Global Journal of Educational Thoughts
GJET vol.2, no.1, June 2025

Submitted: 8 May 2025
Reviewed: 15 May 2025
Accepted: 19 May 2025

INFLUENCE OF STUDENT MOTIVATION AND TEACHER ENCOURAGEMENT ON THE APPLICATION OF CRITICAL AND CREATIVE THINKING IN INDEPENDENT LEARNING: A CASE STUDY OF OWIS NANYANG, SINGAPORE.

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ABSTRACT

In the landscape of 21st century education, critical and creative thinking (CCT) skills are essential for preparing students to navigate complex global challenges. This study examines the extent to which student motivation and teacher encouragement influence the application of CCT skills in classroom learning at One World International School (OWIS) Nanyang, Singapore. Grounded in contemporary theories of intrinsic motivation, constructivism, and socio-emotional pedagogical support, the research investigates both the individual and combined impact of these psychosocial factors on student engagement with higher-order thinking. Employing a mixed-methods approach, the study collected data through a structured self-administrated questionnaire, complemented by semi-structured interviews to gain deeper insights into students and teachers experiences and perceptions. The findings indicate that intrinsically motivated students are more inclined to take intellectual risks, engage in divergent thinking, and persist through cognitive challenges. Simultaneously, teacher encouragement manifested through constructive feedback, scaffolding, and a supportive classroom climate emerges as a crucial enabler of CCT application. However, the study also uncovers barriers such as diverse cultural backgrounds and inconsistent instructional practices that affect the uniform integration of CCT across subjects. The research provides actionable recommendations for educators and school leaders to enhance CCT development through motivational strategies and teacher training. Ultimately, the study contributes to ongoing discourse on fostering 21st century competencies through holistic, learner-centered approaches in international school environments.

Keywords: *Critical thinking, creative thinking, student motivation, teacher encouragement, international education, OWIS Nanyang.*

INTRODUCTION

In the rapidly evolving educational landscape of the 21st century, critical and creative thinking (CCT) skills have emerged as foundational competencies for student success. These skills enable learners to navigate complex problems, generate innovative ideas, and engage meaningfully with real-world issues (Lucas & Spencer, 2022). International educational frameworks, such as those proposed by the OECD (2019), emphasize the urgent need to integrate CCT into curricula to equip students with the tools necessary for global citizenship and lifelong learning. Within this context, both student motivation and teacher encouragement

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are identified as pivotal factors that influence how students apply and develop CCT skills in their learning journey (Kim et al., 2022).

Motivation plays a central role in driving student engagement, self-regulation, and persistence in learning. When learners are intrinsically motivated, they are more likely to seek out challenges, explore new ideas, and reflect critically on their learning processes (Ryan & Deci, 2020). In tandem, teacher encouragement—through verbal reinforcement, scaffolding, and the creation of psychologically safe learning environments—can significantly shape students' willingness to think creatively and analytically (Tan et al., 2020). Especially in international school settings like OWIS Nanyang in Singapore, where diverse student populations encounter a globally oriented curriculum, understanding these dynamics is essential for fostering effective educational practices.

Despite the growing recognition of CCT in educational policy and pedagogy, there remains a gap in applied research that explores the interconnected roles of student motivation and teacher support in facilitating these thinking skills, particularly in multicultural, high-performing educational environments. This study seeks to address this gap by investigating how motivation and encouragement influence the application of CCT skills in students at OWIS Nanyang. Through this exploration, the research aims to contribute valuable insights into instructional practices and learner engagement strategies that promote higher-order thinking.

Background of the Study

Over the past decade, Singapore's education system has gained international acclaim for its academic rigor and forward-thinking reforms. In line with its commitment to 21st century competencies, the Ministry of Education (MOE) has emphasized the importance of nurturing critical and inventive thinking across all levels of schooling (MOE, 2020). Schools are expected not only to deliver content knowledge but also to cultivate students' cognitive flexibility, curiosity, and reflective capacities. This shift requires intentional pedagogical strategies and an environment where students feel empowered to question, analyse, and create.

Within this framework, two psychosocial factors stand out as crucial enablers of CCT development: student motivation and teacher encouragement. Motivation, particularly when intrinsic, is strongly correlated with deeper learning and improved problem-solving skills (Deci & Ryan, 2017; Lee & Tan, 2022). Motivated students are more likely to take intellectual risks, persist through academic challenges, and invest in learning that requires both divergent and convergent thinking. In contrast, students with low motivation may shy away from tasks requiring cognitive effort, thereby hindering their development of CCT skills.

Teacher encouragement functions as a vital extrinsic support that can stimulate and sustain student motivation. Effective teachers model critical thinking behaviours, provide constructive feedback, and create classroom conditions that celebrate creative expression and intellectual independence (Ng & Marsh, 2020). Research has shown that students who perceive their teachers as supportive and encouraging are more likely to feel confident in expressing unconventional ideas and approaching problems from multiple angles (Saavedra & Opfer, 2021).

In the unique context of OWIS Nanyang, a leading international school in Singapore, these dynamics play out within a culturally diverse learning environment where students are exposed to inquiry-based curricula such as the International Baccalaureate (IB) and Cambridge

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frameworks. These curricula explicitly promote learner agency, global-mindedness, and critical reflection. However, the extent to which students apply CCT skills often depends on their internal drive and the encouragement they receive from educators.

Given these considerations, this study explores the interplay between student motivation, teacher encouragement, and the application of CCT skills to student learning at OWIS Nanyang. By examining these variables, the research aims to identify effective strategies for enhancing higher-order thinking and fostering a culture of intellectual curiosity among international school students.

Problem Statement

The ability to think critically and creatively is widely recognized as a cornerstone of 21st century education and a prerequisite for academic and professional success in a complex, globalized world (Lucas & Spencer, 2022; OECD, 2019). Despite the widespread inclusion of critical and creative thinking (CCT) in educational frameworks such as those used in Singapore's international schools, including OWIS Nanyang, the actual application of these skills in student learning remains inconsistent. Many students still struggle to internalize and utilize CCT skills in meaningful ways across subjects, often defaulting to rote memorization or surface-level understanding (Lee & Tan, 2022).

Two significant yet underexplored factors that may influence the effective application of CCT skills are student motivation and teacher encouragement. While motivation drives student engagement and persistence, teacher encouragement creates the psychological safety and support necessary for students to explore complex ideas and generate novel solutions (Ryan & Deci, 2020; Saavedra & Opfer, 2021). However, in international and multicultural school settings, the dynamics between these elements may differ due to diverse learner profiles, pedagogical styles, and cultural expectations.

Currently, there is a lack of focused research that explores how student motivation and teacher encouragement interact to influence the use of CCT skills within international school contexts like OWIS Nanyang. Addressing this gap is essential to inform educators, curriculum planners, and school leaders about how to better scaffold student learning and promote higher order thinking in diverse classrooms. This study seeks to bridge that gap by examining the extent to which motivation and encouragement affect students' ability to think critically and creatively in their academic experiences.

Research Objectives

The primary aim of this study is to investigate to what extent student motivation and teacher encouragement influence the application of critical and creative thinking (CCT) skills in independent learning among students at OWIS Nanyang, Singapore. The specific objectives include:

i. To examine the level of application of CCT skills in independent learning among students at OWIS Nanyang.

ii. To explore the relationship between student motivation, teacher encouragement and the application of CCT skills in independent learning among students at OWIS Nanyang.

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iii. To investigate the jointly impact of student motivation and teacher encouragement on the application of CCT skills in independent learning among students at OWIS Nanyang.

iv. To identify the key challenges faced by students and teachers in fostering the application of CCT skills in independent learning at OWIS Nanyang.

Research Questions

This study is guided by the following research questions:

i. What is the level of application of critical and creative thinking (CCT) skills in independent learning among students at OWIS Nanyang?

ii. What is the relationship between student motivation, teacher encouragement and the application of CCT skills in independent learning among students at OWIS Nanyang?

iii. To what extent student motivation and teacher encouragement jointly influence the application of CCT skills in independent learning among students at OWIS Nanyang?

iv. What are the key challenges faced by students and teachers in the application of CCT skills in independent learning at OWIS Nanyang?

Hypothesis

H_1 Student motivation relates positively to the application of CCT skills in independent learning among students at OWIS Nanyang.

H_2 Teacher encouragement relates positively to the application of CCT skills in independent learning among students at OWIS Nanyang.

H_3 Student motivation and teacher encouragement significantly influence the application of CCT skills in independent learning among students at OWIS Nanyang.

LITERATURE REVIEW

Critical and Creative Thinking (CCT) has become a core educational outcome across global curricula in response to the increasing complexity of the world students are expected to engage with. Schools, particularly international institutions like OWIS Nanyang in Singapore, are tasked with nurturing not only cognitive competence but also the affective and motivational elements that support deeper learning. This literature review explores the key constructs of critical and creative thinking, student motivation, and teacher encouragement, and how their interaction influences student learning outcomes. It also presents relevant theoretical perspectives and develops a conceptual framework for the study.

Critical and Creative Thinking (CCT) in Education

CCT encompasses a blend of divergent (creative) and convergent (critical) cognitive processes that enable learners to solve problems, innovate, and evaluate ideas (Lucas & Spencer, 2022). Critical thinking involves logical reasoning, analysis, and the evaluation of arguments, while creative thinking includes the ability to generate original ideas and consider alternative solutions (OECD, 2019).

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In international school settings such as OWIS Nanyang, curricula like the IB and Cambridge promote inquiry-based learning and reflection as vehicles for developing CCT skills. However, the successful application of these skills relies on both pedagogical strategy and the internal dispositions of students (Kettler & Bouchard, 2020).

Despite policy-level emphasis on CCT, students often exhibit limited application due to test-oriented approaches and lack of engagement (Lee & Tan, 2022). Hence, CCT development must be viewed through the lens of motivational and environmental supports.

Student Motivation and Its Influence on CCT

Student motivation is defined as the internal drive that initiates and sustains learning behaviour—is a strong predictor of academic success and higher-order thinking (Ryan & Deci, 2020). Intrinsically motivated learners are more likely to embrace challenges, engage deeply in learning, and demonstrate resilience in problem-solving (Zhao & Pan, 2022).

Studies indicate that motivated students are more inclined to apply CCT skills because they see value in creative exploration and critical analysis (Cho et al., 2020). For instance, Lee and Tan (2022) found a positive correlation between intrinsic motivation and CCT application among secondary students in high-performing schools.

Factors influencing student motivation include autonomy, competence, relatedness, and personal interest—all critical components of Self-Determination Theory (Ryan & Deci, 2020). When these elements are supported, students display higher engagement in intellectually demanding tasks.

Teacher Encouragement and Classroom Environment

Teacher encouragement involves emotional and instructional support provided to students to boost confidence, stimulate curiosity, and reinforce positive learning behaviours. It includes verbal praise, constructive feedback, and the design of learning environments that invite questioning and experimentation (Tan et al., 2020).

Saavedra and Opfer (2021) argue that supportive teacher behaviour can reduce students' fear of failure, which is often a barrier to critical or creative risk-taking. This is especially relevant in international classrooms where students from varied cultural backgrounds may have differing levels of comfort with open-ended inquiry and expression (Ng & Marsh, 2020).

Empirical findings from Kim et al. (2022) show that students who perceive their teachers as encouraging are more likely to take intellectual risks and engage in both independent and collaborative thinking processes.

Interaction Between Motivation and Teacher Support

While motivation is an internal attribute, its development is heavily influenced by external stimuli, particularly from teachers. Encouragement enhances student motivation by affirming effort, fostering belonging, and creating emotionally safe learning spaces (Ritchhart, 2021).

The interplay between teacher encouragement and motivation has a compounding effect on CCT. Research by Hennessey and Amabile (2020) supports that positive reinforcement and autonomy-supportive teaching contribute to heightened motivation, which in turn fosters creative expression and critical analysis.

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A recent mixed-methods study by Wong et al. (2023) in Asian international schools demonstrated that students who felt both internally driven and externally supported were significantly more likely to engage in CCT-related classroom activities and assignments.

Challenges in Developing CCT in International Schools

Despite structural advantages such as access to global curricula and resources, international schools face unique challenges in cultivating CCT. Diverse student populations bring varied academic foundations and cultural interpretations of thinking and creativity (Jin & Cortazzi, 2021).

Teachers may also struggle to balance curriculum coverage with open-ended inquiry. Without adequate training and institutional support, fostering CCT through motivation and encouragement can be inconsistent (Ng & Marsh, 2020).

Furthermore, assessment frameworks in some schools may still prioritize content recall over process thinking, disincentivizing risk-taking and creativity among students (Tan et al., 2020).

Theoretical Framework

This study is grounded in two complementary theories:

Self-Determination Theory (SDT)

Developed by Ryan and Deci (2000; updated 2020), SDT emphasizes the role of intrinsic motivation in learning. It posits that individuals are more likely to engage in and persist with challenging tasks—such as those requiring critical and creative thinking—when they feel autonomous, competent, and connected. In the context of this study, SDT explains how motivation drives students' willingness to apply CCT skills.

Vygotsky's Sociocultural Theory of Cognitive Development

Vygotsky (1978) highlights the role of social interaction and scaffolding in cognitive growth. Teacher encouragement can be seen as a form of scaffolding that helps students extend their thinking capacities within the Zone of Proximal Development (ZPD). This theory supports the idea that teacher encouragement is essential for fostering students' ability to think critically and creatively.

Conceptual Framework

The conceptual framework for this study illustrates the hypothesized relationships between student motivation, teacher encouragement, and the application of critical and creative thinking (CCT) skills in student learning. It is designed to guide the investigation of both the individual and combined effects of these psychosocial factors within the context of an international school setting.

At the core of the framework are three independent variables—demographic factors, student motivation and teacher encouragement—which are expected to influence the dependent variable, namely the application of CCT skills in classroom learning.

This structure not only facilitates the analysis of direct relationships but also allows for the exploration of contextual dynamics that may affect the degree and manner in which CCT skills are demonstrated by students. The framework is informed by previous work on

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motivation and pedagogical support in international education (Wong et al., 2023; Kim et al., 2022; Lee & Tan, 2022; Zhao & Pan, 2022) and is visually represented in Figure 1.

(Source: Adapted from Wong et al., 2023; Kim et al., 2022; Lee & Tan, 2022; Zhao & Pan, 2022)

Figure 1: Conceptual Framework

RESEARCH METHODOLOGY

Research Design

A mixed-methods design was employed, combining quantitative and qualitative approaches to provide a holistic understanding of the research problem. The quantitative component focused on measuring levels of student motivation, teacher encouragement, and CCT skill application through structured surveys. Complementing the quantitative data, the qualitative strand focused on capturing deeper contextual insights through semi-structured interviews with selected teachers and students to gain deeper insights into perceptions and classroom dynamics.

Research Population and Sample

The target population for this study consisted of 110 students from the upper secondary section at OWIS International School Nanyang, Singapore (OWIS Nanyang, 2025). In term of sampling method, this study applied a purposive sampling method with proportionate random approach (Quinlan, et al., 2024) to determine the minimum sample size and to ensure fair representation across different grade levels, specifically from Years 10 to 12. The final sample included 90 (81.8%) students who participated in the survey. According to Krejcie and Morgan (1970), this sample size is sufficient. For the qualitative phase, purposive sampling was used to select information-rich participants, including five teachers and eight students from diverse academic backgrounds, with meaningful exposure to critical and creative thinking activities. Combining these sampling techniques providing a well-rounded dataset to support the study's objectives, allowing for both broad generalizability through quantitative analysis and deep contextual understanding via qualitative methods (Singh, 2023; Rahman et al., 2020).

Research Instrument

In this study, for the quantitative component, a structured questionnaire which was adapted from Wong et al (2023), Kim et al (2022), Lee and Tan (2022), and Zhao and Pan (2022) was used as the main instrument to gather data. The instrument employed a five-point Likert scale ranging from *Strongly Disagree (1)* to *Strongly Agree (5)* to ensure consistency and allow for nuanced responses across various domains. The questionnaire comprising four key sections, each designed to assess variables aligned with the research objectives. Section 1 collected basic demographic data to contextualize the findings and support subgroup analysis. It included items on grade level, gender, age, programme (e.g., IGCSE or IBDP), and nationality. Section 2 asking about student motivation (Academic Motivation Scale). Questions focused on students'

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autonomy, competence, relatedness, and personal interest. Section 3 asking about teacher encouragement, emphasizing the role of teachers in fostering student engagement, involves emotional and instructional support provided to students to boost confidence, stimulate curiosity, and reinforce positive learning behaviours. Lastly, Section 4 asking about application of critical and creative thinking (CCT) skills. Questions explored how frequently and confidently students apply CCT skills such as problem-solving, idea generation, questioning assumptions, reflecting critically, and producing original work across various subjects.

A pilot study for the draft questionnaire was carried out on 30 respondents from the research population to examine its reliability and construct validity. Data gathered from this instrument provided both quantitative insight into the prevalence and strength of the targeted constructs and foundational input for qualitative follow-up in interviews. The results of the pilot study revealed that the Cronbach's Alpha coefficients for all variables were relatively high, i.e., Student Motivation – $\alpha = 0.870$ (> 0.700); Teacher Encouragement - $\alpha = 0.831$ (> 0.700); Application of CCT Skills - $\alpha = 0.851$ (> 0.700). These values confirmed strong internal consistency across all scales, indicating that the items reliably measure their intended constructs. Furthermore, item analysis revealed that all the items from the questionnaires reached the significant level at 0.05, further enhance the content validity.

On the other hand, for the qualitative component, a semi-structured interview guides were designed for both students and teachers with the focus on the following areas:

- Perceived motivation and factors influencing it
- Experiences of teacher encouragement
- Opportunities and challenges in applying CCT in class activities
- Differences in CCT use across subjects

Data Analysis Techniques

- **Quantitative Data Analysis**:
  Descriptive statistics (mean, SD) were used to describe level of application of CCT skills. Inferential statistics (Correlation and multiple regression) were used to test hypotheses about relationships between variables. SPSS Version 27 was used for analysis.

- **Qualitative Data Analysis**:
  Interview transcripts were coded and analysed thematically using NVIVO. Themes were generated through inductive analysis (Tracy, 2019).

RESULTS AND DISCUSSION

Descriptive Analysis

In this study, the descriptive analysis consists of detailed demographic information of the respondents and level of achievement in awards.

Demographic Profile of Respondents

A total of 90 students from OWIS Nanyang, Singapore, participated in the quantitative phase of this study. The demographic data provides a clear representation of the diversity within the student body and serves to contextualize the findings regarding student motivation, teacher encouragement, and the application of critical and creative thinking (CCT) skills. The

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breakdown of participants across five key demographic variables—grade level, gender, age group, academic programme, and nationality—is presented in Table 1.

Table 1: Demographic Profile of the Respondents

Factor	Category	Frequency	Percentage
Grade level	Grade 10	35	38.9%
	Grade 11	33	36.7%
	Grade 12	22	24.4%
Gender	Male	43	47.8%
	Female	47	52.2%
Age groups	15-16	60	66.7%
	17-18	30	33.3%
Programmes	IGCSE	62	68.9%
	IBDP	28	31.1%
Nationality	Local (Singaporean)	25	27.8%
	Foreigner	65	72.2%

In terms of grade level, the respondents were evenly distributed across Grades 10 to 12. The highest proportion of students were from Grade 10 and Grade 11, each comprising 38.9% of the total sample (n = 35), followed closely by Grade 11 students at 36.7% (n = 33). Grade 12 students were the smallest group, representing 24.4% (n = 22). Regarding gender, the sample included 43 male students (47.8%) and 47 female students (52.2%), indicating a relatively balanced gender distribution. The age group analysis reveals that most students were aged between 15 and 16 years (n = 60; 66.7%), while 33.3% (n = 30) were aged 17 to 18 years. These age groupings correspond appropriately with the students' grade levels and reflect a predominantly mid-adolescent sample, which is critical in studying emerging higher-order thinking capabilities and engagement behaviours. With respect to the academic programmes, a significant majority of respondents (n = 62; 68.9%) were enrolled in the International General Certificate of Secondary Education (IGCSE) track, while 31.1% (n = 28) were in the International Baccalaureate Diploma Programme (IBDP). Finally, the nationality profile underscores the international nature of the school, with 65 students (72.2%) identifying as foreign nationals and 25 students (27.8%) as local (Singaporean).

The Level of Application of Critical and Creative Thinking (CCT) Skills in Independent Learning among Students at OWIS Nanyang

The first research question of this study is: "*What is the level of application of critical and creative thinking (CCT) skills in independent learning among students at OWIS Nanyang?*" To address this inquiry, three items indicating number of hours spent for applying CCT skills, number of subjects involved, and number of CCT skills applied per subject within the upper secondary students of OWIS Nanyang were tailored for this purpose. The results of these inquiries are presented in Table 2.

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Table 2: Mean and Standard Deviation of the Level of Application of Critical and Creative Thinking (CCT) Skills in Independent Learning

	Mean ($\bar{x}$)	***Standard Deviation (SD)***
• Number of hours spent for applying CCT skills	3.8556	.4635
• Number of subjects involved	4.0778	.6400
• Number of CCT skills applied per subject	4.0000	.3352
Overall	**3.9778**	**.4796**
Valid N (listwise): 90		

Table 2 presents the mean scores and standard deviations reflecting the level of application of critical and creative thinking (CCT) skills for independent learning among students at OWIS Nanyang, Singapore. The overall mean score was 3.9778 (SD = .4796), slightly below the anticipated mean of 4.0. Regarding the number of subjects involved for applying CCT skills, the mean score was 4.0778 (SD = .6400), indicating that, on average, OWIS Nanyang students applied CCT skills for their independent learning of approximately four subjects of their studies marking the highest-rated aspect. Following closely is the number of CCT skills applied per subject, with a mean score of 4.0000 (SD = .3352), suggesting that, on average, this school students have applied four CCT skills for the independent learning of every subject of their studies. Lastly, the mean value for the number of hours spent for applying CCT skills is 3.8556 (SD = .4635), suggesting that, on average, OWIS Nanyang students spent 3.8556 hours weekly on applying CCT skills into their independent learning process. In summary, the level of application of critical and creative thinking (CCT) skills in independent learning among students at OWIS Nanyang, Singapore is moderately high.

The Relationship between Student Motivation, Teacher Encouragement and the Application of CCT Skills in Independent Learning among Students at OWIS Nanyang.
The second research question of this study is "*What is the relationship between student motivation, teacher encouragement and the application of CCT skills for independent learning among students at OWIS Nanyang?*" To answer this inquiry, the hypotheses H_1 and H_2 were set:

H_1 Student motivation relates positively to the application of CCT skills in independent learning among students at OWIS Nanyang.

H_2 Teacher encouragement relates positively to the application of CCT skills in independent learning among students at OWIS Nanyang.

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Table 3: Correlations between Student Motivation, Teacher Encouragement and the Application of CCT Skills

Correlations

Spearman's rho		Application of CCT skills	Student motivation	Teacher encouragement
Application of CCT skills	Correlation Coefficient	1	.680**	.730**
	Sig. (1-tailed)		.000	.000
	N	90	90	90
Student motivation	Correlation	.680**	1	.520**
	Sig. (1-tailed)	.000		.000
	N	90	90	90
Teacher encouragement	Spearman Correlation	.730**	.520**	1
	Sig. (1-tailed)	.000	.000	
	N	90	90	90

***. Correlation is significant at the 0.01 level (1-tailed).*

From Table 3, it is found that there is a significant, positive, and strong relationship between student motivation and the application of CCT skills ($r = .680$, $n = 90$, $p < .01$). The positive significant relationship shows that a unit of increase in student motivation increases 0.680 unit in the level of application CCT skills among the students of OWIS Nanyang and vice versa. The results supported previous research's findings (Wong et al., 2023; Lee & Tan, 2022; Cho et al., 2020). Hence, hypothesis H_1: Student motivation relates positively to the application of CCT skills in independent learning among students at OWIS Nanyang, is supported.

Similarly, there is a significant, positive, and strong relationship between teacher encouragement and the application of CCT skills ($r = .730$, $n = 90$, $p < .01$). The positive significant relationship shows that higher teacher encouragement received by the students can increase the level of application CCT skills for their independent learning at the school and vice versa. The results supported the findings from previous studies (Wong et al., 2023; Kim et al., 2022; Saavedra & Opfer, 2021). Therefore, hypothesis H_2: Teacher encouragement relates positively to the application of CCT skills in independent learning among students at OWIS Nanyang, is supported.

The Jointly Influence of Student Motivation and Teacher Encouragement on the Application of CCT Skills in Independent Learning among Students at OWIS Nanyang

The third research question of this study is "*To what extent student motivation and teacher encouragement jointly influence the application of CCT skills in independent learning among students at OWIS Nanyang*?" To address this inquiry, hypothesis, H_3: Student motivation and teacher encouragement significantly influence the application of CCT skills in independent learning among students at OWIS Nanyang, was set. The analysis of regressions was conducted to ascertain the impact of these independent variables on the dependent variable. The results are showed in Table 4.

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Table 4: Correlation and Multiple Regressions of Student Motivation and Teacher Encouragement on the Application of CCT Skills

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.781[a]	.610	.602	.49185

a. Predictors: (Constant), student motivation, teacher encouragement.

ANOVA[a]

Model		Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	59.892	3	19.964	61.798	.000[b]
	Residual	28.106	87	.3231		
	Total	87.998	90			

a. Dependent Variable: Application of CCT skills
b.Predictors: (Constant), student motivation and teacher encouragement.

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	.385	.075		5.133	.000
	Student motivation	.410	.080	.094	5.121	.000
	Teacher encouragement	.470	.078	.215	6.030	.000

a. *Dependent Variable: Application of CCT skills*

Table 4 shows the results of the multiple regressions analysis of the impact of student motivation and teacher encouragement on the application of CCT Skills in independent learning among students at OWIS Nanyang. From the Model Summary table, it is concluded that all the independent variables statistically significantly predict the dependent variable of the application of CCT skills [$F (3, 87) = 61.798$, $p < .01$]. The combined influence of all the predictor factors explained 61.0% of the variance change in the application of CCT skills ($R^2 = .610$, Adj. $R^2 = .602$, $p < .01$). In this context, 39.0% of the variance in the application of CCT skills explained by other factors than the student motivation and teacher encouragement. The results show that teacher encouragement ($\beta = .470$, $p < .01$) to be slightly better predictor factor in comparison with student motivation (($\beta = .410$, $p < .01$) for the application of CCT skills. With that said, the hypothesis H_3: Student motivation and student teacher encouragement significantly influence the application of CCT skills in independent learning among students at OWIS Nanyang, is supported. The results supported largely on the existing literatures of the factors influencing the application of CCT skills for student independent learning (Wong et al., 2023; Kim et al., 2022; Lee & Tan, 2022; Zhao & Pan, 2022; Ng & Marsh, 2020).

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Results of the Qualitative Data Analysis

The aim of the qualitative data analysis is to illustrate and complement the results of the statistical analyses and answering the fourth research question: *What are the key challenges faced by students & teachers in the application of CCT skills in independent learning at OWIS Nanyang?* For this very reason, a thematic analysis approach was applied to interview transcripts. Five major themes emerged:

Theme 1: Intrinsic Drive as a Motivator

Students described personal curiosity and enjoyment as drivers of engagement in inquiry-based and problem-solving tasks.

> "*When I'm interested in a topic, I go beyond what the teacher says and try to fin+d out more*."

Theme 2: The Power of Positive Reinforcement

Teachers shared that encouragement especially through praise and opportunities for choice increased student risk-taking and creativity.

> "*Even small affirmations like 'That's an interesting idea!' can make students more confident to think out of the box*."

Theme 3: Curriculum Design and Task Structure

Students indicated that open-ended and interdisciplinary projects were more conducive to applying CCT.

> "*In our project on climate change, we had to think critically and creatively to come up with real solutions*."

Theme 4: Cultural Diversity and Communication

Teachers noted that diverse cultural backgrounds influenced student comfort with critical questioning and idea generation.

> "*Some students are more reserved because they come from systems where questioning is discouraged*."

Theme 5: Key Challenges in Sustaining CCT

Both teachers and students cited time constraints, examination pressures, and a content-heavy syllabus as barriers to CCT application.

The qualitative data analysis, conducted through thematic analysis of semi-structured interviews, sought to explore the challenges faced by students and teachers in applying critical and creative thinking (CCT) skills for independent learning at OWIS Nanyang. Five salient themes emerged. First, intrinsic motivation surfaced as a key driver of student engagement, with many students expressing that personal interest in a topic encouraged deeper exploration beyond classroom expectations. Second, the power of positive reinforcement was evident in teacher accounts, highlighting that affirmation and offering students autonomy fostered greater risk-taking and creativity. Third, participants emphasized the influence of curriculum design and task structure, noting that interdisciplinary and open-ended projects provided more authentic opportunities for applying CCT skills. Fourth, cultural diversity and communication styles were identified as factors shaping students' comfort with critical questioning,

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particularly among those from more traditional or examination-oriented educational backgrounds. Finally, a recurring concern among both teachers and students was the key challenge of sustaining CCT application, often constrained by rigid curriculum demands, time limitations, and assessment pressures. Together, these themes offer nuanced insights into the contextual enablers and barriers affecting the development and application of CCT skills in an international school setting.

CONCLUSION AND RECOMMENDATIONS

This study has demonstrated that both student motivation and teacher encouragement significantly influence the application of critical and creative thinking (CCT) skills in international education settings. At OWIS Nanyang, these psychosocial factors work synergistically to support students in navigating complex tasks, developing original ideas, and engaging in reflective thought. By addressing systemic challenges and fostering supportive learning environments, schools can ensure that CCT becomes an integral and lasting part of student learning.

The study found a strong, statistically significant relationship between student motivation and the application of CCT skills. This supports the theoretical assumptions of Self-Determination Theory (Deci & Ryan, 2020), which posits that intrinsically motivated students exhibit greater cognitive engagement, creativity, and persistence. The high level of motivation suggests that students at OWIS Nanyang generally approach learning with a growth-oriented mindset, particularly in inquiry-based tasks. This aligns with Lucas and Spencer (2022), who argue that critical and creative thinking thrives in environments where students are intrinsically driven to explore and question.

Teacher encouragement was identified as an even stronger predictor of CCT skill application than student motivation. The consistent verbal affirmation, scaffolding, and classroom autonomy described by students significantly enhanced learners' creative risk-taking and problem-solving in classrooms. Additionally, teacher encouragement fosters psychological safety, allowing students to take intellectual risks—a critical condition for CCT. This finding confirms that beyond curriculum design, the teacher-student relationship is central to fostering a culture of analytical and innovative thinking.

Collectively, this study demonstrated that the joint influence of student motivation and teacher encouragement explains a significant proportion of variance in students' CCT application. This highlights the importance of a holistic approach combining both internal (motivation) and external (encouragement) drivers to stimulate critical inquiry and creativity.

However, qualitative data revealed challenges posed by cultural norms, particularly among students from high power-distance cultures. As Saavedra and Opfer (2021) suggest, cultural conditioning can inhibit questioning, divergent thinking, or challenging authority, requiring sensitive, culturally responsive pedagogy. Furthermore, both teachers and students cited structural barriers, such as examination pressure, time constraints, and syllabus rigidity as limiting the consistent integration of CCT into classroom practices.

Submitted: 8 May 2025
Reviewed: 15 May 2025
Accepted: 19 May 2025

Theoretical Implications

This study affirms the relevance of two key frameworks:

- Self-Determination Theory (Deci & Ryan, 2020) explains how intrinsic motivation is essential for autonomous, creative learning.

- Vygotsky's Sociocultural Theory, particularly the concept of the Zone of Proximal Development (ZPD), supports the role of teacher encouragement in guiding students through complex thinking tasks they may not accomplish independently (Kim et al., 2022).

Together, these theories frame motivation and encouragement as interdependent factors necessary for scaffolding students' CCT capacity.

Practical Implications

For Teachers:

- Embed positive reinforcement, open-ended questioning, and student-led learning into daily practice.

- Create psychologically safe classrooms that welcome diverse perspectives.

For School Leaders:

- Invest in professional development focused on culturally responsive pedagogy and CCT integration.

- Review assessment frameworks to allow more project-based and inquiry-driven evaluation.

For Curriculum Designers:

- Design interdisciplinary tasks that encourage exploration and synthesis.

- Include reflective journaling, peer critiques, and creative brainstorming exercises to nurture CCT.

For Policymakers:

- Encourage policy shifts toward formative assessment and 21st century skills-based education.

- Provide frameworks that balance content coverage with CCT development.

Recommendations

1. **Establish a School-wide CCT Framework:**
   Develop a structured program with clear learning outcomes that integrate CCT skills across subjects.

2. **Empower Teachers through Targeted Training:**
   Conduct regular workshops on motivational strategies and CCT-enhancing teaching techniques.

Submitted: 8 May 2025
Reviewed: 15 May 2025
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3. **Revise Assessment Practices:**
   Incorporate performance-based assessments (e.g., portfolios, presentations, debates) that emphasize thinking over memorization.

4. **Foster a Culture of Inquiry:**
   Promote student-led research projects and Socratic dialogue across grade levels.

5. **Address Cultural Sensitivities:**
   Train educators in cultural intelligence to better support students from diverse backgrounds in expressing critical and creative thought.

Limitations and Suggestions for Future Research

This study is limited by its focus on a single international school, which restricts the generalizability of its findings. Additionally, reliance on self-reported data introduces the possibility of social desirability bias, and while cultural influences were qualitatively explored, they were not systematically measured. Future research should consider expanding the sample across multiple international schools to enable comparative analysis, examining the long-term effects of CCT skill development on academic outcomes. Moreover, exploring teacher-specific variables such as mindset, teaching experience, and professional development could yield deeper insights into their influence on students' critical and creative thinking.

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