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Exploring Creative Thinking among Higher Education Students: A behavioural perspective

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Abstract
Creative thinking is an essential competency for students of higher education. This study explores the relationships between personal characteristics, interpersonal relationships, and innovativeness in creative thinking among students at the Universiti Teknologi MARA, Melaka, Malaysia. Based on purposive sampling, the final data were drawn from 140 diploma and degree students enrolled in the Faculty of Business and Management. All three independent variables significantly predicted approximately 59% of the variation in creative thinking. However, personal characteristics and interpersonal relationships contribute considerably to creative thinking. The study emphasizes the importance of personal traits and behaviour in developing creativity among Malaysian undergraduates.

Keywords: creative thinking, personal characteristics, interpersonal relationships, innovativeness

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1.0 Introduction

In today's fast-changing knowledge economy, creative thinking is an output of higher education. Creative thinking is the talent to create original, meaningful, and adaptive ideas. From a behavioural perspective, it empowers students to approach complex problems with innovative solutions and create new knowledge (Becerra & Regaldo, 2024; Zhanqiang, 2023). Creative thinking has been found to increase employability, entrepreneurial intentions, and academic engagement (Zhao et al., 2022). From an employability perspective, creativity is ranked at the top of behavioural competencies that employers look for in graduates, highlighting its importance over and above academic excellence (Thornhill-Miller et al., 2023). Behavioural dynamics influence educational and social development in diverse communities, and this research examines behavioural factors that favour creative development in higher education settings.

Creative thinking could be developed and shaped via personal traits and social interactions. According to the Social Cognitive Theory (Bandura, 1986), human behaviour is viewed as the outcome of the dynamic interplay between individual and environmental factors, as well as the behaviour itself. This study frames creative thinking as the dependent variable, which is determined by three key behavioural antecedents: personal characteristics, interpersonal relationships, and innovativeness. Personal characteristics include interests, self-perceptions, work-related attitudes, individual needs, skills or competencies, knowledge pertinent to tasks, emotions,

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moods, beliefs, and values. (Sumantri et al., 2021). They are cognitive and personality features, such as openness to experience, self-confidence, and intrinsic motivation. Interpersonal relationships enable students to interact and collaborate effectively with their peers, lecturers, and learning instructors. This would lead to an increase in creative output (Liu et al., 2024). Innovativeness among students reflects their levels of ability and preferences for being innovative. A student may learn to adapt to change and adopt new ideas, accept errors and differences from others, enjoy the freedom to explore and take well-calculated risks, and learn to adopt changes and novel methods (Roffeei et al., 2017).

The pursuit of this study is particularly important in the context of Malaysian higher education. Promoting creativity is essential for producing competent, flexible, and visionary future graduates. Also, fostering creative thinking in students enhances their capacity to confront future issues. Since Malaysia is shifting to a digital and innovation-oriented economy, universities should prioritize developing behavioural skills and increasing students' creative potential (OECD, 2020). Despite these extensions of creativity in educational discourse, empirical research on behavioural determinants among Malaysian students remains scarce. With Malaysia's shift to a digital and innovation-oriented economy, universities are expected to develop behavioural skills among graduates, increasing their creative potential.

Therefore, this research aims to fill this gap by examining the impact of personal characteristics, interpersonal relationships, and innovativeness on creative thinking among undergraduates. Concurrently, the present study attempts to establish whether there is any significant difference in the mean scores of creative thinking based on gender and program level (diploma and degree students). The findings are expected to inform policy and practice regarding the formulation of actionable lines for curriculum design, as well as for educators and leaders of institutions who strive to develop a culture of creativity.

2.0 Literature Review

Considered a fundamental ability in higher education, creative thinking is becoming increasingly important for equipping students to negotiate challenging, practical tasks. It entails generating creative, practical, and flexible ideas in many settings. Creative thinking improves problem-solving skills, drives innovation, and prepares undergraduates for uncertain and fast-paced employment (Thornhill-Miller et al., 2023). Higher education institutions are charged with producing students who are knowledgeable and creative thinkers, able to turn knowledge into significant solutions as economies worldwide, including Malaysia, move toward innovative models (Zhao et al., 2021). Thus, national progress and personal student development depend on fostering creativity in institutions. Recent research emphasizes the importance of several elements that affect creative thinking, most notably personal characteristics, interpersonal relationships, and innovativeness.

This paper applies Bandura's Social Cognitive Theory (SCT) (1986) to clarify the behavioural elements affecting creative thinking among university students. According to SCT, a theory sometimes known as reciprocal determinism, human behaviour results from the dynamic interaction of personal traits, environmental influences, and the behaviour itself. In this sense, creative thinking is not just a cognitive ability but also a behaviour shaped by personal qualities and social surroundings.

2.1 Personal Characteristics

Personal characteristics such as openness to experience, self-efficacy, and intrinsic motivation have repeatedly correlated with creative thinking. A facet of the Big Five personality qualities, openness to experience promotes divergent thinking and receptivity to new ideas (McCrae, 1987; Karwowski & Lebuda, 2015). Self-efficacy improves creative performance by encouraging tenacity and confidence during the creative process. Moreover, intrinsic drive inspires inquiry and the quest for creative activities free from outside pressure (Deci & Ryan, 2000; Hennessey & Amabile, 2009).

2.2 Interpersonal Relationships

Positive interactions with classmates and learning instructors influence students' creative involvement. Supportive settings help increase risk-taking and teamwork, thus leading to a better quality of ideas. Liu et al. (2024) underlined that higher-order thinking, including creativity, develops mostly from social contact. Recent research suggests that by encouraging emotional safety and open idea exchange, peer collaboration and teacher-student connection may improve creative thinking (Thornhill-Miller et al., 2023; Zhangjang, 2023).

2.3 Innovativeness

One can consider innovativeness as the inclination to embrace fresh ideas and strategies. It is a necessary precursor of creative expression. Innovative students are more likely to challenge conventions, conduct experiments, and propose original solutions (Roffeei et al., 2017). Setiamurti and Kurniawati's (2024) recent systematic review validates that students' creative performance in diverse learning situations is much predicted by their inventive inclinations. Furthermore, encouraging innovation and creative expression by including digital tools and pedagogies with an eye toward invention has been done (Zhao et al., 2021).

2.4 Hypotheses Development

Based on arguments presented earlier, within the educational context, personal characteristics, interpersonal relationships, and innovativeness are connected and greatly affect students' ability for creative thinking. Developing teaching plans and institutional policies supporting creativity in higher education depends on an awareness of their consequences. Based on these arguments, the following hypotheses are proposed:

H1: There is a significant relationship between personal characteristics and creative thinking among students at UiTM Melaka.

H2: There is a significant relationship between interpersonal relationships and creative thinking among students at UiTM Melaka.
H3: There is a significant relationship between innovativeness and creative thinking among students at UiTM Melaka.

3.0 Methodology

This section will explain the research design. The purpose of this study is descriptive, as it aims to explore the relationship between individual characteristics, interpersonal relationships, innovativeness, and creative thinking among undergraduate students. Descriptive research is appropriate for identifying and explaining the association between independent and dependent variables within a defined context (Aggarwal & Ranganathan, 2019). The type of investigation adopted in this study is correlational, as it seeks to clarify the extent to which the selected independent variables influence creative thinking. Regarding the extent of researcher interference, this study involves only minimal interference, as the researchers collected data through self-administered online surveys. Hence, the study setting is non-contrived, allowing data collection within the respondents' natural environment. The unit of analysis is at the individual level, specifically targeting undergraduate students enrolled in Universiti Teknologi Mara, Melaka, Malaysia. Finally, this study uses a cross-sectional survey design, as the data will be collected at a single point in time.

The research was conducted with students at the Faculty of Business & Management, Universiti Teknologi MARA, in Melaka, Malaysia. This is the biggest faculty on the campus. The study determined the number of participants to be the equivalent of five times the number of self-report items, following Suhr's recommendation on sample size determination (2006). A total of 25 questions are included in the survey. Therefore, the study needs 125 responses. In order to achieve this, 300 copies of the survey questionnaire were handed out using convenience sampling. Out of these, this study received 140 completed and returned questionnaires.

The questionnaire had five sections: demographic details, personal characteristics, interpersonal relationships, innovativeness and creative thinking. Measurement items in the study were taken from research that was performed beforehand. In order to measure personal characteristics, this research used 10 items from Park and Kim's (2022) study. These items cover areas such as "I come up with good ideas frequently" and "I work to complete what I plan." One of the items used for interpersonal relationships was "I can form alliances with others," which was adapted from López-Fernández et al. (2022). The innovativeness scale contained five items adapted from work done by Liao and Chen (2006). The following is a representative example: "I often join forces with other students to develop original and imaginative ideas." We used a 5-point Likert scale from 1 (strongly disagree) to 5 (strongly agree) to measure each point. Five items from Torrance (2012) and Mumford et al. (2003) were used to measure creative thinking for the dependent variable.

4.0 Results

4.1 Demographic Profile of Respondents

According to the study's demographic findings, most respondents were women, at 76.4%, and the rest were men, totalling 23.6%. There were 89 respondents between 18 and 20 (63.6%). Those in the age group 21 to 23 years reached second place with 42 responses (30%), and only nine people, 6.4% of the entire group, were aged between 24 and 26 years. Overall, in terms of the highest level of education, 87 people (62.1%) were diploma students, while 37.9% of the total sample population were pursuing bachelor's degrees.

4.2 Reliability

Cronbach's Alpha was applied to ensure the overall consistency of the measures used. Based on the application, the value of Cronbach's Alpha for personal characteristics was 0.889 (using 10 items). For interpersonal relationships, the value is 0.787, using five items, and for innovativeness, the value is also 0.780. Creative thinking has a Cronbach's Alpha score of 0.796 (with five items). All the measures reached a threshold value of above 0.7, suggesting good internal consistency.

4.3 Regression

Table 1. Results of Multiple Regression

Predictors	Beta (Unstd.)	Beta (Std.)	t-value	P-value
Personal Characteristics	0.600	0.554	7.202	.000***
Interpersonal Relationships	0.195	0.188	2.335	.021*
Innovativeness	0.136	0.137	1.858	.065
Adjusted R2	0.632			
F-test	80.613			
Significance	0.000			

Notes: *** signiifcance at 0.001; * significance at 0.05 (Source: Developed by authors)

A regression analysis was conducted to find answers to the main research question. The results are presented in Table 1. Based on the table, 63.2% of the variance in creative thinking scores is explained by the three independent variables: personal characteristics, interpersonal relationships, and innovativeness. Other factors not included in this study could explain 39.8% of the variance in creative thinking. The regression analysis also revealed that personal characteristics significantly and positively predict creative thinking ($\beta = .554$, $p < .001$), indicating that students with stronger individual traits (e.g., self-confidence, openness) tend to have higher creative thinking abilities. Thus, H1 is supported. Next, interpersonal relationships also significantly predict creative thinking ($\beta = .189$, $p = .028$), suggesting that students who are better at social interaction and communication are more likely to demonstrate creative thinking. Thus, H2 is also supported. However, the results failed to find support for H3. Innovativeness was not a significant predictor ($\beta = .137$, $p = .0.65$), indicating that within this sample, the inclination to pursue new ideas did not significantly influence creative thinking when controlling for the other variables.

4.5 Independent Sample T-test

Table 2. Independent Sample T-test on Creative Thinking

Variables		N	Mean	Std Dev.	T-test for equality of means			
					t-value	df	sig	η (effect size)
Program Level	Diploma	87	3.7862	.53769	-2.37	138	0.019**	0.41
	Degree	53	4.0075	.53344				
Gender	Male	33	4.0000	.61847	1.576	138	.117	Not significant
	Female	107	3.8299	.51674				

Note: ** significance at 0.01 (Source: Developed by authors)

The independent sample t-test was used to assess the difference in creative thinking scores between diploma and degree students. The students in the degree course (M = 4.01, SD = 0.53) achieved significantly higher scores than diploma students (M = 3.79, SD = 0.54), as the difference was statistically significant: t(138) = -2.369, p = .019. Perhaps, a higher level of academic work could encourage creative thinking, given that students may develop their thinking and learning skills and have more resources. In terms of the effect size, creative thinking varies statistically significantly between students of different programs, showing a small-to-medium effect.

In terms of gender, the results of the independent samples t-test showed that both male and female students had similar creativity scores, t(138) = 1.576, p = .117. While the mean score for males (M = 4.00, SD = 0.62) was higher than for females (M = 3.83, SD = 0.52), this does not make a statistically significant difference at the 0.05 level. Therefore, gender does not seem to impact students' creativity.

5.0 Discussion

From the behavioural perspective, being creative is an intangible resource, and the ability to think creatively is a valuable and rare skill one should have. Drawing from the SCT, creative thinking in undergraduates might be affected by three factors: personal characteristics, interpersonal relationships, and innovativeness. It was found that these three main factors could explain 63.2% of the total variance in creative thinking.

The most important part of these three is personal characteristics, which make up a person. Sometimes, getting a clear sense of your abilities and personal traits inspires you to think creatively. Perhaps, students possessing a strong belief in what they can do are more willing to take more risks and explore, face new concepts, and keep going despite challenges, which are all key components of creative thinking. Furthermore, intrinsically motivated people spend more time on a task and create fresh and original ideas (Deci & Ryan, 2000). How someone interacts with creativity often relates to certain traits in their personality. Many studies have found that openness to experience and curiosity are linked to having creative abilities (McCrae & Costa, 1997). Thus, individuals who enjoy exploring uncertainty and new ideas are usually more creative.

Secondly, how well the students interact with others also plays a big role in creativity. These qualities become suitable for idea sharing and working with others. According to current findings, diverse contacts can inspire us to think creatively because they expose us to multiple outlooks and ways of living. According to Dhir and Vallabh (2025), encouraging the interaction between coworkers, either officially or unofficially, can support creativity and innovation. Sharing opinions may give rise to fresh approaches to issues among the students. Thus, the likelihood of creative ideas increases.

Lastly, this study did not support hypothesis 3. The low significance between innovativeness and creative thinking in students is possibly due to the clear difference between having an innovative mindset and carrying out creative tasks. Although people may be inspired to try new things, that does not always result in creative work in universities, since there are limited opportunities for innovation. Additionally, creativity means more than simply liking something new. It depends on the ability to change ideas, knowledge of the subject, and a helpful environment. A person might have many new ideas but may not be equipped with what they need or encouraged enough to implement them in practice.

The results of the independent sample t-test conclude that those studying at the degree level have a higher chance of creative thinking, probably owing to increased academic exposure and a higher degree of cognitive development. Perhaps, at a higher level of education, degree level as compared to diploma level, students are facing greater academic loads and heightened expectations. The level of assessments also necessitates a higher degree of creativity in learning and problem-solving. This might increase pressure and encourage them to think creatively and continuously develop fresh perspectives in navigating and solving tasks and assignments. Nonetheless, there is no difference between them based on gender. Gender is not a major factor affecting students' creative thinking. Much research has demonstrated that gender does not play a major role in shaping students' creativity. Male and female students, in general, have similar levels of creative performance in various school settings (Hashim et al., 2022; Mahama et al., 2022). Moreover, these authors claimed that it is more the environment such as schooling and parental support, that influences creativity, rather than gender. This means that encouraging everyone in the classroom can help every student become more creative without regard to gender.

6.0 Conclusion & Recommendations

In conclusion, the findings reveal the importance of encouraging higher education students to develop their creative thinking skills. These findings show that personal characteristics, such as how a person is and their relationships with others, are important for creative thinking. Even though creativity is an element that can be encouraged and taught via training and activities, should the person remain reserved and introverted, the creativity might not spark. Thus, it is important to adapt teaching methods to support the varying creative abilities of students at all learning levels, as was seen in this comparison between diploma and degree students. Given the rising need for creative solutions among professionals, higher education institutions must focus on training students to solve problems creatively.

For recommendations, lecturers and educators should think of some ways to boost creativity among higher education students in Malaysia. They should initiate group learning in their teaching, allow students to get feedback from one another, and provide mentoring opportunities. By doing this, students become more creative and feel supported by their classmates. At the same time, self-reflection is encouraged among university students to help them see their strengths and aspects that need improvement. Moreover, if students participate in project-based learning, it could help them build and practice their creativity and flexibility to face real company issues.

There are also several limitations that need to be highlighted in this research. First, the results of this study come from a small sample of students located in only one of the faculties on the campus. It prevents the generalizability of the findings. Second, the study does not address how aspects of academics or culture might impact the relationship between each variable. With collectivist cultures like Malaysia's, students may emphasize doing things the same way as others and achieving good grades, so creative thinking could primarily be shaped by culture (Lindqvist, 2003). Furthermore, the pressure to follow standard academic guidelines may restrict students' willingness to take creative risks, reducing the observable effect of innovativeness.

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Paper Contribution to Related Field of Study

This study offers a significant contribution to the field of student development in higher education. It helps to inform policy and practice regarding formulating actionable strategies for curriculum design, educators, and leaders of institutions who strive to develop a culture of creativity among potential future leaders.

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