

Factors Affecting Innovative Behaviours among Students in Public Higher Learning in the Southern Region in Malaysia [†]

Khairunnisa Rahman ¹, Mariam Setapa ^{2,*}, Nurdia Azlin Ghazali ³ , Norshahniza Sahari ¹
and Nur Haslina Ramli ²

- ¹ Faculty of Business and Management, Universiti Teknologi MARA, Johor Branch, Segamat Campus, Jalan Universiti Off Km. 12, Jalan Muar, Segamat 85000, Johor, Malaysia
- ² Faculty of Business and Management, Universiti Teknologi MARA, Kelantan Branch, Machang Campus, Bukit Ilmu, Machang 18500, Kelantan, Malaysia
- ³ Faculty of Computer and Mathematical Sciences, Universiti Teknologi MARA, Negeri Sembilan Branch, Seremban Campus, Persiaran Seremban Tiga/1, Seremban 3, Seremban 73000, Negeri Sembilan, Malaysia
- * Correspondence: maria135@uitm.edu.my
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Abstract: The purpose of this study is to investigate how undergraduate students perceive leadership competencies and their impact on innovative behaviour. A quantitative research approach was applied in this investigation. The study's results were validated using quantitative analysis. SPSS software was used to conduct the data analysis. Descriptive statistics were used to summarise the respondent's information. The independent t-test and analysis of variance (ANOVA) were used to compare the differences in the level of innovative behaviour based on demographic background. Besides, multiple linear regression was implemented to explore the relationship between students' leadership competency skills, cognitive development/critical analysis, interpersonal skills, and innovative behaviour. A total of 2156 students responded to an online survey; however, only 731 qualified. The respondents in this survey were undergraduate students who have held a position in any club or group on campus. The current study shows that cognitive development/critical analysis, interpersonal skills, and students' leadership competence skills all play a role in predicting student innovative behaviour. Student interpersonal skills are the most important factor influencing students' innovative behaviour. This study examined the effect of leadership skills on students' innovative behaviour. Additionally, this study examined undergraduate students who were active in any club or group on campus. This type of research has not been thoroughly studied, if at all, in academic circles.

Keywords: innovative behaviours; public higher learning students; cognitive development; interpersonal skills; leadership skill and competency



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1. Introduction

As society and the workplace continually evolve, higher education institutions are under pressure to adapt to new expectations. Undergraduates must be prepared for future professions; future workers must be taught how to fulfil job duties; and, ideally, new ideas that lead to innovation must be generated. People's jobs and lifestyles have evolved as a result of the Fourth Industrial Revolution, also known as Industry 4.0. Students in higher education must set a higher standard for creativity to solve these problems because they are future employees and an organisation's major success is built on innovative people. Because technological advancements have led to substantial labour market shifts, the technology that emerges in Industrial 4.0 has the potential to replace staff functions. As a result, it is vital to encourage students to engage in innovative behaviour.

Education institutions in particular can be seen as a microcosm of the trend of global industrialisation [1]. Every educational establishment is responsible for ensuring that its

students are prepared and capable enough to compete in the workforce. A business must innovate in education if it wants to produce qualified human resources [2]. Businesses must innovate if they want to maintain a competitive advantage in the modern market. Afsar et al. [3] states that businesses can employ innovation to gain a competitive advantage and succeed as an organisation. Student creativity is linked to economic performance and is viewed as a crucial ability for the twenty-first century [4].

In business, industry, entrepreneurship, and higher education, innovative behaviour has been recognised as a critical factor in long-term success [4–6]. However, in higher education, it is uncommon to hear certain students' creative behaviour. Higher education institutions must generate a workforce that is both creative and prepared to meet the challenges of the twenty-first century [7,8]. Numerous studies show that, because of the importance of education in the development of human innovative skills, higher education institutions alone will not be able to achieve these expectations [9]. According to a study, students' ability to participate in novel activities is underappreciated [10]. Particularly in higher education, educational systems have come under fire for failing to develop these professional knowledge requirements. As a result, developing new potential abilities is one of higher education's main objectives, especially for students.

Even though innovative behaviour is one of the most essential techniques to achieving academic and professional goals, research among students in educational settings is still limited [11]. According to Ailing et al. [12], universities also lack the instruments necessary to create innovative undergraduate capabilities. Innovative characteristics, leadership abilities, and competency all play a role in innovative behaviour. This gap provides the framework for this study to examine innovative behaviour among students in higher learning institutions because graduates are the university's output. There is a need to investigate innovative student behaviour in the Malaysian educational system.

The primary goal of this research is to look into the innovative behaviour of students at a public higher learning institution in Malaysia's southern region. As a result, the specific research objective of this study is to see if there are any disparities in levels of innovative behaviour based on demographics. Secondly, the objective to investigate the impact of various elements on innovative behaviour (leadership skill and competency, cognitive development/critical analysis, and interpersonal skill).

2. Literature Review and Hypotheses

This section will cover the dependent variable of innovative behaviour, and independent variables of student leadership skills and competencies, interpersonal skills, and cognitive development or critical analysis. The ability and desire of students to be creative are related to their innovative behaviour in this study. Students who can adapt to unexpected situations and ideas, accept opposing viewpoints and mistakes, experiment freely and take measured risks, and be open to innovation exhibit creativity [13]. Students can also apply what they have learnt to create fresh solutions and ideas. However, there is a dearth of studies on innovative behaviour and demographic traits. The purpose of this study is to determine whether there is a relationship between innovative behaviour and demographic traits. This statement leads to the following hypothesis.

Hypothesis 1. *There are differences in innovative behaviour based on demographic factors.*

For students to self-identify as prospective innovators in their field, Cusson [14] contends that they must possess conceptual competency in innovative behaviour. In order to better understand how students from different backgrounds make decisions and seize chances, a number of studies involving students from such backgrounds have been conducted. According to Binnawas et al. [15], students who participated in a club or organisation at school showed more confidence and drive; nevertheless, few studies on this group have looked at their innovative behaviour. The following hypothesis comes as a result of this statement.

Hypothesis 2. *There is a significant influence between students’ leadership competency skills and innovative behaviour.*

Many resources are required in higher education institutions, but human resources are a crucial resource for developing creative people. One action that can be taken with the aid of coaching, instruction, and training is interpersonal skills, which, according to Hogan and Warrenfelz, are competences and behaviours that entail direct communication, such as interacting with others and forming relationships [16]. According to Mariepazh [17], the range of interpersonal skills, which include a person’s ability to begin, create and maintain compassionate connections as well as fruitful ones also determines one’s capacity to do so. It is divided into four categories: “disclosing oneself and trusting others, accurately communicating with one another, resolving conflict and relationship issues in a healthy manner, and supporting and valuing variety”.

One of the elements that significantly influence a student’s innovative conduct in pursuing the goals of higher education is their interpersonal skills. According to the findings of research by Kanthasamy [16], their analysis revealed a positive association between interpersonal skills and behaviour, and according to Mahmudi [18], interpersonal skills, group integrity, and self-efficacy have direct beneficial influences on behaviour. This statement leads to the following hypothesis.

Hypothesis 3. *There is a significant influence between students’ interpersonal skill influence and innovative behaviour.*

This paper discusses critical thinking as the fundamental cognitive skill. To make the most informed decisions possible about what to believe and what to do, critical thinking is a process that activates specific cognitive skills, such as conceptualising, applying, analysing, synthesizing, and/or evaluating information that has been gathered from or generated by observation, experience, reflection, or communication [19]. By fusing its connections to adolescent development and its contributions to adolescents’ learning, welfare, and positive development, Sun and Hui [20] study cognitive competence as a construct for outstanding youth growth. It demonstrates how critical thinking may be transformed into self-regulated cognitive abilities that teenagers can master and use to accomplish tasks more effectively, come up with accurate answers to issues, and arrive at the best judgments. It is thought that developing critical thinking skills in children helps them learn for life and develop holistically, as well as preparing them to lead society in the future and address societal issues and advance humankind. This statement leads to the following hypothesis.

Hypothesis 4. *There is a significant influence between students’ cognitive development/critical analysis and innovative behaviour.*

The suggested conceptual framework for this inquiry is shown in Figure 1. Based on a detailed analysis of prior research, a conceptual framework is provided to recognise the linkages, as illustrated in Figure 1.

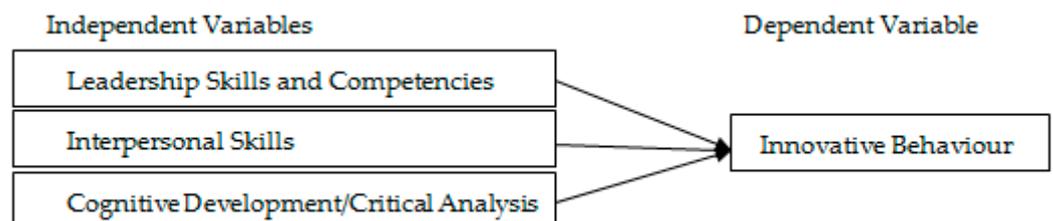


Figure 1. Research Framework.

3. Research Design

In this exploratory investigation, data and information were gathered using a questionnaire as the survey instrument. This study also used cross-sectional analysis; a type of observational study that looks at data from a population or a representative sample during a specific time period.

3.1. Sampling and Data Collection

Simple random sampling was used in this study. Each person was chosen completely at random, with each population member had an equal chance of being chosen. This study was conducted at three (3) different UiTM campuses: Campus Johor, Campus Melaka, and Campus Negeri Sembilan. The only two branches that UiTM Campus Johor has were in Segamat and Pasir Gudang. UiTM Campus Melaka has three branches: Alor Gajah, Lendu, and Bandaraya Melaka. Furthermore, there were three (3) UiTM Campus Negeri Sembilan branches situated in Seremban, Rembau, and Kuala Pilah.

As the focus of this study is on college students who held a position in any club or group on campus, the total number of students from the three campuses was 2156. The size of the sample from each campus was calculated using G-Power software [21], with a 95% confidence level and a 5% margin of error to calculate the precise number of respondents chosen. In detail, a total of 151 students from Johor Campuses answered the survey. Meanwhile, Melaka campuses stated 580 as the population and 232 as the sample; however, the total responses received were 264. The same scenario existed with Negeri Sembilan campuses, where the numbers were 1440 for the total of population and 304 for the sample; however, the actual responses were 316.

This survey had 731 individuals and the respondents were given three (3) weeks to answer the questions on the Google Form sheet. After receiving approval from the Ethics Committee, the Google Form sheet questionnaire was carefully designed, and the link to it was then shared with the responders on these three (3) campuses. A leader from each branch was chosen to oversee the responses and guarantee that the respondents provided reliable cooperation for this study.

3.2. Questionnaire Design

There were three (3) components to the questionnaire. The respondents' profiles were discussed in Part A, which included seven (7) questions regarding the respondents' campus, gender, age, education, cumulative grade point average (CGPA), race, and status in clubs or organisations. Part B, on the other hand, focused on the independent variable, which included three (3) components: interpersonal skills, cognitive growth/critical analysis, and leadership skills and competencies. Additionally, the dependent variable of innovative behaviour was the focus in Part C. The Likert scale, from 1 (strongly disagree) to 5 (strongly agree), was used in Parts B and C. The questionnaire utilised in this study was adapted by modifying the instrument to suit the study.

3.3. Data Analysis

This study used quantitative analysis to achieve the objectives. The data analysis was conducted using Statistical Package for Social Sciences (SPSS) Version 26 software (IBM Corp. Armonk, NY, USA). The descriptive statistics were analysed to summarise the information about the respondent. Next, a *t*-test and ANOVA test were carried out to compare the gender, campus, age, CGPA educational background, and position differences towards innovative behaviour. Multiple linear regression was implemented to explore the relationship between students' leadership competency skills, cognitive development/critical analysis, interpersonal skills, and innovative behaviour.

4. Results

4.1. Demographic

The results of descriptive statistics for 731 respondents are summarized in Table 1. About 316 respondents were from UiTM Negeri Sembilan (43.2%), 264 respondents were from UiTM Melaka (36.1%), and 151 respondents were from UiTM Johor (20.7%). The results show that 73.9% of the respondents were female and 26.1% were male. About 62.4% aged 18–20 years, 35.6% aged 21–23 years, and 2% were more than 23 years old. It can also be observed that 63.6% of the respondents had a diploma, while 36.5% had a degree. Looking at the CGPA, 47.3% of the respondents obtained a CGPA of 3.51 and above, and 44.5% obtained a CGPA of 3.01–3.50. For the position in the committee, 13.8% of the respondents were president, 7.5% were vice president, and 8.2% were secretary.

Table 1. Descriptive statistics of respondents’ demographic background.

Variable	Description	Frequency	Percentage
Campus	UiTM Negeri Sembilan	316	43.2
	UiTM Melaka	264	36.1
	UiTM Johor	151	20.7
Gender	Female	540	73.9
	Male	191	26.1
Age	18–20	456	62.4
	21–23	260	35.6
	24–26	14	1.9
	More than 26	1	0.4
Education Level	Degree	456	63.6
	Diploma	266	36.4
CGPA	2.50 and below	6	0.8
	2.51–3.00	51	7.0
	3.01–3.50	328	44.9
	3.51–4.00	346	47.3
Position	President	101	13.8
	Vice President	55	7.5
	Secretary	60	8.2
	Assistant Secretary	19	2.6
	Treasurer	39	5.3
	Assistant Treasurer	15	2.1
	Academic Unit	38	5.2
	Multimedia Unit	79	10.8
	Protocol Unit	26	3.6
	Community Unit	22	3.0
	Activity Unit	20	2.7
	Other	257	35.2

4.2. Questionnaire Reliability

Table 2 shows the Cronbach alpha coefficients as the reliability and internal consistency of Likert scale questions results for this study. It can be seen that all of the Cronbach’s alpha coefficients were more than 0.7, which suggests that the questionnaire is reliable.

Table 2. Reliability statistic for the questionnaire.

Variable	Cronbach’s Alpha
leadership skill and competency	0.886
cognitive development/critical analysis	0.787
interpersonal skill	0.914

4.3. Differences in Innovative Behaviour Based on Demographic Background

Table 3 summarizes the results based on the t-test and ANOVA test, respectively. The tests were conducted to assess the first hypothesis testing, which compared the significant difference between the demographic background of students (gender, campus, age, CGPA, educational background, and position) and innovative behaviour. The results show that there were no statistically significant differences between innovative behaviour and campus, age, and CGPA, as the *p*-value was more than 0.05. It can be said that innovative behaviours of students on the three campuses are generally the same. Moreover, the innovative behaviours of students on the different groups of age and CGPA are the same.

Table 3. Testing differences in innovative behaviour on demographic background using *t*-test and ANOVA.

Variable	Description	Mean Score Innovative Behaviour	<i>p</i> -Value
Gender	Female	32.92	0.030
	Male	33.88	
Education	Degree	33.7	0.041
	Diploma	32.87	
Campus	UiTM Negeri Sembilan	32.82	0.610
	UiTM Melaka	33.32	
	UiTM Johor	33.21	
Age	18–20	32.77	0.068
	21–23	33.86	
	24–26	33.07	
	More than 26	35	
CGPA	2.50 and below	28.5	0.075
	2.51–3.00	32.92	
	3.01–3.50	32.93	
	3.51–4.00	33.51	
	President	35	
Position	Vice President	34.16	0.000
	Secretary	33.12	
	Assistant Secretary	32.71	
	Treasurer	34.64	
	Assistant Treasurer	32.71	
	Academic Unit	32.08	
	Multimedia Unit	33.56	
	Protocol Unit	30.5	
	Community Unit	33.5	
Activity Unit	31.5		

Interestingly, there were statistically significant differences between innovative behaviour and gender (*p*-value = 0.030), as well as education level (0.041) and position (0.000). This implies that the innovative behaviours of male and female students are different. Besides that, the innovative behaviours of students are different if the students have different education levels and positions in a committee.

4.4. Relationship between Innovative Behaviour and Independent Variables

The strength of the association between creative behaviour and the four independent variables is determined by the Pearson correlation coefficient. Table 4 displays the Pearson correlation coefficient between independent variables and innovative behaviour. It is clear that there is a significant correlation between independent variables and innovative behaviour because all of the independent variables' *p*-values were less than 0.05. According to the correlation coefficient, there is a substantial association between interpersonal skill influence and innovative behaviour. One can also observe a moderate correlation between students' leadership skill and competency and cognitive factor development/critical analysis and dependent variable (innovative behaviour).

Table 4. Pearson’s correlation coefficients of independents variables and innovative behaviour.

Independent Variable	Pearson’s Correlation	p-Value	Relationship Strength
leadership skill and competency	0.643	0.000	Moderate
cognitive development/critical analysis	0.617	0.000	Moderate
interpersonal skill influence	0.707	0.000	Strong

4.5. Factors Influencing Innovative Behaviour

From Table 5, 54.2% of the total variation in measuring the factors influencing innovative behaviour can be explained by students’ leadership skill and competency, cognitive development/critical analysis, and interpersonal skill, while other factors explain 45.8%.

Table 5. Goodness of fit test results of the model.

R Square	Adjusted R Square
0.542	0.540

Table 6 shows the ANOVA results; the F-statistic was 286.226 and the critical value for F3, 727 at a p-value of 0.05 was 2.60. Thus, this suggested that the three independent variables in the model are significantly predictive of the dependent variable.

Table 6. ANOVA test results for the significance of the model.

Model	Sum of Squares	Degree of Freedom	Mean Square	F	Sig.
Regression	11,007.123	3	3669.041	286.226	0.000
Residual	9319.181	727	12.819		

4.6. Testing the Significance Factors Influencing Innovative Behaviour

This study examines the impact of individual independent variables (students’ leadership skill and competency, cognitive development/critical analysis, and interpersonal skill) on the dependent variable (innovative behaviour) in order to test the second, third, and fourth hypotheses. Table 7 shows the results of multiple linear regression. From the results, it can be concluded that all three factors significantly influenced creative behaviour as the p-value was less than 0.05. The absolute value of β indicates the order of importance of the independent variable. Looking at the coefficients of each independent variable, interpersonal skill influence was the most influential factor in students’ innovative behaviour.

Table 7. Factors influencing innovative behaviour.

Factors	β	t	p-Value
constant	5.173	5.119	0.000
leadership skills and competencies	0.275	5.926	0.000
cognitive development/critical analysis	0.313	3.334	0.001
interpersonal skill influence	0.361	10.620	0.000

The regression equation of the model for this study can be written as follows:

$$y = 5.173 + 0.275x_1 + 0.313x_2 + 0.361x_3 \tag{1}$$

where y is the value of innovative behaviour, x₁ is leadership competency skill, x₂ is cognitive development/critical analysis, and x₃ is interpersonal skill influence.

5. Discussion

The current study demonstrates that interpersonal skills, student leadership competence skills, and cognitive factor development/critical analysis strongly predict students' innovative behaviour. Students with strong interpersonal skills offer fresh perspectives on novel thoughts, opinions, and ideas to increase the potential for innovation. For students to adapt to the shifting demands of the labour market and to develop their leadership qualities, they must possess abilities such as teamwork, public speaking, problem-solving, decision-making, and other technical skills [22].

Ali [23] found that three personality traits of agreeableness, extraversion, and openness to experience are positively connected with phases of innovative behaviour in the formulation and advancement of ideas. The Big Five Personality result indicates that students with more competitive and positive interpersonal skills are welcomed in the job market. Although the majority of college students lack these skills, many businesses assert that interpersonal skills like oral communication are crucial when evaluating staff, especially potential new workers [24].

According to this study, a student's innovative behaviour differs depending on their gender, educational attainment, and position within a committee. The study's findings support the notion that a student's capacity for critical thought and factor development will have a favourable impact on their capacity for innovation. The influence of cognitive abilities in human learning activities will only be accurately portrayed in a learning environment by adding particular cognitive skills in the context of exploration, as learning activities entail a variety of unique abilities and operate together in unforeseen ways [25].

Student interpersonal relationships is the factor that has the biggest impact on students' innovative behaviour. The study's findings show that having strong interpersonal trust has a good effect on a student's innovative behaviour. More proactive and daring behaviour can be displayed by individuals (and organisations), which can encourage innovative behaviour [26,27].

6. Conclusions

This study investigated the relationship between student leadership competency and innovative behaviour through the construction and testing of a model. The undergraduate students at the centre of this study are those whose perceptions of their capacity for innovation influence those of their degree of competence. Before making generalisation about other groups, it is essential to understand and respect individual distinctions. The data were only gathered from Universiti Teknologi MARA in the southern region, because this study focused solely on undergraduate students there. To create a better generalisation, more research can be conducted to increase the sampling size across all sites. Additionally, this study advised that it is conducted in a variety of campuses, including research universities and private universities. To have a more comprehensive understanding of innovative behaviour, future studies should incorporate moderator or mediator variables. The focus of the current study was on students' innovative behaviour as it relates to leadership competencies. Finally, it is recommended that students be given access to a specific leadership development programme in order to enhance their leadership skills.

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