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Stem Knowledge in Teaching Cosmetology Among Lecturers in Malaysian Vocational Colleges

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Abstract

In the 21st century, STEM elements (Science, Technology, Engineering and Mathematics) have become the norm in education and must be emphasized. This study aims to see the level of knowledge of lecturers, especially lecturers in the field of Cosmetology, in 16 vocational colleges throughout Malaysia, which are divided according to Zones, and to see the extent of the application of STEM elements in the learning and facilitation (PdPc) of Vocational College Cosmetology lecturers. With this study, we see the extent of the involvement of STEM elements in this vocational education, especially in skills. We will also see the importance of STEM elements in vocational education in line with the educational needs of the 21st century. This study seeks the level of lecturers' knowledge and STEM application in teaching and learning. In summary, the study's findings show that only 2.2% were unable to answer the STEM meaning question, and 97.8% were able to answer well and thoroughly. Lecturers first need to know the meaning of STEM and the elements found in it. As for the level of knowledge of STEM elements in each treatment machine, seven machines have been prepared in the question. Findings show the level of application of STEM elements. The findings show that Cosmetology lecturers apply STEM elements in their PDPC, whereas the correlation results show no significant relationship between the two variables.

Keyword: Stem, Applications, Teaching and Learning In Cosmetology, Vocational College

Introduction

Malaysia aims to become a developed country and keep pace with the world economy's rate. The world of education in Malaysia also needs to progress according to the passage of time and strive to produce students who are also the generation that will lead the country in the future so that they are of better quality and high knowledge. Educators, which include both teachers and lecturers, must understand how to implement STEM effectively to provide students with the best educational experience. According to Chang and Park (2014), active and quality STEM learning and teaching can help create a fun educational or learning

experience for students. However, Gambari and Yusuf (2015) state that teachers or lecturers still emphasize memorization techniques among students and reduce discussion activities among students. The delivery of lecturers in teaching needs to be diversified to apply STEM elements and give students an understanding of the importance of STEM knowledge in education. Learning in Cosmetology skills has long involved STEM elements; lecturers need to emphasize the importance of STEM during the learning and facilitation (*Pembelajaran dan Pemudahcaraan*, PdPc) because STEM cannot be isolated in Cosmetology course learning. This field requires technology, treatment machines, scientific processes during treatment, calculating body mass index, business accounts and many more. This is supported by Sunyoung Han et al. (2015), who stated teachers or lecturers need help understanding the new teaching reform and implementing STEM education differently from what is prescribed. With the hope of making the Cosmetology course more applied to STEM elements in PdPc, the researcher started the study by looking at the level of STEM knowledge and application of STEM elements in PdPc among Cosmetology Lecturers.

Need of the Study

The importance of preparing students to enter the Science, Technology, Engineering, and Mathematics (STEM) field needs to be emphasized. (Thibaut et al., 2018). The Malaysian Ministry of Education has also issued a guide to implementing STEM in Teaching and Learning (2016). Lack of studies involving the field of Cosmetology, the curriculum also emphasizes the need for STEM in PDPC for student readiness. Qualified STEM professionals are needed to remain competitive in the global market and meet contemporary demands such as ensuring sufficient and sustainable energy, efficient healthcare, and considering technological development (Boe et al., 2011). The Malaysian government is preparing the young generation to face Industrial Revolution 4.0 in the Higher Education Development Plan 2015-2025. Therefore, even if they are not STEM professionals, they should also have the necessary skills and competencies to deal with Malaysia's challenges towards the Industrial Revolution 4.0.
The degree obtained by graduates is not a ticket to get a job, but graduates must complement themselves well and challenge themselves to stay in the competition to get a job (Ahmad Wazir Aiman & Noor Akmal Shareela, 2014). Malaysia faces the problem of having graduates who lack soft skills, which are life skills, detecting and solving problems, having broad knowledge and a noble personality, language proficiency, and communication skills (Ahmad Wazir Aiman & Noor Akmal Shareela, 2014: Ismail et al., 2011).

Applications of Stem in Teaching and Learning

The importance of the STEM field is now being emphasized a lot among students (Thibaut L. et al., 2018). As potential professionals, students need to meet the global market's demands. The Malaysian Ministry of Education (KPM) is meeting future workforce resource needs by striving to achieve the 60:40 ratio of Science or Technical Stream to Literature policy by increasing student participation in Science, Technology, Engineering, and Mathematics (STEM). To increase student participation in the STEM field, four main initiatives have been drawn up: strengthen STEM education, strengthen skills and abilities, popularize STEM education, and incentives regarding STEM (National Colloquium of Terengganu STEM Educators, 2016).

STEM in Cosmetology

In the article entitled "A Voice to talk about It": Cosmetologists as STEM Experts in educational technology design and Implementation, Lachney et al. (2020) emphasizes STEM education in the field of Cosmetology. As researchers who teache Cosmetology courses, they express their interest in the industry that makes STEM a pillar in education. The researchers stated the importance of STEM knowledge in this field and highlighted that all parties involved in Cosmetology must be experts and knowledgeable in STEM elements. It was found critical to start a study in the breadth and area as well as in the group of Cosmetology lecturers that will reveal STEM education in this field in more depth.

Several articles have studies the application of STEM education; however, there still needs to be research that focuses on the field of Cosmetology, especially in the technical and vocational education group. One of the study by Lee (2013) shows that teachers apply only some STEM elements in teaching. In conclusion, it is hoped that the new findings in this study will help the education system, especially in the field of Cosmetology, to emphasize the STEM elements and generate more students and graduates who keep up with the times, who are of high quality and in line with the demands of the industry that requires quality workers.

Research Methodology

Population and Sample

The population combines 16 vocational colleges from all over the country that want to be used as a sample and study. The total population is 1675 lecturers. In this study, the researcher used a random sampling method. The researcher only used cluster sampling because it involved 16 vocational colleges. Researchers have further narrowed the scope to select Cosmetology lecturers. The sample size was reduced to 89 Cosmetology lecturers who teach the field of Cosmetology in 16 Vocational Colleges throughout Malaysia, including Sabah and Sarawak.

Data and Sources of Data

This study uses a questionnaire as a research instrument. There are three sections: Section A, Section B and Section C. Section A is a section about the sample demographics, i.e. Age, Vocational College Zone, Duration of Teaching Experience and Current Subjects. Part B is to identify and measure the level of knowledge of the meaning of STEM and STEM elements in the treatment machine; the items provided are as many as eight items using fill-in-the-blank questions. The last part of the researcher's questionnaire is Part C, which identifies the level of STEM application teaching and learning in Cosmetology; it contains ten items, using a 5-point Likert scale, namely, Strongly Disagree, Disagree, Not Sure, Agree, Strongly Agree. The researcher referred experts in the field to obtain the validity and reliability of the research instrument. As for item reliability, each instrument item was measured using Cronbach's Alpha measurement. Alpha Cronbach reliability index value that can be used is within 0.7 and above.

Results And Discussion

Analysis shows that 97.8% of lecturers can answer the meaning of STEM well and thoroughly (Table 1). For the next question, the researcher put three values to analyze the answers to the STEM elements questions in each treatment machine, which is 1 for wrong, 2 for less accurate and 3 for correct. Results from this indicate that the level of knowledge is low, medium or high for the STEM elements in each treatment machine. In conclusion, most of the

respondents or Cosmetology lecturers could not answer the questions in the level of STEM knowledge well. The last part, part C, is the level of STEM application in teaching Cosmetology. Table 2 shows the overall statistics and the frequency of each item. The frequency reported high for all item except one, indicating that most respondents agree with the items. The conclusion that can be made is that the respondents as a whole still apply only a little of the STEM elements in teaching and learning.

Table 1
Frequency Meaning of STEM

Items	Frequency	Percentage (%)
Yes	87	97.8
No	2	2.2
Total	**89**	**100**

Table 2
Level of Application in Teaching and Learning in Cosmetology

No	Items	Mean	Level
B1	I explain STEM terms to students	3.21	Medium
B2	I always ask students questions related to anatomy and physiology during theory and practical sessions	3.96	High
B3	I explain the scientific process that takes place when treating using a face/body treatment machine	4.00	High
B4	I use various electronic devices (such as Laptops, while teaching theory)	3.81	High
B5	I use technology equipment and existing applications during PDPC	4.03	High
B6	Sometimes I ask students to ask students to use the internet facility during the pdpc session	4.00	High
B7	My students are actively involved in using technology during learning sessions.	4.08	High
B8	I provide teaching aids using ICT facilities such as slide shows and so on	4.02	High
B9	I always prepare science-related questions and assignments in face and body treatments	4.03	High
B10	I explain the technological elements in each face and body treatment machine	4.07	High

Demographic findings using the descriptive analysis show that lecturers who teach SVM Year 2 have the highest frequency among respondents. Correlation analysis were conducted to identify the link between lecturers' STEM knowledge and its application in their teaching. The correlation value indicates p-value higher than .005, accepting null hypothesis. Hence, no significant relationship was found between the Cosmetology lecturers' knowledge of STEM and their application of STEM in their teaching. To conclude, the findings from this study implicated the critical need to improve STEM knowledge among lecturers teaching in Malaysian vocational colleges. It is possible that there is no significant link between STEM knowledge and how lecturers apply it in their teaching because lecturers are unaware or lack

knowledge of the real purpose and meaning of STEM and how important it is for their classroom instruction to reflect these applications.

Conclusion and Suggestions For Future Studies

In conclusion, the data analysis from the researcher shows that the respondents or Cosmetology lecturers still need to improve their knowledge about STEM. This may be due to lecturers not emphasizing STEM learning in themselves. The findings of this study are expected to give awareness to Cosmetology lecturers to pay more attention to STEM knowledge.

The findings of this study can give implications to several parties, especially Cosmetology lecturers, to further improve their skills and knowledge to help students become more familiar with STEM knowledge, apply STEM in their learning, and further enhance their skills. The study should be continued by looking for differences between cosmetology lecturers who teach SVM (Malaysian Vocational Certificate) and DVM (Malaysian Vocational Diploma) because SVM is a very comprehensive learning, and more needs to be revealed about STEM. Do lecturers who teach SVM have a higher level of knowledge more elevated than those who teach DVM, who are mostly more experienced in Cosmetology Education? Hopefully, this study and beyond can have promising implications for the country's Education system, especially in the field of Cosmetology.

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