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Teaching activities for supporting students' 4cs skills development in vocational education

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Abstract: The soft skills competencies needed in the industrial revolution 4.0 era on the 21st century are critical thinking, creativity, communication and collaboration or known as 4Cs Skills. This study aims at revealing a teaching activity that can develop and improve the 4Cs skills of vocational education students. This research was a quantitative study using a survey method. The research instrument used a questionnaire of the lecturers' statements about teaching activities carried out by educators to improve or develop the 4Cs skills of vocational education students. The respondents in this study were 403 educators that consisting of 200 educators from Universitas Negeri Padang (Indonesia) and 203 educators from Universiti Tun Hussein on Malaysia (Malaysia). Based on the research findings, it was found that the teaching activity that was most often carried out or appeared with a high percentage in improving students' 4Cs skills was problem solving to improve critical thinking skills, debate to improve communication skills, peer partner learning to improve collaboration skills and finally mind mapping to improve creative skills. Based on the results of this study, lecturers in the implementation of learning need to condition learning activities that can develop students' 4Cs skills, so that the competencies possessed are in accordance with the needs of the developing industry in this 21st century.

Keywords*:* Teaching activities; 4C's; 21st century; Vocational education

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1. Introduction

Vocational education graduates are not only required to have hard skills, but also must have soft skills in order to compete in the world of work. Based on the results of study on the competencies needed in the industrial revolution 4.0, it was found that non-technical skills (soft skills) are as important as technical skills (hard skills) in the engineering profession (Maisiri et al., 2019). Soft skills that are important in the 21st century are critical thinking skills, communication, collaboration and creativity or known as 4Cs Skills (Hunaidah et al., 2018; P21 Framework for 21st century learning, 2007; Tang et al., 2020; Triana et al., 2020). The world of work in the 21st century is very competitive, the vocational education graduates have to be able to find opportunities for future careers (Zhou et al., 2016), therefore they must have these 4Cs skills (Roblek et al., 2016). 4Cs Skills are life skills that education graduates must have to be able to exist and overcome the 21st century challenges due to the industrial revolution 4.0 (Ağaoğlu & Demİr, 2020; Effendi et al., 2020; Le et al., 2022).

Critical thinking skills are also needed in analyzing, synthesizing, decisions making and evaluating (Ennis, 2018; Sipayung et al., 2018). The workforce needed by the world of work and business in the 21st century is those who have critical thinking and problem-solving skills (Apino & Retnawati, 2017; Lestari et al., 2020). In the 21st century, the world of education has to create learning that teaches student creativity, because through creativity someone will be able to give birth to innovation (Putra et al., 2019). Creative ability is very important in today's technological era, both in process (*creative thinking*) and in producing (*creative products*)

(Henriksen et al., 2016; Samani et al., 2019). Creativity must be owned by everyone in order to produce something useful (May et al., 2020). Creativity is the result of cognitive processes that develop over time and thus, it has the potential to be trained to improve (Runco, 2016; Runco & Acar, 2012).

In looking for a job, a person has to possess the ability and courage to promote himself so that employers can be interested in recruiting him (Suroto et al., 2017). Therefore, communication skills are important to be possessed by vocational education graduates. Communication skills are not only related to find a job, but also in business in the form of promoting jobs to be done or promoting products to be marketed. Communication skills are one of the general skills that vocational education graduates have to possess in order to be successful in their jobs (Wahyuni et al., 2018). Marketing of products in the form of goods or services in the 21st century era is very competitive. Therefore, it requires a workforce that is able to promote its products. These four skills are interconnected, and every vocational education graduate has to possess all these skills in a complex manner. Through the ability to think critically, someone will be able to solve the problems found. Through communication skills, a person will get a relationship for business or career development. Through collaboration skills, a person will be able to work in a team. Therefore, it is very important for a vocational education graduates to have these 4Cs skills (Selman & Jaedun, 2020).

Educators at universities in the world are constantly looking for the best way to be able to create learning that can provide the opportunity to have the 4Cs Skills, so that the graduates can be absorbed by the world of work. Each teaching activity conditioned by educators has an influence on the competencies possessed by students (Jalinus et al., 2019). This study aims at describing effective teaching activity to be implemented in developing students' 4Cs skills. The results of this study are expected to be a guide for other researchers to further develop teaching activities that can develop 4Cs skills and become a reference for educators in choosing models, methods or learning strategies to be applied in the learning process.

2. Methods

This survey which used a quantitative approach to co collect the information that related to the objectives of study. TVET Educators at Universiti Tun Hussein on Malaysia (UTHM) and Universitas Negeri Padang (UNP) were respondents in this study. The respondents consist 403 educators, 200 educator form UNP and 203 educators form UTHM.

The research instrument is a questionnaire that will be distributed to 403 educator s to identify the teaching activities that they apply in improving or developing the 4C's skills of vocational education students. This questionnaire consists of 2 parts, namely part A and part B. Part A is about demography, which contains faculty's name and gender. Part B consists of 50 kinds of teaching activities (Table 1). On every statement, the respondents only choose one, some or all skills that can develop or improve from the teaching activity implementation. This questionnaire is designed to find the teaching activities used by educators in developing the 4Cs skills of vocational education students. In order to describe effective teaching activity in developing students' 4Cs skills based on the vocational education lecturers' judgment. So, it was analyzed in percentage and frequencies.

Table 1. Teaching activities

1. Active Reading	21. Focuses Imaging/Visualization Graphic Organizers	33. Peer Partner Learning
2. Anticipation Guide	22. Guided Reading	34. Picture Book and Illustrator Studies
3. Assigned Questions	23. Heterogeneous Grouping	35. Problem Solving
4. Brainstorming	24. Homogeneous Grouping	36. Read & Paraphrase
5. Case Studies	25. Interdisciplinary Approach	37. Reflective Discussion
6. Categorizing	26. Jigsaw	38. Research Projects
7. Compare & Contrast	27. Journal Writing	39. Response Journals
8. Computer Assisted Instruction	28. Learning Logs	40. Role Playing
9. Concept Attainment	29. Mind Mapping	41. Scaffolding
10. Concept Formation	30. Modelling (Demonstration)	42. Self-Monitoring Strategies
11. Concept Maps/Webbing	31. Narratives	43. Think Aloud
12. Cooperative Learning	32. Oratory/Public Speaking and Speech Writing	44. Think-Pair-Share
13. Debate		45. Three-Two-One(3-2-1)
14. Didactic Questions		46. Visual Imaging
15. Drill & Practice		47. Web Quest
16. Essays		48. Webbing
17. Experiments		49. Writing to Inform
18. Explicit Teaching		
19. Field Trips		
20. KWL		

3. Results

3.1 Critical thinking skills development

Teaching activities that are conditioned by educators affect to the students' experience that they get in developing or improving 4Cs skills. Respond from UNP and UTHM educators about the appropriate method in improving or developing student critical thinking is shown in Figure 1.

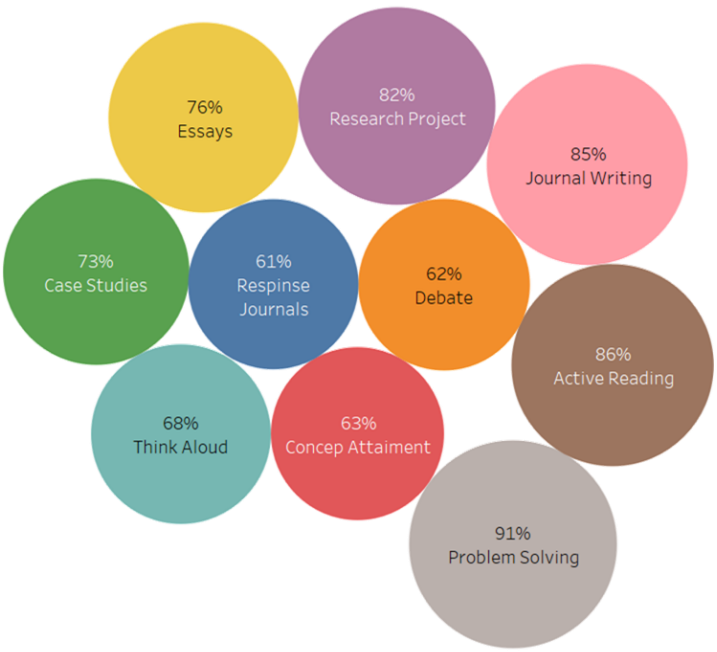

Figure 1. Survey results of teaching activities on the critical thinking skills development

Based on the survey results that have been conducted, among fifty teaching activities, there were 10 teaching activities were selected with a percentage of more than 50%, including problem solving (91%), active reading (86%), journal writing (84.5%), research project (82%), essays (75.5%), case studies (72.9%), think aloud (67.5%), concept attainment (62.6%), debate (61.6%) and response journal (60.6%). The survey results show that the teaching activity that is most often carried out or that appears with the highest percentage in developing critical thinking skills is problem solving.

3.2 Communication skills development

Teaching activities to support the development of student communication skills can be seen in Figure 2, there were 8 teaching activities were selected with a percentage of more than 50%, including debate (89%), oratory/public speaking and speech writing (80.50%), cooperative learning (71, 5%), reflective discussion (68.5%), research projects (66%), role playing 65%), field trips (59%) and narratives (56.70%). The survey results indicated that the teaching activity that was the most often carried out or that appears with the highest percentage was in developing communication skills, namely debate.

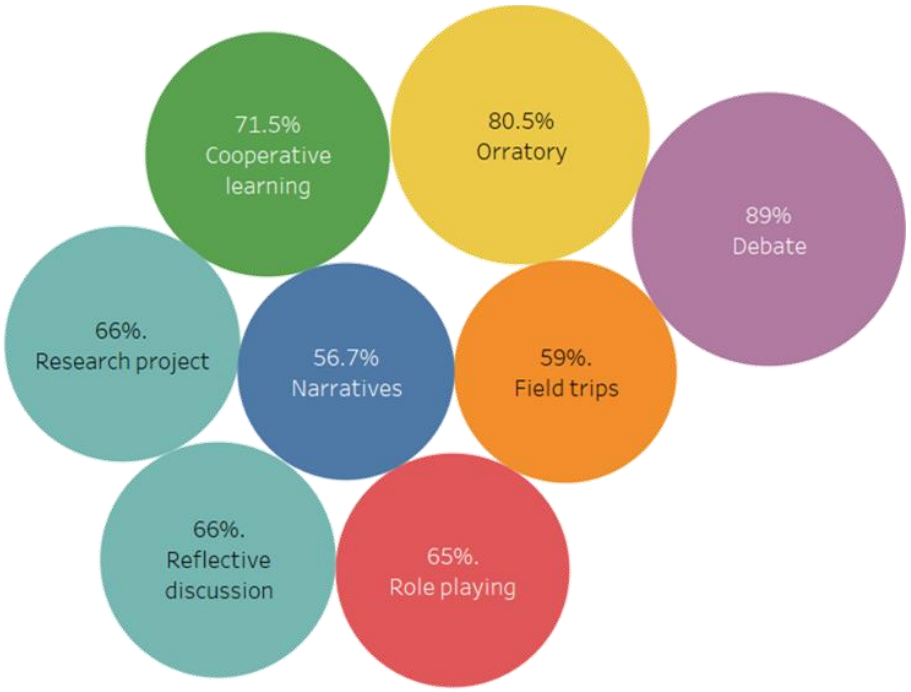

Figure 2. Survey results of teaching activities on the communication skills development

3.3 Collaboration skills development

Figure 3 show the teaching activities to support the development of Collaboration skills, there were 7 teaching activities were selected with a percentage of more than 50%, including peer-partner learning (80%), think-pair-share (75%), research projects (74%), cooperative learning (69.5%), fields trip (69.5%), heterogeneous grouping (60.1%) and jigsaw (59.1%). The survey results showed that the teaching activity that was the most often carried out or that appears with the highest percentage in developing collaboration skills, namely peer partner learning.

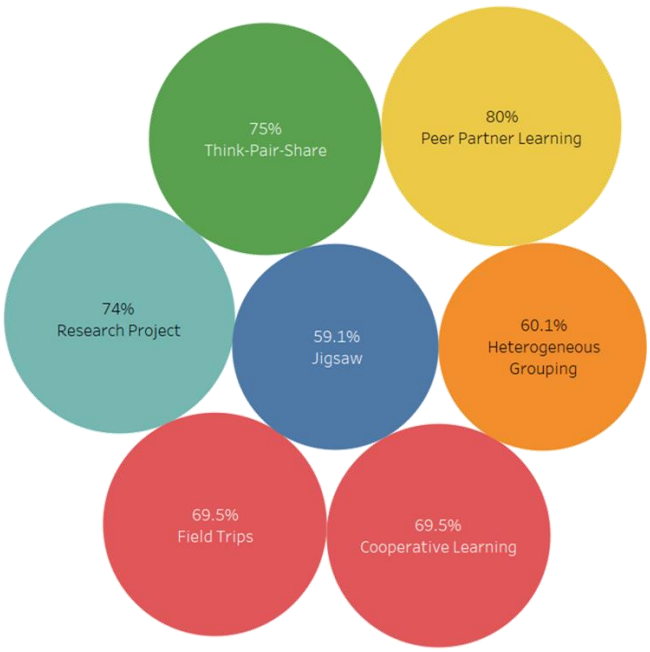

Figure 3. Survey results of teaching activities on the collaboration skills development

3.4 Creative skills development

Based on the results of the survey that had been conducted, from fifty teaching activities, there were 10 teaching activities were selected with a percentage of more than 50%, including mind mapping (85.5%), problem solving (82.5%), visual imaging (82). 5%), research project (81.5%), brainstorming (79.5%), modeling (demonstration) (78%), picture book and illustrator studies (77.5%), web quest (73.5%), focuses on imaging / visualization (71.5%) and experiments (70.5%). The survey results show that the teaching activity that is the most often carried out or that appears with the highest percentage in developing creative skills is mind mapping.

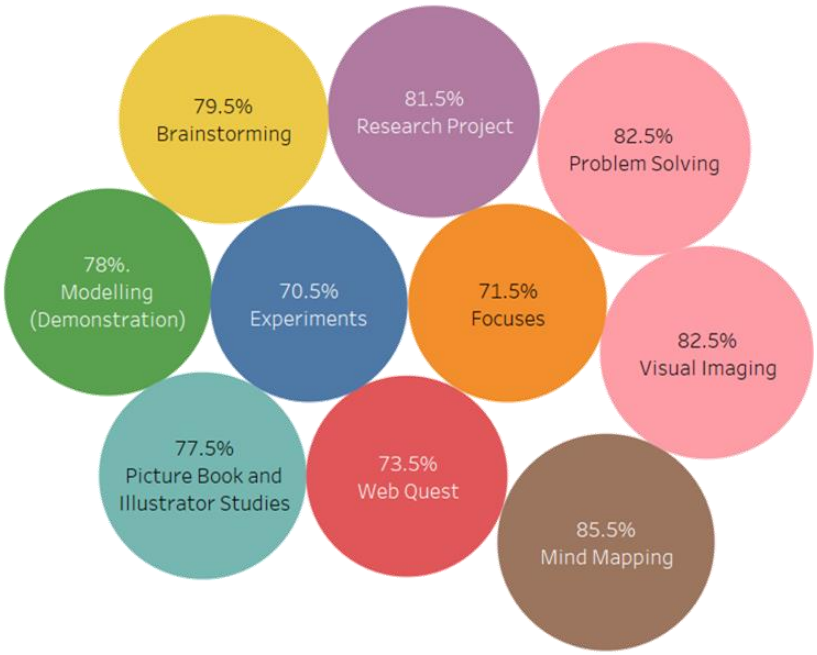

Figure 4. Survey results of teaching activities on the creative skills development

4. Discussion

The result of study shows that teaching activity often to be used or appears with the highest percentage implemented by lecturers to develop and increase students' critical thinking skill is problem solving strategy. This teaching activity is one of the most essential life skills that educators have to teach to students so that students know how to solve problems and make healthy decisions for themselves (Changwong et al., 2018). One of the factors that causes why the problem solving is widely used by UNP and UTHM educators, it is because the characteristics of students in vocational education are required to be ready to work in the industrial world, it makes them accustomed to solve problems at hand, so that they can increase critical thinking skills that they have. This is in line with previous research by (Utami et al., 2019) which proved that learning involves students directly participating in solving problems can improve their critical thinking skills, including cognitive understanding. The results of research with problem solving develops students' critical thinking skills in the aspects of interpreting, analyzing and concluding. It is similar to the research conducted by (Belecina & Jr, 2018), it was revealed that students' critical thinking skills in problem solving increased significantly after using problem situations. The students also expressed positive attitudes and sentiments towards the use of this problem situation.

Based on the research results, it can be seen that the teaching activity that is most often used or appears with the highest percentage in developing communication skills is debate. Debate was chosen because students at UNP and UTHM have started to actively speak through the discussion method that implemented in the class (Heong et al., 2019; Jalinus et al., 2020), but they still tend to hesitate to argue and tend to do the instrumental argument without thinking intelligently and creatively. So that, this debate method was chosen to help students to be more daring to argue well and correctly intelligently and creatively. This strategy in addition to developing communication, it can improve communication skills, trained to think intelligently and creatively for students. And, it also proves that educators meet 21st Century Education, where educators have to possess a high communication skill in managing the entire environment by planning, organizing and motivating students to communicate with each other (Selman & Jaedun, 2020).

Brainstorming activities before debates, group argument presentations, and discussions during debates between group members, as well as opportunities to answer and rebut arguments are part of debate activities that can encourage students' communication skills (Rodger & Stewart-Lord, 2020). The results of previous research on debates concluded that the acquisition of new knowledge and ideas when preparing for a debate will affect students' communication skills because they will be able to convey arguments smoothly and comment on or criticize opposing arguments if the topic is in accordance with their mastery (Iman, 2017; Peasah & Marshall, 2017). Students will perform well in debates if they have adequate knowledge about the topic (Mumtaz & Latif, 2017). The findings of this study indicate that the teaching activity that is most often used or appears with a high percentage in developing collaboration skills is the peer partner learning. UNP and UTHM educators indicated that the peer partner learning would increase enthusiasm and allow students to be more involved in learning activities, and this teaching activity could make students develop and have open communication. Meanwhile, heterogeneous grouping also supports in developing student collaboration skills. It indicates that each class consists of students who have different characteristics. Thus, an educator should try to make sure everyone in the heterogeneous class is challenged and learns the material. Therefore, heterogeneous grouping presents different challenges for educators. Previous studies related to the collaboration and group work have emphasized the importance of heterogeneity for performance, creativity and learning (Sumadi et al., 2017).

The results of this study show that the teaching activity that is most often used or appears with a percentage, namely mind mapping in the teaching and learning process to develop creativity

skills. It indicates that these teaching activities encourage students character building to have the ability to develop, implement, and provide new ideas to others, as well as be open and responsive to new perspectives. Creativity is the key to find out to develop students' creative thinking skills, it requires a link between learning styles and geographical and cultural conditions that occur around students. The implementation of mind mapping in this study is in line with the research that conducted by Zubaidah et.al. and Weinstein previously, they revealed that mind mapping is an ideal technique for practicing creative thinking skills (Weinstein, 2014; Zubaidah et al., 2017). It is because mind mapping makes use of all the skills commonly associated with thinking, especially imagination, connecting ideas, and flexibility. In addition, experimental teaching activities even though at number 10 are also used in learning to support creative skills. It indicates that this experimental teaching activity can develop new and unique ideas and can also make students discover something new and amazing that they have never encountered before. So that this experimental teaching activity can develop logical thinking skills, increase curiosity, enjoy observing and student creativity.

5. Conclusions

Based on the research findings, it can be seen that the teaching activities that is most often carried out or appears with a high percentage is used as a learning strategy in supporting the development of critical thinking skills, namely problem-solving strategies. Meanwhile, the strategy that is most often carried out or appears with a high percentage in developing communication skills, namely debate. The strategy most often carried out or appears with a high percentage in developing collaboration skills is the peer partner learning. And the last strategy that is most often carried out or appears with a high percentage, namely the Mind Mapping strategy in the teaching and learning process to develop creativity skills. The implication of this research, it can provide references contribution to the knowledge and education regarding to the teaching activities in supporting the development of 4Cs. External variables that affect the 4Cs skill have not been studied in this research, so it is hoped that it can be a consideration for other researchers in conducting further research in a plot.

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Declarations

Author contribution

Nizwardi Jalinus contributes to designing the research concept and writing articles. Sukardi and Rizky Ema Wulansari are responsible for collecting and processing research data. Meanwhile, Yee Mei Heong and Tee Tze Kiong are involved in analyzing and interpreting the research data results.

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Conflict of interest

The authors declare no conflict of interest.

Ethical Clerance

The involvement of human subjects in this research complies with the Declaration of Helsinki.

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