the psychological need for competence, positively affecting student attitudes and intrinsic motivation, and leading to higher levels of engagement (Legault, 2017, Guay, 2021)

Social Cognitive Theory (SCT) explains that engagement requires individuals to have positive beliefs and self-efficacy to execute actions (Bandura, Social Cognitive Theory, 1989). Self-efficacy, which refers to students' beliefs about their abilities and skills, drives student attitudes and is a key predictor of academic achievement and engagement (Haw, Sharif, & Han, 2022). According to this theory, whether students engage in class depends on their positive attitudes, which are influenced by their perception of their capabilities, competence, and confidence in mastering tasks (Jenkins, Hall, & Raeside, 2018). When students believe they can successfully find and apply information (information skills), effectively communicate ideas (communication skills), and see the impact of their actions in tackling complex problems creatively (creation skills), their self-efficacy increases (Govindaraju, 2021). This enhanced self-efficacy strengthens their belief in their capabilities, leading to a greater willingness to engage in learning activities, participate in class, and persist through challenges (Ponton & Rhea, 2006). Student engagement comprises three dimensions: behavioral engagement (attending classes, participating actively, and completing assignments on time), emotional engagement (increased interest, enjoyment, and enthusiasm in educational activities), and cognitive engagement (investing in deeper learning strategies, problem-solving, and critical thinking) (Ryan & Deci, 2000). Both SCT and SDT highlight how the development of information, communication, and creation skills shapes and enhances students' positive attitudes, particularly by instilling a sense of competence and high self-efficacy. This, in turn, influences the level of student engagement in class. Therefore, we propose the following hypothesis:
H4: Student attitudes mediate the relationship between information skills and student engagement
H5: Student attitudes mediate the relationship between communication skills and student engagement
H6: Student attitudes mediate the relationship between creation skills and student engagement

Research Model

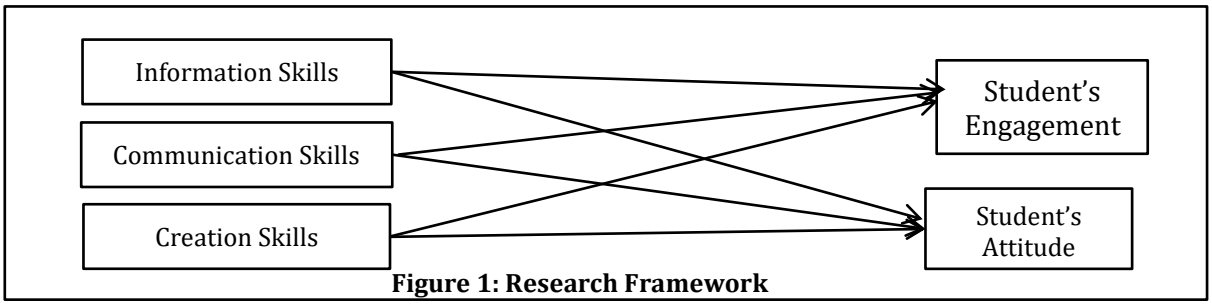


Figure 1: Research Framework

Figure 1 connects the variables as follows: The independent variables, which are the causes or influencing factors in this study, refer to the three primary skills (information skills, communication skills, and creation skills). The dependent variable, which is the effect or outcome influenced by independent variables, is student engagement. The mediator, or mediating variable, in this case, refers to an attitude, which acts as a bridging gap explaining how and why the effect occurs.

3. Research Methodology

The study population focuses on university students, specifically targeting local Malaysian students who are currently in semester 4. By using purposive sampling, this study set three criteria which are full-time or Part-time students, second in semesters 4 and 5, and local universities located only in Klang Valley. Data is collected quantitatively by distributing a structured online survey to 323 undergraduate students. The questionnaire includes 8 questions for demographic information, 13 questions related to the information skills variable, 5 questions for communication skills, 3 questions for creation skills, 4 questions on student attitude towards learning, and 5 questions on student engagement. All items adapted from Peart et al. (2020) and used a 5-point Likert scale. Hy skills. Smart-PLS and SPSS programs will be used to conduct the data analysis. The SPSS program will cover Preliminary Analysis and Descriptive Analysis to provide information about the selected sample group. Meanwhile, the Smart-PLS program will focus on the Structural Equation Model (Convergent Validity, Discriminant Validity – HTMT, Factor Loading), Structural Model (Direct and Indirect Effect), and Mediation Analysis to analyze the relationship between the three primary skills (information, communication, creation) and student engagement, mediated by attitude.

4. Results

The analysis is carried out based on the conceptual framework generated by the Smart-PLS program, as shown in The path model illustrates the relationship between the three primary skills (information, communication, and creation), attitude, and student engagement.

Profile of Respondents: Table 2 explains the frequency tables that provide a basic understanding of the demographics of the respondents. It summarizes that the majority of respondents are:

Table 2: Demographic and Geographic Information About Student Engagement

Demographics Factors	Frequency	Percentage
GENDER		
Males	75	76.8%
Females	1248	23.2%
Total	**323**	**100%**
AGE		
20-25	322	99.7%
26-30	1	.3%
Total	**323**	**100%**
CURRENTLY, I AM…		
Full time	321	99.4%

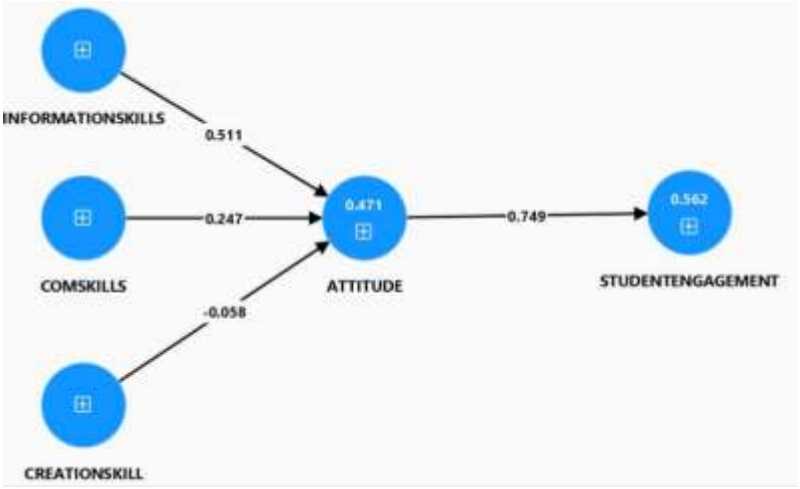
Part-time	2	.6%
Total	**323**	**100%**
CURRENTLY, I AM…		
<6months	14	4.3%
PT jobs	25	7.7%
Not work	284	87.9%
Total	**323**	**100%**
WORKING EXPERIENCE		
<6months	220	68.1%
1-2	82	25.4%
2-3	19	5.9%
>5	2	.6%
Total	**323**	**100%**
IN MY STUDY, I HAVE BEEN EXPOSED TO THE DIGITAL SKILLS		
Yes	310	96.0%
No	13	4.0%
Total	**323**	**100%**

Descriptive Statistic: Table 3 provides information on basic statistical measures as a summary of the answers in the 5-point Likert scale questionnaire for each variable.

Table 3: Descriptive Statistics

Variable	Mean	Std. Dev.	Explanation
Information Skill	3.9159	0.65979	On average, students rated their information skills at 3.9159 on a certain scale. The variation around this mean score is relatively moderate, with a standard deviation of 0.65979, indicating that most students' ratings are fairly close to the mean.
Communication Skills	3.9505	0.73376	The average rating for communication skills is 3.9505. The standard deviation of 0.73376 suggests a moderate spread of ratings around the mean, implying a moderate level of consensus among students about their communication skills.
Creation Skills	3.8163	0.72705	Students rated their creation skills at an average of 3.8163. The standard deviation is 0.72705, indicating a moderate level of variability in how students perceive their creation skills.
Attitude	4.0689	0.70800	The mean score for student attitude is 4.0689, indicating generally positive attitudes among the students. The standard deviation of 0.70800 shows a moderate variation around the mean, suggesting some diversity in student attitudes.
Student Engagement	3.9022	0.67564	The average rating for student engagement is 3.9022, with a standard deviation of 0.67564, suggesting that most students' engagement levels are close to the mean, with some variation.

Figure 2: Conceptual Framework



Factor Loading: Figure 3 visualizes the path model, illustrating the strengths of relationships by quantifying them with path coefficients for different constructs, thereby assisting in better understanding these relationships. The outer loadings measure how well each survey question relates to the construct, indicating the level of accuracy for the indicator in representing the concept being measured. Results from Table 4 represent a high outer loading, suggesting that the data collected is an effective measurement tool. According to the results, it can be seen that all four indicators for attitude are above 0.89, indicating that every set of questions well represents the respective construct of attitude. Similarly, the five indicators of communication skills have loadings where the lowest is 0.882, which is well above 0.7. Creation skills, with three questions, have the highest average, with the lowest at 0.932, nearly reaching 1, indicating a strong correlation to the respective construct. However, among the 13 indicators for information skills, one is highlighted in red with a score of 0.684 (INFORMATIONSKILLS1), which is below 0.7 but the value marginally accepted for this study. Lastly, all five indicators for student engagement, with at least 0.892, indicate strong reliability in measuring student engagement.

Table 4: Outer Loading

Indicators	Attitude	Communication Skills	Creation Skills	Information Skills	Student Engagement
ATTITUDE1	0.924				
ATTITUDE2	0.934				
ATTITUDE3	0.923				
ATTITUDE4	0.895				
COMSKILLS1		0.900			
COMSKILLS2		0.934			
COMSKILLS3		0.914			
COMSKILLS4		0.919			
COMSKILLS5		0.882			
CREATIONSKILL1			0.932		
CREATIONSKILL2			0.939		
CREATIONSKILL3			0.948		
INFORMATIONSKILLS1				0.684	
INFORMATIONSKILLS2				0.787	
INFORMATIONSKILLS3				0.829	
INFORMATIONSKILLS4				0.814	
INFORMATIONSKILLS5				0.823	
INFORMATIONSKILLS6				0.803	
INFORMATIONSKILLS7				0.858	

INFORMATIONSKILLS8	0.908	
INFORMATIONSKILLS9	0.879	
INFORMATIONSKILLS10	0.875	
INFORMATIONSKILLS11	0.915	
INFORMATIONSKILLS12	0.905	
INFORMATIONSKILLS13	0.800	
STUDENTENGAGEMENT1		0.900
STUDENTENGAGEMENT2		0.937
STUDENTENGAGEMENT3		0.956
STUDENTENGAGEMENT4		0.893
STUDENTENGAGEMENT5		0.892

Convergent Validity: This concept is assessed using: Cronbach's Alpha, which measures internal consistency, with values above 0.7 considered acceptable, above 0.8 considered good, and above 0.9 considered excellent; Composite Reliability, which reflects overall reliability, with values above 0.7 representing an acceptable level of reliability; and Average Variance Extracted (AVE), which measures how well the concept is related to each other, with values above 0.5 indicating a trustworthy construct. The purpose of convergent validity is to ensure measurement accuracy and enhance the credibility of this study, with results shown in Table 5. Overall, the results show that the constructs have high levels of reliability and validity. In short, each item in the questionnaire consistently measures the concepts related to the variables –information skills, communication skills, creation skills, attitude, and student engagement – and these constructs are clearly defined and meaningful to the context of this research.

Table 5: Convergent Validity

Variable	Composite Reliability (rho_c)	Average Variance Extracted (AVE)
Attitude	0.956	0.845
Communication Skills	0.960	0.828
Creation Skills	0.958	0.883
Information Skills	0.969	0.704
Student Engagement	0.963	0.839

Discriminant Validity: The result shows the Heterotrait-Monotrait Ratio (HTMT), which calculates the average correlation between different constructs (heterotrait) and the same construct (monotrait). This aims to support the theoretical framework by ensuring that each construct has a unique aspect in this study. An HTMT value less than 0.85 indicates that the constructs are distinct, a value between 0.85 and 0.90 suggests some overlap that requires further review and refinement, and a value greater than 0.90 indicates a problem with discriminant validity, as the constructs are overly correlated. The interpretation of these results is illustrated in Table 6. Overall, the correlations for most of the interrelationships are distinct from each other constructs. Overall of the discriminant issues explained there was no issue of discriminant validity of this model.

Table 6: Discriminant Validity

Variable	Attitude	Communication Skills	Creation Skills	Information Skills
Attitude				
Communication Skills	0.668			
Creation Skills	0.577	0.803		
Information Skills	0.708	0.890	0.813	
Student Engagement	0.789	0.756	0.732	0.778

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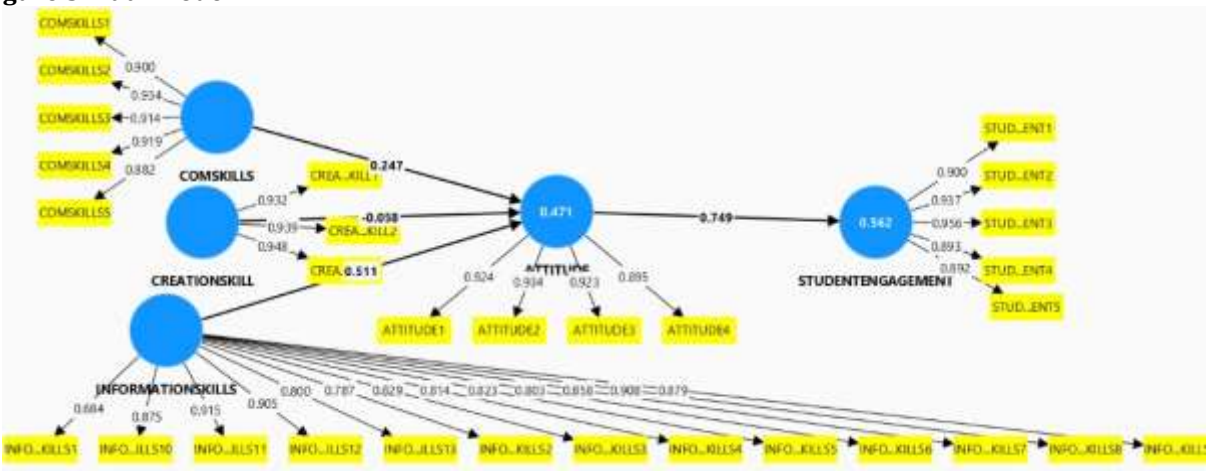
Figure 3: Path Model



Structural Model: The result of the path coefficient for the direct effect is explained by the p-value, which represents the probability of the observed path coefficient. Values less than 0.05 indicate statistical significance, meaning the model is significant at the 5% significance level. The numbers are calculated by the Smart-PLS in hypothesis testing and model validation by quantifying the relationship and providing the strength and direction based on the values. As can be seen in the results, of 2 out of 4 hypothesis testing, the result in Table 7 represents significant relationships. The relationship between communication skills and attitude shows a positive p-value (β = 0.247, p>0.05), but since it is higher than 0.05, it suggests uncertainty regarding the impact of communication skills on driving student attitude towards learning. Next, the relationship between creation skills and attitude (β = -0.058, p>0.05), has a p-value far above 0.05, indicating a statistically non-significant relationship, meaning there is no meaningful impact between the two variables. The significant relationships are between attitude and student engagement (β = 0.749, p>0.05), which shows that attitude plays an important role in determining the level of student engagement, and between information skills and attitude, highlighting the importance of information skills in shaping student attitudes.

Table 7: Structural Model

Variable	Beta Value	SE	T- Value	P-Values	Results
Information Skills -> Attitude	0.511	0.123	4.165	0.000	H1: Supported
Communication Skills -> Attitude	0.247	0.142	1.740	0.082	H2:Not Supported
Creation Skills -> Attitude	-0.058	0.127	0.456	0.648	H3: Not Supported
Attitude -> Student Engagement	0.749	0.051	14.702	0.000	H4: Supported

Mediation Analysis: Similar to the structural model that explains the direct effect, mediation analysis explains the indirect effect of path coefficients. The most important element is the p-value result; obtaining a p-value less than 0.05 represents a significant relationship. Conducting the analysis helps to clarify the relationship and provides a different perspective on relationship development and testing. Since the earlier direct effect showed no significant relationship between communication skills and creation skills towards the mediator of student attitude, the results of the indirect effect similarly indicate that among the three primary skills, communication skills with a p-value of 0.090 and creation skills with a p-value of 0.648 are not statistically significant. Only information skills are statistically significant, with a p-value of 0.00. In short, students with information skills tend to have a positive attitude toward learning, leading to a high level of engagement in class.

Table 8: Mediation Analysis

Variable	Beta Value	SE	T Statistic	P Values	Results
Communication Skills -> Attitude -> Student Engagement	0.185	0.109	1.694	0.090	H5: Not Supported
Creation Skills -> Attitude -> Student Engagement	-0.044	0.095	0.457	0.648	H6: Not Supported
Information Skills -> Attitude -> Student Engagement	0.383	0.094	4.081	0.000	H7: Supported

Discussion

Table 8 shows a summary of the analysis. Among the three primary skills, information skills are the only ones with a significant impact, as indicated by a p-value less than the 0.05 threshold. This suggests that the data from the questionnaire provide sufficient evidence to support that students equipped with information skills – specifically, the ability to identify important and needed content from an information pool – are more likely to have a positive attitude towards the learning process, resulting in a p-value of 0.00. Moreover, the indirect relationship, with a p-value of 0.00, further supports that students with information skills are more likely to have a positive attitude, which enhances their willingness to participate and engage in class. However, the coefficient for the direct effect of communication skills falls between 0.05 and 0.10, meaning it does not meet the 5% significance level. Therefore, the evidence is not strong enough to conclude that communication skills affect student attitudes toward learning. Similarly, the indirect effect of communication skills, with a p-value of 0.090, also does not reach the level of significance required for a strong conclusion. Lastly, the direct effect for creation skills has a p-value of 0.648, which is well above the 0.05 threshold. This suggests that more research is needed to link creativity to its impact on students' perceptions and behaviors toward learning experiences. The indirect effect of creation skills shows the same p-value of 0.648, indicating that it also requires further investigation to establish a significant connection.

Limitations

Although multiple theories support the formulation of the six hypotheses, the data analysis shows different results except for information skills. This discrepancy is due to the limitations of the study: poor definition, sampling bias, and sample size (Theofanidis & Fountouki, 2018). The poor definition can be evidenced in the discriminant validity, where no distinct aspect is found in the relationship between communication skills and creation skills, with a correlation as high as 0.903. This leads to a poor construct where both variables were not assessed comprehensively, affecting hypothesis testing by inflating or deflating the path coefficients, and causing possible errors in determining and interpreting the strengths and direction of the relationships, resulting in incorrect conclusions due to distorted relationships.

Sampling bias occurs when the results are not generalizable, as seen in the frequency table where respondents are primarily students currently in their fourth semester, mainly aged 20-25, nearly 90% not working and pursuing full-time study, and the questionnaire only targeting local students. With a sample lacking diversity, the study becomes inapplicable to other populations that are neglected, such as part-time students, older students, international students, and those in different academic stages. Different groups of students have different experiences and perceptions towards the three primary skills, attitude, and student engagement. In short, the biased result assumes that all students share the same characteristics and points of view regarding the importance of the three primary skills due to the homogeneity of the chosen sample size. (Chen, Keglovits, Devine, & Stark, 2022). Sample size refers to the number of participants, which in this study is only 323, with no more than 100 responses accepted by the SmartPLS program. This leads to inaccuracies in the results and increases the difficulty of detecting significant relationships, resulting in a possible Type II error, or failing to detect a true effect. The larger the sample size, the more reliable the result (Andringa & Godfroid, 2020).

5. Managerial Implications and Recommendations

The purpose of this study is to provide insights to policymakers for designing the upcoming Malaysia Education Blueprint for the years 2026 to 2036, serving as guidelines for the entire educational system. In the literature review, this study covers other researchers' results and conclusions, supported by theories to hypothesize the

proposed relationships. Self-efficacy theory explains the strong connection between skills and attitude. However, the results of the data analysis suggest an insignificant relationship, especially for communication and creation skills towards attitude, which contradicts the earlier assumption. This may be due to the limitations of the study. In short, the data analysis in this study only supports the direct effect between information skills and attitude.

For the indirect effects, where attitude mediates the relationship between skills and engagement, the literature review of this study is supported by two theories: Self-Determination Theory (SDT) and Social Cognitive Theory (SCT). Based on the strong relationship observed in studies by other researchers, the hypothesis of the indirect effect was assumed. However, the data output rejected this measure, except for the relationship where information skills drive student attitude and lead to student engagement. This is potentially due to limitations such as a small sample size, sampling bias, or poor definitions.

From the proven result that information skills can drive a positive attitude in the learning process, resulting in a high level of student engagement, it is suggested to the Ministry of Education that the blueprint focus on offering Digital Literacy Programs. According to the preliminary analysis, nearly all respondents have been exposed to digital skills, representing a basic understanding of the effective use of technology to access information. (Putra & Rullyanti, 2023). The next step is teaching how to analyze the information. However, this requires the Ministry of Education to address the root cause by offering professional development programs, including training with supportive resources for educators to deliver knowledge and assist students in acquiring information skills. (Mopara & Sanrattana, 2023).

By implementing the recommendations suggested in the blueprint, it is foreseeable that students will have well-practiced information skills, driving positive behavior in the learning process, thereby leading to a high level of engagement in the classroom shortly. This can ultimately improve the educational system and elevate the average qualifications of Malaysians.

Based on the conclusion and the importance of carrying out educational research that helps the Ministry of Education design specific solutions for improving Malaysia's education outcomes, future research areas are suggested to make a cross-cultural comparison, examining whether different cultures can influence the relationship between skills and student engagement mediated by student attitudes. As the theories applied in this study are mainly developed in a Western context and have shown significant relationships in that particular educational setting, it is important to consider whether, without the limitations of this study, the results would still be different in a non-Western context.

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