

# Critical Thinking Level among Nursing Students of Faculty of Medicine UKM

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## ABSTRAK

Pemikiran kritis memainkan peranan penting dalam membuat keputusan dan melaksanakan tugas harian termasuk mencari, mendapatkan, menilai, menganalisis, mensintesis dan mengkonseptualisasikan maklumat. Kajian ini bertujuan untuk mengenal pasti dan membandingkan tahap pemikiran kritis dalam kalangan pelajar kejururawatan di Fakulti Perubatan UKM berdasarkan aspek analisis sistematik, pemikiran dalam dan luar kotak. Kajian ini merupakan kajian secara keratan rentas yang menggunakan soal selidik dalam talian melalui Google Form mengenai tahap pemikiran kritis dan domain. Terdapat 115 pelajar kejururawatan di Fakulti Perubatan UKM terdiri daripada Tahun 1 (34.9%), Tahun 2 (26.1%), Tahun 3 (16.5%) dan Tahun 4 (23.5%). Hasil kajian menunjukkan tahap keseluruhan pemikiran kritis berada pada tahap sederhana ( $\text{min}=3.815$ ,  $\text{s.d}=0.431$ ) dengan domain analisis sistematik berada pada tahap pertengahan ( $\text{min}=4.027$ ,  $\text{s.d}=0.522$ ), domain berfikir dalam kotak pada tahap rendah ( $\text{min}=2.547$ ,  $\text{s.d}=0.688$ ) dan domain berfikir di luar kotak berada pada tahap pertengahan ( $\text{min}=4.181$ ,  $\text{s.d}=0.600$ ). Analisis lanjut menunjukkan terdapat perbezaan yang signifikan antara pelajar Tahun 2 dan Tahun 3 serta Tahun 3 dan Tahun 4 dalam domain berfikir di luar kotak ( $p=0.006$ ). Ini menunjukkan bahawa kemahiran berfikir kritis dalam kalangan pelajar kejururawatan adalah tahap sederhana.

**Kata kunci:** Analisis sistematik; pemikiran kritis; pelajar kejururawatan

## ABSTRACT

Critical thinking plays an important role in decision-making and implementing

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daily tasks which includes searching, obtaining, evaluating, analysing, synthesising and conceptualising information. The aim of this study was to identify and compare the level of critical thinking among nursing students in Faculty of Medicine UKM based on systematic analysis, thinking in and out of the box domains. This was a cross-sectional study that utilised a self-administered Google Form online questionnaire on the level of critical thinking levels and domains. There were 115 nursing students in the Faculty of Medicine, UKM comprising of Year 1 (34.9%), Year 2 (26.1%), Year 3 (16.5%) and Year 4 (23.5%). The result showed that overall level of critical thinking was at intermediate level (mean=3.815, s.d=0.431) with systematic analysis domain was at intermediate level (mean=4.027, s.d=0.522), thinking in the box domain at low level (mean=2.547, s.d=0.688) and thinking out of the box domain was at intermediate level (mean=4.181, s.d=0.600). Further analysis showed that there was significant difference between students Year 2 with Year 3 and Year 3 with Year 4 in thinking out of the box domain ( $p=0.006$ ). It was shown that critical thinking skills among nursing students were intermediate level.

Keywords: Critical thinking; nursing students; systematic analysis

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## INTRODUCTION

Critical thinking plays an important role in decision making and implementing daily tasks. Critical thinking is a process that includes searching, obtaining, evaluating, analysing, synthesising and conceptualising information (Özkahraman et al. 2011). Critical thinking skill is one of the aspects that has been focused on in the education system of Malaysia since the 1990's where the Ministry of Education has recommended the use of critical thinking as a way and a part of the basic skills required in obtaining information and learning specific subjects (Fadhullah & Ahmad 2017). Critical thinking consists of mental activity through analysing, synthesising, and valuating (Bloom 1956). According to Fero et al. (2010), critical thinking acts as a rational

thinking and reflects on the decision made. Here, critical thinking acts as reflective thinking which focuses on beliefs and what needs to be done. Hence, critical thinking can be adapted in various aspects of thinking such as higher order thinking, problem solving and meta cognition.

Accountability in the medical sector has shifted through lots of changes and this has made a huge impact in the clinical sector where nurses are recognised as being more essential and given more tasks and responsibility (Carter et al. 2016). The increasing roles and expectations of a nurse require one to have a higher knowledge and able to apply their knowledge safely and effectively in nursing interventions (Birks et al. 2018). Nowadays, there are an increase in advancement of technology used in providing medical services where the

increase in population, complexity of patients and increasing complexity of medical treatments are becoming issues (Safford 2015).

The advancement of health technology in the future requires the roles of nurses in providing healthcare services to be reviewed and redefined (Feringa et al. 2018). All the factors that have been stated above are influencing the medical cost and will be able to reduce patient's time in the hospital (Simpson & Courtney 2002). Therefore, it is vital that nurses are equipped with high critical thinking skills and function as part of a complex multidisciplinary team. In the advancing healthcare environment, nursing students are faced with difficulties in making decisions (Papathanasiou et al. 2014). Failure to resolve this issue by giving emphasis in expanding critical thinking skills into nursing students might affect the efficiency of the services as well as the safety of care given to patients. Based on the literature studies, critical thinking is a skill needed to be acquired by nurses involved in providing patients' care where they will need to evaluate and interpret patients' needs and being able to make the right decisions. Without this skill, a nurse will not be able to function effectively (Pitt et al. 2015).

In the process of clinical decision making, nurses need to have good critical thinking skill (Heidari et al. 2016), which is crucial process towards a safe, efficient and skilful intervention. Critical thinking plays an essential part in decision making, which will affect the results of the patient's health. Critical thinking is crucial in the nursing

sector as it helps in decision making, identifying problems and solving them as well as applying the most suitable method. By training and experience, nurses will be able to execute their critical thinking skills in making the right decisions as care takers. This will also enable nurses to plan ahead before doing any tasks and interventions. A feeble critical thinking skill will fail to detect patient's deterioration. This in turn might impede patient's care.

Critical thinking is a specific skill required by nurses in handling and implementing their role and taking care effectively (Wilgis et al. 2008). Critical thinking is a process in which a nurse uses proper steps such as evaluating, diagnosing, planning, implementing, and analysing patient's health issues as well as listing interventions based on priority to solve clinical dilemmas (Lin et al. 2015).

Several studies have emphasised the needs to prioritise critical thinking in their nursing curriculum (LaMartina et al. 2014; Simpson 2002). Study related to critical thinking level among nursing student had been done and the results showed that the level was average (El-Hessewi et al. 2007). A study showed that Asian students have lower critical thinking skills compared to non-Asian students (Salsali et al. 2013). Students have been practicing memorising method in nursing care, procedures, and care plan without any complex thinking. On the other hand, critical thinking is required to actively process, reading and understanding, choosing and evaluating complex issues and non-critical on a daily basis before any action is taken for the sake of the

patients. According to Rezaei et al. (2015) the level of critical thinking skills among Malaysian student is below average. The below average level of critical thinking among nurses and the ability to make effective clinical decisions demand efforts to improve and enhance their skills through proper education planning and continuous education program (Nibbelink & Brewer 2018).

Critical thinking in a systematic analysis is an approach or process of thinking structured, organised and logical in solving a problem or analysing situation. This process involves systematic steps in identifying the information, gather information, check and evaluate the information in term of their relevance so as to be able to produce better and effective understanding among the nurses. Generally, analysis and synthesis are processes where the disclosure of the information that has been collected and the evaluation has taken place. Thinking inside the box is an approach where there are limitations to the issues. This way of thinking is inclined in following existing norms, rules or paradigms without exploring creative alternative solutions. By thinking inside the box, it symbolises a person defending and not involving creative thinking, not taking any risks or exploration of new things. On the other hand, to think outside the box, it is an innovative, creative approach or out of bounds in producing solutions. This type of thinking process involves someone looks for a solution unexpected in defending existing ideas, breaking paradigms as well

taking a new approach towards the solutions. Thinking outside the box is also considered important to stimulate creativity, innovation and effective problem solving.

With references to the above, it is very significant to evaluate the level of critical thinking ability among the nursing students. The outcomes of this research would provide invaluable information regarding the level of teaching and learning in producing nurses with high level of critical thinking ability and in turn leads to improvement of the nursing curriculum. Therefore, this research is to identify the level of critical thinking in systematic analysis aspect, thinking out of the box as well as identifying whether the levels are comparable among nursing students in Faculty of Medicine Universiti Kebangsaan Malaysia (UKM) based on the year of study.

## MATERIALS AND METHODS

This cross-sectional survey research consisted of quantitative research approach using self-administered questionnaire which included students from Years 1, 2, 3, and 4 from the Department of Nursing, Faculty of Medicine UKM. Research framework in this study was based on critical thinking concept which consisted of three main constructs which were systematic analysis, thinking within the box and thinking outside the box (Ludin 2018). This research framework was as pictured in Figure 1.

This research population consisted of students from nursing program in

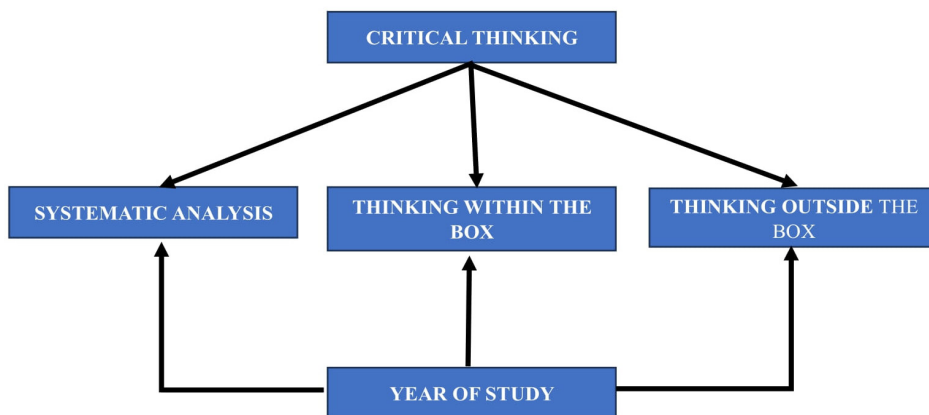


FIGURE 1: Research framework

the Faculty of Medicine UKM. The study focused on students from the Years 1, 2, 3 and 4 in the 2022/2023 session. In context of this research, the sample size was determined based on determination size formula by Krejcie et al. (1970) and the minimum sample size obtained was 97 based on the total number of nursing students of 130 students.

This study adopted a validated questionnaire constructed by Ludin (2018). The questionnaire consisted of Part A and Part B. Part A consisted of one item, namely for obtaining information on year of study of the respondents while Part B consisted of questions on critical thinking which contained three constructs i.e. (i) systematic analysis (5 items), (ii) thinking within the box (8 items) and (iii) thinking outside the box (5 items). This questionnaire used a 6-points Likert scale ranging from “Strongly disagree” to “Strongly agree”. A mean score of 1.00 to 2.67 showed that the level of critical thinking of nursing students was at a low level, a mean score of 2.68 to 4.33 was at

a moderate level, while a mean score of 4.34 to 6.00 showed that the level of critical thinking of nursing students was at a high level (Ahmad 2002).

Data collection for this research was done using Google Form, where the link was distributed through WhatsApp starting from the 9<sup>th</sup> of February 2023 till 20<sup>th</sup> February 2023. Data was analysed using IBM SPSS Statistics version 24.0. Two types of statistical analysis were used in data analysis which were (i) descriptive statistics using mean and standard deviation used to identify critical thinking level among nursing students and (ii) Kruskal-Wallis analysis of variance (ANOVA) used to identify if there was any significant difference in the levels of critical thinking namely systematic analysis, thinking within and outside the box domains among nursing students based on their years of study.

## RESULTS

This study involved 115 nursing students of Faculty of Medicine UKM

comprising of students from Year 1 until Year 4 for the 2022/2023 academic year. A complete respondent profile for this research is shown in Table 1.

TABLE 1: Research respondent profile

Respondents Background	Frequency	Percentage
Year of Study		
Year One	39	33.9
Year Two	30	26.1
Year Three	19	16.5
Year Four	27	23.5
Total	115	100.0

Based on Table 2, the overall level of critical thinking among nursing students of Faculty of Medicine UKM was at intermediate level (mean=3.815; s.d.=0.431). A more detailed analysis for every aspect in critical thinking constructs showed that the systematic analysis aspect was at intermediate level (mean=4.207; s.d.=0.522);

thinking within the box was at low level (mean=2.547; s.d.=0.688); while thinking outside the box construct was at intermediate level (mean=4.181; s.d.=0.600).

A normality testing using the Shapiro-Wilk test showed a significant departure from normality for overall level of critical thinking among nurses ( $W(115)=0.800$ ,  $p<0.001$ ). Based on Table 3, using the Kruskal-Wallis ANOVA test, there was no significant difference on the overall level of critical thinking among nursing students based on the year of study ( $\chi^2(3)=4.75$ ,  $p=0.191$ ). This indicated that the level of critical thinking among nursing students was on intermediate level (Year 1 mean=3.763  $\pm$  0.392; Year 2 mean=3.822  $\pm$  0.490; Year 3 mean=3.739  $\pm$  0.394; Year 4 mean=3.934  $\pm$  0.435).

Based on Table 4, using the Kruskal-Wallis ANOVA test, there was no significant difference on the

TABLE 2: Mean score, standard deviation and the level of critical thinking among nursing students

No	Critical Thinking Constructs	Mean	s.d	Level
1.	Systematic Analysis	4.027	0.522	Intermediate
2.	Thinking within the box	2.547	0.688	Low
3.	Thinking outside the box	4.181	0.600	Intermediate
	Overall critical thinking level	3.815	0.431	Intermediate

Note: (mean score 1.00-2.67: Low; mean score 2.68-4.33: Intermediate ; mean score 4.34-6.00: High)

TABLE 3: Kruskal-Wallis ANOVA test comparison of overall critical thinking level based on year of study

Year of Study	n	Mean	s.d.	$\chi^2$ -value	p value
Year 1	39	3.763	0.392	4.75	0.191
Year 2	30	3.822	0.490		
Year 3	19	3.739	0.394		
Year 4	27	3.934	0.435		

TABLE 4: Kruskal-Wallis ANOVA test comparison of critical thinking level from systematic analysis construct based on the year of study

Year of Study	n	mean	s.d.	$\chi^2$ -value	p value
Year 1	39	3.969	0.599	0.530	0.912
Year 2	30	4.040	0.549		
Year 3	19	4.021	0.388		
Year 4	27	4.103	0.465		

critical thinking level from systematic analysis construct among nursing students based on their year of study ( $\chi^2(3)=0.530$ ;  $p=0.912$ ). This showed that the levels of critical thinking from systematic analysis construct among nursing students based on their year of study were all at intermediate level (Year 1 mean= $3.969 \pm 0.599$ ; Year 2 mean= $4.040 \pm 0.549$ ; Year 3 mean= $4.021 \pm 0.388$ ; Year 4 mean= $4.103 \pm 0.465$ ).

Based on Table 5, using the Kruskal-Wallis ANOVA test, there was no significant differences on the critical

thinking level from thinking within the box construct among nursing students based on their year of study ( $\chi^2(3)=1.63$ ,  $p=0.652$ ). This showed that the levels of critical thinking from thinking within the box construct among nursing students based on their year of study were all at low level (Year 1 mean= $2.557 \pm 0.530$ ; Year 2 mean= $2.662 \pm 0.847$ ; Year 3 mean= $2.532 \pm 0.738$ ; Year 4 mean= $2.412 \pm 0.671$ ).

Based on Table 6, using the Kruskal-Wallis ANOVA test, there was a significant difference on the level of

TABLE 5: Kruskal-Wallis ANOVA test result for the comparison of critical thinking level from thinking within the box construct based on the year of study

Year of Study	n	mean	s.d.	$\chi^2$ -value	p value
Year 1	39	2.557	0.530	1.63	0.652
Year 2	30	2.662	0.847		
Year 3	19	2.532	0.738		
Year 4	27	2.412	0.671		

TABLE 6: Kruskal-Wallis ANOVA test comparison on critical thinking based on thinking outside the box construct based on the year of study

Year of Study	n	mean	s.d.	$\chi^2$ -value	p value
Year 1	39	4.071	0.803	12.48	0.006*
Year 2	30	4.380	0.390		
Year 3	19	3.894	0.423		
Year 4	27	4.318	0.444		

\*significant at  $p<0.05$   
 Post-hoc Dunn's test, =0.0083

critical thinking from the thinking outside the box construct among nursing students based on their year of study ( $\chi^2(3)=12.48, p=0.006$ ). This showed that there was significant difference of the level of critical thinking on the thinking outside the box construct based on year of study. The Post-Hoc Dunn's test using a Bonferroni corrected alpha of 0.0083 indicated that the mean ranks of the following pairs were significantly different which were Year 2 with Year 3 and Year 3 with Year 4.

## DISCUSSION

This research identified that as a whole, the level of critical thinking among nursing student of the Faculty of Medicine of UKM was at intermediate level. Through detailed analyses on every construct of critical thinking, researchers found out that the level of critical thinking in systematic analysis and thinking outside the box constructs were at intermediate level, and the thinking inside the box construct was at low level. Nursing students of Faculty of Medicine UKM were found to have systematic analysis skills at intermediate level related to logical thinking, problem solving, ability to manage ideas, self-appreciation as someone who is having a comprehensive and accurate thinking, ability to objectively analyse problems and the point of reference by colleagues in decision making. Systematic analysis in thinking was an important aspect according to Lin et al. (2015).

Nurses need to utilise systematic

analysis steps in nursing process namely assessment, diagnosis, planning, execution and evaluation to enable them to analyse patient's health issues and list down intervention according to priorities in order to solve clinical dilemmas. This is to ensure effective treatment is given with high standards and having the ability to make quality decisions (Benner et al. 2008).

Based on the descriptive analysis, the level of critical thinking on the thinking outside the box construct was at intermediate level. The nursing students of the Faculty of Medicine UKM were found to be at intermediate level of thinking outside the box in relation to having the desire to gain more knowledge, ability to understand other people's ideas, anticipating challenges in patient care and the passion to solve difficult cases.

However, the nursing students of Faculty of Medicine UKM have been found to have intermediate levels of thinking outside the box skills in relation to the desire to learn how to solve problems. Thinking outside the box is the way of thinking out of the ordinary, challenges the traditional way and taking oneself out of their comfort zone. It requires creative thinking, looking at things from another point of view, out of the status quo. The ability to think outside the box is not easily obtained, however, if a person is able to master this skill it will be a big advantage for an individual or organisation. Thinking outside the box is to enable workers to use their creativity or applying unique approaches in solving problems or dealing with any issues in an organisation. Thinking outside the



box in nursing is crucial as it requires logical thinking and think of nursing issues which normally have more than one solution, and to take the right actions in various circumstances.

This study also showed that the level of critical thinking on thinking within the box construct is low. Thinking within the box means that a person is thinking within certain limits, which in turn prevents the person to think critically. The low level of thinking within the box among nursing students in this study sends a positive sign that the nursing students have the ability to think and act out of the ordinary and not attached to a certain status quo or limitation.

The overall comparison on the critical thinking level from the aspect of systematic analysis and thinking within the box showed a similar trend which was no significant difference based on the year of study. There was a significant difference from the thinking outside of the box construct. However, it only involved the students of Year 2 with Year 3 and Year 3 with Year 4. There was no significant difference on the critical thinking level on the thinking outside the box construct between students of other years of study. The study clearly showed that the level of critical thinking was flat across the years. In other words, there were no increment on the level of critical thinking among Year 1 students when they first started until the end of their study in Year 4.

Indeed, the nursing course involves the process of learning theories and clinical learning to produce professional nurses with emphasis on

three main domains namely cognitive, affective and psychomotor. Nurses in training need to learn the management of patients in various situations by approaches such as classroom lessons, laboratory and clinical training (Dinmohammadi et al. 2016). The emphasis on critical thinking must be done to produce nurses who are able to make decisions and act accordingly in different circumstances including emergencies. Strategies and learning approaches need to be updated and managed well (Jeppesen et al. 2017).

Although a validated critical thinking questionnaire was used, it was a self-reported online Google Form questionnaire where data was collected based on participants' perception potential which predisposed to response bias and social-desirability bias. The study involved data evaluation from a single institution which did not represent the diversity of nursing students in Malaysia thus generalisation on conclusions had to be made with caution. Further studies comprising nursing students from other medical schools in Malaysia have to be conducted for a holistic picture of their resilience level. Lastly, this study was a cross-sectional study where casual interferences could not be inferred.

This study showed that there was no increase in the levels of critical thinking among nursing students from Year 1 until Year 4. Therefore, it was highly recommended in the future to conduct a study looking at the causality and effectiveness related to improving the level of critical thinking among nursing students. Apart from that, a review of the curriculum especially

the element of critical thinking, to give more emphasis on the teaching method not only in the understanding of the concept but to also stimulate the thinking process among the students are needed. With this improvement, it is hoped that every nursing student will be able to improve their critical thinking skill.

## CONCLUSION

From this study, it can be summarised that the overall level of critical thinking in nursing students of the Faculty of Medicine UKM was at intermediate level and there was no significant difference on the level of critical thinking among nursing students based on their year of study.

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