The choices of thinking tools among UTeM students

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ABSTRACT – This article meant to investigate the choices of thinking tools among UTeM students. Each group were given an assignment to write one out of seven thinking tools taught in the class. The thinking tools are Brainstorming, Mind Map, SCAMPER, 6 Thinking Hat, SWOT, CPSP and Design Thinking. This is quantitative research wherein data taken from the choices of 30 groups. The courses involved are BITS from FTMK, BENG from FKE and BMFG from FKP. Each course has 10 groups and there will be 30 groups to choose one thinking tool that they prefer the best tool for their learning purposes. This research is important because it will explore the preference of thinking tools among students. Thus, they can use the most suitable thinking tools for their learning purposes. The finding shows that each course from different faculties had different preference of thinking tools. Then, the lecturer can use the similar preference thinking tools as their part of teaching for better learning approach. There is not wrong or right in whatever choice taken by the students because what is more important whether it is suitable for them in developing their creative and critical thinking.

1. INTRODUCTION

Thinking tools are important because the student can use it for evaluating, analyzing and decision making [1]. Thinking tools help students to measure complex skill such as critical thinking, creativity and collaborative problem solving. By applying these tools, the students are developing the designing and the assessment skills. The subject of Creative and Critical Thinking offered for all students of UTeM, enable them to learn diversity of thinking tools, to understand the differences and to choose which is the best tool for them not only for study purposes but for everyday life. Studying the role of thinking tools is crucial to students because these types of tools can bring an extra added value of assessment skills among them.

There are seven thinking tools presented in the subject of Creative and Critical Thinking. They are Brainstorming, Mind-map, SCAMPER, 6 Thinking Hat, SWOT, CPSP and Design Thinking. The subject is offered to all students because critical thinking can help them to have a reasonable reflective thinking when deciding what to believe or do as defined by Ennis [2]. Then, critical thinking is very important for student because it help student to be competent and interdependent in evaluating the credibility of sources; in analyzing the quality of arguments; in making inferences using reasoning and making decision or solving problem as defined by Lai and Viering [3].

In short, thinking tools are important because it enhance the students' critical thinking especially when they have to deal with situation relates to comparative analysis, categorization, reasoning, determining the authenticity, creating, or designing analogy and metaphor; and decision making.

2. LITERATURE REVIEW

There are a lot of thinking tools available in this world from A-Z letters. Student may choose from Active Listening, a thinking tool that provide an instructional skill where students learn the correct way of listening; to Y Chart thinking tool where student learn how to do a cooperative learning strategy when discussing a multifaceted issue. However, the thinking tools included in the subject of Creative and Critical Thinking offered at UTeM are seven. They are Brainstorming, Mind Map, SCAMPER, 6 Thinking Hat, SWOT, CPSP and Design Thinking.

Why Brainstorming? This thinking tool is one of the most essential approaches in triggering creativity and solving problems in the educational, commercial, industrial, and political fields. AlMutairi [4] mentioned that brainstorming requires the use of brain to reach the active problem solving. Meanwhile the brainstorming session will pursue students to cultivate creative solutions to any problems arise. Creative thinking is recognized as a composite intellectual activity trying to direct a powerful aspiration to look for solutions or getting original solutions that were not founded before [4].

Meanwhile, mind map, which was established by Tony Buzan as a note-taking practice, is an application which has the supremacy in detecting the types of thoughts since brain has two lobes with different function. Using mind map will stimulate the right and left lobes of the brain to compose a direct thought. It is understood that mind maps have advantages such as remembering, upgrading the inventiveness, deciphering problem, concentrating on a subject, and coordinating the thoughts. It is believed that mind maps have a valuable position as a lifetime learning tool these days when constructivist tactic is utilized as foundation during learning-teaching process [5].

Next thinking tool is SCAMPER, believed as an appropriate technique to cultivate creative thinking skills. SCAMPER method was favored, firstly because it fundamentally intends to generate numerous viewpoints. Secondly, SCAMPER is a good choice to teach creative literature. Lastly, SCAMPER offers an entertaining atmosphere for student to trigger creative thinking [6].

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Next acronym thinking tool is SWOT. It stands for Strengths, Weaknesses, Opportunities, and Threats. It is a technique to assess these four aspects in any matter of business. SWOT is useful in analyzing the most of what had accomplished and the best benefit by any organization. It also able to decrease the prospects of any disaster, by identifying what is has been missed, and eradicating the oblivious risks [7].

Design thinking is commonly identified as an analytical and innovative process that connects an individual an opportunity to do experiment, to create; and to test prototype models, to assemble response; and to restructure the model [8]. Design thinking has grown into an essential part for the field of design and engineering as well as business. It can create a constructive impact on 21st century education throughout disciplines because it encompasses creative thinking in generating problem resolutions [9]. Thus, in order to help students to succeed in this interrelated, digital realm where people live in, educators could provide students an emerging 21st-century skills (e.g., design thinking, systems thinking, and teamwork skills) to improve their problem solving skills and to foster their ability to complement for institution and profession [10].

Table 1 Thinking tool choices

TYPES OF THINKING TOOLS	THE CHOICE OF TOOLS OF THINKING
1- BRAINSTORMING	0
2- MIND MAP	13
3- SCAMPER	2
4- 6 THINKING HAT	7
5- SWOT	6
6- CPSP	1
7- DESIGN THINKING	1
Total Numbers of Group/Choices	**30**

Next famous thinking tool is the Six Thinking Hats by Edward de Bono. He promotes this skill as more effective creative thinking and decision making. White Hat Thinking asks for information well-known or required. Yellow Hat Thinking discovers the positives and search for benefit and value. Black Hat Thinking is judgment on why something may not work. Spot the obstacles and hazards. It signifies think of negative, or vigilance. The expectation is that the black hat role will stop people from making blunders. Red Hat Thinking connotes emotions, instincts, and insight. When using this hat, people can communicate feelings and sentiments and share anxieties, likes, dislikes, loves, and hates. Green Hat Thinking is an opening to convey new ideas and new insights. Blue Hat Thinking is the control mechanism that make sure the standards of all the Six Thinking Hats are observed. It deals with managing the thinking process [11].

3. DATA ANALYSIS

Descriptive analytics is a statistical approach that is employed to explore and encapsulate chronological data to discover patterns or connotation. This is a reflective assessment of novice figures and to deliver comprehension into historical forms of behaviors and accomplishment in online learning settings. One of the major advantages of descriptive analysis is its high level of impartiality and objectivity of the researcher [12]. Descriptive analysis is believed to be extensive than other quantitative methods and it provides a bigger picture of an event or phenomenon. Descriptive Analysis can use sizable number of variables or even a single number of variables to carry out a descriptive analysis.

This research includes three faculty programs which are BITS from Faculty of Information Technology and Communication, BENG from Engineering Faculty of Electric and lastly BMFG from the Engineering Faculty of Manufacturing. Each program contains 10 groups which means that 30 group need to choose one thinking tool out of seven as their preference for the topic of group assignment. This research aims to find what is their selections and try to figure out the reason of their preference.

3.0. Data Analysis

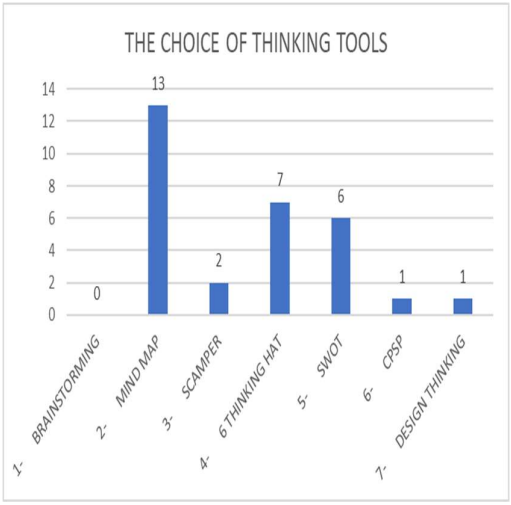

Figure 1 Overall analysis

Overall, out of 30 groups there are 13 clusters prefer mind map over other thinking tools. Followed by 7 groups picked 6 Thinking Hat. Meanwhile, 6 groups preferred SWOT Only 2 groups selected SCAMPER and the rest; each group opted CPSP and Design Thinking. The decision to favor Mind Map probably due to its exciting concept skill that easily understood, learned, and applied. Moreover, it involves colors and art when branching out points and information for better remembrance. The second favorite, 6 thinking hats is a very interesting skill and is very enjoyable if done in a physical classroom. The least favorite tool of thinking such as CPSP and Design Thinking could be due to its complexity to learn, to understand and to practice. It is surprising that brainstorming has zero taken.

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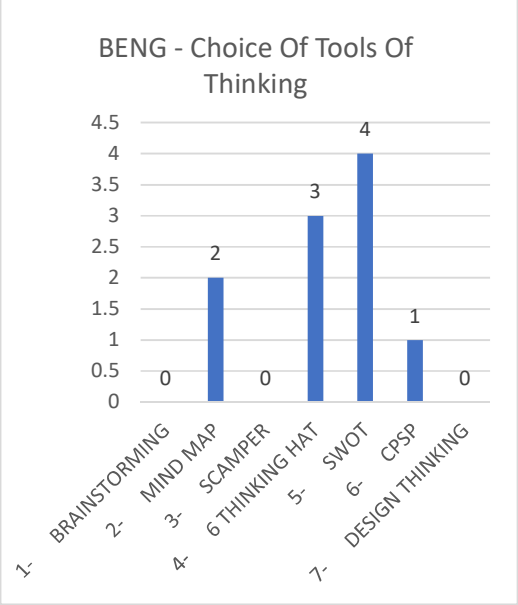

Figure 2: Program from Faculty of Electrical Engineering

It is found out that 4 groups from this faculty love SWOT and 3 groups prefer 6 thinking hats. Two groups opted mind map and only one group chose CPSP. No group chose Brainstorming or Design thinking. Their option on SWOT, Mind map and 6 thinking hats could be due to its suitability with their nature of learning in the faculty.

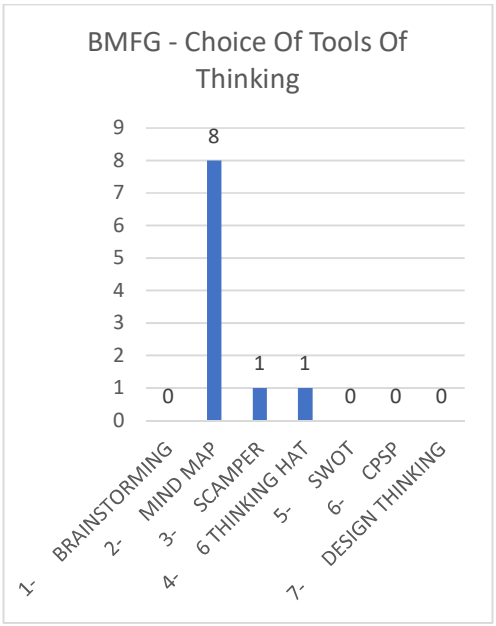

Figure 3: Program from Faculty of Manufacturing Engineering

In this faculty, majority of groups which is 8 opted mind maps. The other two groups, each of them chose SCAMPER and 6 Thinking Hat. Other thinking tools not taken at all. It might show that mind map is the best tool for this faculty for teaching and learning. Mind map could be the most suitable learning tool for students.

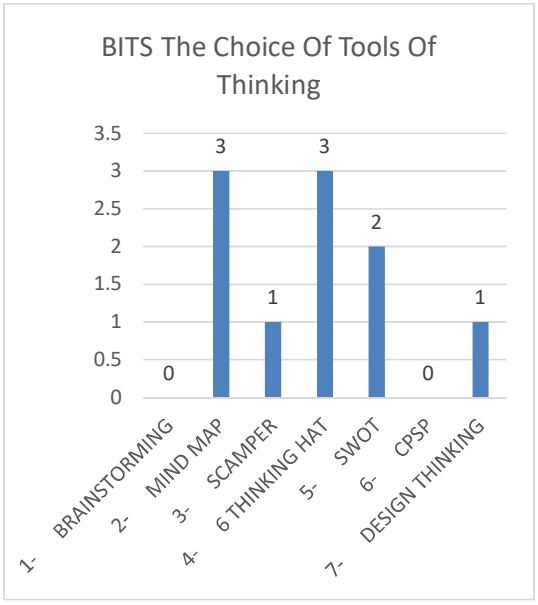

Figure 4: Program from Faculty of Information Technology and Communication

This faculty is not purely an engineering faculty and likely to have a variety of preferences of thinking tools. Indeed, three groups selected mind map as expected as favorite choice among students. The same number of groups opted the second preference of thinking tool which is 6 thinking hats. Two groups wanted SWOT and the rest dived into design thinking. No taken for CPSP and as usual no keen for brainstorming.

4. CONCLUSION

Critical thinking is the process of examining, analyzing, questioning, and challenging situations, issues, and information of all kinds. Critical thinking is an important tool in solving community problems and in developing interventions or initiatives in health, human services, and community development. There are many thinking tools available in the world and each student may select what is their best option for them to use for teaching and learning process.

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