

A Preliminary Study of the Levels of Engineering Drawing Teaching of Creativity Practices Teachers in Malaysia

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ABSTRACT

This study was a preliminary study that aim to identify the level of knowledge and understanding of Engineering Drawing (ED) teachers. The area covered creativity, and the level of teachers' creativity in teaching, which focusing on the domains of planning, implementing, and making evaluations and assessments. It was conducted to review the need to produce a framework for the teaching creativity of ED teachers, as a guide in practicing creative and effective teaching. Respondents were asked to answer 35 questionnaire questions using a five-point Likert scale. The sample was selected using a purposive sampling method, consisting of 30 primary school teachers from nine Technical Secondary Schools throughout Malaysia. Descriptive analysis was performed using SPSS V21 software to report the study in the form of frequency, percentage, mean, and standard deviation. The results of the study found that the level of knowledge and understanding of ED teachers towards creativity was (mean = 3.64), at a medium level. Meanwhile, the average level of teaching creativity of ED teachers from the aspects of planning, implementing, and making evaluations and creative assessments was at a moderate level. The three domains of creativity practice recorded a mean achievement between 3.71 and 3.79. However, all respondents agreed that a guide and reference in the form of a creativity practice framework for the teaching of ED teachers is needed to be used as a reference by teachers. Therefore, this finding also shows guidance in realizing various Ministry of Education (MoE) policies.

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Contribution/Originality: This study will contribute to the existing literature on the importance and role of teachers in practicing creativity in teaching and learning.

1. Introduction

Teachers are individuals who should always be ready and open to accept any challenges in the current changes. Therefore, the challenge of transforming the education system today, demands changes in the Teaching and Learning (TL) aspect, along with education in the era of industrial revolution 4.0 (Ahmad Saifudin & Hamzah, 2021). The Covid-19 pandemic also requires teachers to be more creative, diversify their teaching methods, and use various resources and materials which are compatible with TL (Bahrom, 2020; Henry & Mahamod, 2021). Accordingly, facing the transformation of the world of education today requires teachers not to be tied to a particular way of delivery, but rather requires planning and thinking outside the box of common thinking which is more effective (Dagang, 2016). Consequently, in order to meet the needs of industrial revolution 4.0 in the digital era of the 21st century, teachers must play an important role in producing human capital that is knowledgeable, has integrity, thinks creatively and innovatively (Apak & Taat, 2018).

According to Mustafa et al. (2021), the need for a paradigm shift, skills, and knowledge are needed to face the transformation of education in this century. For that reason, teachers have to be wise to change their own attitudes and practices to face any changes along with the transformation of the current education system (Henry & Mahamod, 2021). A study by Leifler (2020) discovered that a teaching process which prioritizes creativity, can develop students' cognitive, affective, and psychomotor potentials. That being a case, there is a need to a paradigm shift in teachers' teaching to ensure the effectiveness of their delivery and teaching method (Batjo & Ambotang, 2019).

Accordingly, the effectiveness of teachers' teaching is the most important factor in transforming education and increasing students' success (Abu & Eu, 2014; KPM, 2011; Hamdan, 2017). This statement is in line with the findings of the Batjo and Ambotang (2019) study, which stated that there is a significant correlation between teachers' teaching quality and students' success. The quality of a teacher's teaching delivery is very important in determining the success of a student (Batjo & Ambotang, 2019). Similarly, Mohd Shah and Halim (2018) and Ahmad et al. (2019) found that a student's success does not depend on the school attended but rather on the creativity and effectiveness of the teacher's teaching delivery. Besides that, Wong (2016) also mentioned that teachers should become the individuals who are responsible as facilitator, referencing experts, assessors, educators and facilitators. Therefore, effective teaching practices of today's teachers do not only cover teaching planning, but also their creativity during the teaching and learning process (Samsudin et al., 2013; Mustafa et al., 2021).

1.1. Research Objectives

This study aims to identify the level of knowledge and understanding of ED teachers regarding creativity, as well as the level of teaching creativity of ED teachers focusing on the domain of planning, implementing, and making creative assessments. Apart from that, this study was also conducted to review the need to produce a framework as a guide in practicing creative and effective teaching.

1.2. Research Questions

Specifically, the research questions are:

- i. What is the level of creativity in teaching engineering drawing teachers?
- ii. Do engineering drawing teachers agree on the need for a framework of engineering drawing teachers' teaching creativity practices as a guide and reference in teaching and learning?

2. Research Methods

2.1. Research design

A descriptive, quantitative approach was chosen as the study design. A survey method was used to get feedback on the level of creativity practices in the teaching of ED teachers, as well as the need for a guide or framework for creativity practices.

2.2. Study sampling

This study involves 49 ED teachers from all over Malaysia. The study sample consisted of 30 teachers who agreed to answer the given questionnaire. Sample selection was intended to ensure the study sample met the criteria and could help to provide answer for the research objectives set.

2.3. Study Instrument

Form software to easily calculate the data obtained. Respondents were required to answer 35 question items based on their level of understanding of creativity in teaching, as well as their creativity practices in planning, implementing, making evaluations and assessments. The questionnaire was adapted and modified from [Ngatiman \(2018\)](#) study, using a five-point Likert scale. An instrument in the form of a questionnaire was used as it was easier to manage, collect and carry out the data analysis process ([Darusalam & Hussin, 2021](#)). The questionnaire was divided into two parts: Part A and Part B. Part A covered the demographics of the respondents while Part B covered the understanding of creativity and creativity practices of teaching and learning by teachers.

2.4. Study Procedures

Before distributing the questionnaire, the researcher obtained permission to conduct the study from the Education Policy Planning and Research Division (EPRD) of the Ministry of Education Malaysia. Upon obtaining the approval, the researcher distributed a letter of permission to the principals of the schools involved. An online questionnaire was created using Google Form, a survey administration software as this method is simple, easy to be used, and convenient for the respondents. The questionnaire was shared to the respondents via WhatsApp, Telegram or email to the head of ED subject committee at each involving Technical High School. Respondents were reminded to press the 'next' button, upon answering a part or section, and press the 'submit' button after all questions have been answered. The responses and answers of the respondents were stored in the database system, and could be accessed directly by the researcher to continue the data analysis process.

3. Results

3.1. Respondent Demographics

The study sample consisted of 30 ED teachers, and the demographic findings of the respondents in Part A of the questionnaire are shown in [Table 1](#).

Table 1: Demographic findings of the respondents

Demographics	Category	Frequency	Percentage (%)
Gender	Men	12	40 %
	Female	18	60 %
Nation	Malay	29	97 %
	Not Malay	1	3 %
Approval	Degree	25	83 %
	Masters	5	17 %
I attend a Creativity Practice Course or Briefing	Ever followed	5	17 %
	Not following	25	83 %
I agree that a comprehensive Teacher Teaching Creativity Practice Framework or guide can be used as a reference for all Education Teachers	Yes	30	100 %
	Nope	0	0%

3.2 The level of knowledge and understanding of creativity in Teaching and Learning

[Table 2](#) shows the mean distribution and standard deviation of the Knowledge Construct on creativity practices in the teaching and learning of ED. The results of the study show that the highest mean is A10, which means "I always make an assessment of something perfectly," with a mean of 4.01. This is followed by item A4 (mean = 3.79), item A1 (mean = 3.75), item A9 (mean = 3.73), item A5 (mean = 3.70), A6 (mean = 3.69), A7 (mean = 3.67), A8 (mean = 3.63), and A2 (mean = 3.17). The lowest mean is A3, i.e. "I like to try challenging and difficult work," with a mean of 3.13. The overall mean of the Knowledge Construct on creativity practices in the teaching and learning of ED teachers is 3.64, and the standard deviation is 0.684.

Table 2: The mean distribution and standard deviation of the knowledge construct on creativity practices

Item	Statement	Frequency and Percentage					Mean	Std	Level
		Never	Rarely	medium	Frequent	Very Often			
A1	I practice Creative Teaching to ensure PdP is planned, interesting and effective.	0 (0.0)	0 (0.0)	10 (33.3)	12 (40.0)	8 (26.7)	3.75	0.566	medium

A2	I use the understanding of creativity to create things	0 (0.0)	0 (0.0)	7 (23.3)	20 (66.7)	3 (10.0)	3.17	0.834	Medium
A3	I like to try challenging and difficult work.	0 (0.0)	1 (3.33)	7 (23.3)	16 (53.3)	6 (20.0)	3.13	0.636	Medium
A4	I am motivated and confident to be creative.	0 (0.0)	0 (0.0)	4 (13.3)	21 (70.0)	5 (12.7)	3.79	0.869	Medium
A5	I am willing to take risks by trying different ideas.	0 (0.0)	0 (0.0)	8 (26.6)	20 (66.7)	2 (6.67)	3.70	0.849	Medium
A6	I combine existing ideas with creative new ideas.	0 (0.0)	1 (3.33)	9 (30.0)	13 (43.3)	7 (23.3)	3.69	0.548	Medium
A7	I am sensitive to a problem and try to identify and fix it.	0 (0.0)	0 (0.0)	15 (50.0)	10 (33.3)	5 (16.7)	3.67	0.652	Medium
A8	I love thinking of new ideas to solve problems.	0 (0.0)	2 (6.6)	10 (33.3)	15 (50.0)	3 (10.0)	3.63	0.628	Medium
A9	I will defend a creative idea with a reasonable answer.	0 (0.0)	1 (3.33)	6 (20.0)	15 (50.0)	7 (23.3)	3.73	0.597	medium
A10	I make an assessment of something perfectly.	0 (0.0)	0 (0.0)	6 (20.0)	16 (53.3)	8 (26.7)	4.01	0.663	high
Average men							3.64	0.684	medium

3.3. Levels of Practice Domain Creativity Planning Teaching and learning

Table 3 shows the distribution of the mean and standard deviation of the construct of Creative Teaching and Learning Planning Practice of ED teachers. Based on Table 3, item B15 recorded the highest mean value, which was will plan a teaching method. This was for the statement, "I plan teaching methods that are organized according to the students' existing knowledge and teaching objectives". Item by items B12 had an equivalent mean value of 3.76, followed and B16, B14 and B17 with an equivalent mean value of 3.75 at a moderate level. Item B18, "I am always determined to implement teaching approaches and strategies" had the second lowest mean (mean = 3.73) in the construct of planning

teaching and creative learning. The lowest mean was for items B11 and B13, with an equivalent mean value of 3.67. Table 3 also shows that the mean of the whole construct of planning creative teaching and learning was 3.76 with a standard deviation of 0.626, which is at a medium level.

Table 3: The mean distribution and standard deviation of constructs designing creative teaching and learning are calculated.

Item	Statement	Frequency and Percentage					Mean	Std	level
		Never	Rarely	medium	Frequent	Very Often			
B11	I have various ideas in solving the ED TL problem.	0 (0.0)	0 (0.0)	8 (26.7)	14 (46.7)	6 (20.0)	3.67	0.590	Medium
B12	I am able to plan new and creative teaching activities.	0 (0.0)	0 (0.0)	9 (30.0)	11 (36.7)	10 (33.3)	3.76	0.552	Medium
B13	I often share ideas, expertise and innovations produced with other teachers.	0 (0.0)	0 (0.0)	15 (50.0)	10 (30.1)	5 (16.7)	3.67	0.652	Medium
B14	I combine existing ideas with new ideas.	0 (0.0)	0 (0.0)	5 (16.7)	20 (66.7)	5 (16.7)	3.75	0.822	Medium
B15	I plan teaching methods that are organized according to the students' existing knowledge and teaching objectives.	0 (0.0)	0 (0.0)	7 (23.3)	15 (50.0)	10 (33.3)	3.76	0.650	Medium
B16	I produce creative teaching methods and techniques for PdP effectiveness.	0 (0.0)	0 (0.0)	10 (30.1)	9 (30.0)	11 (36.7)	3.75	0.552	Medium

B17	I plan the use of relevant ICT to help expand and facilitate the teacher's delivery process.	0 (0.0)	0 (0.0)	8 (26.7)	14 (46.7)	8 (26.7)	3.75	0.600	Medium
B18	I am determined to implement teaching approaches and strategies.	0 (0.0)	0 (0.0)	10 (33.3)	11 (36.7)	9 (30.0)	3.73	0.552	Medium
Average Mean							3.76	0.626	Medium

3.4. Domain Practice Levels Implementing creative teaching and learning

Table 4 shows the distribution of the mean and standard deviation of the construct of the teaching process in ED Teachers' Creative Teaching Practice. There are seven items in the Creative Teaching Process Construct. Based on the findings, item C20 has the highest mean of 4.07, indicating a good level. Two items reach good level, namely item C22 (mean = 4.02) and item C25 (mean = 4.01). Two items have the same mean of 3.77, namely item C23 and item C24. The lowest mean is on theme C21, which is "I will use creativity to innovate on the existing Teaching aids in order to achieve the effectiveness of using it" with value (mean = 3.43). The overall mean of the Creative Teaching Practice Construct is 3.79, which is at a medium level, and the standard deviation is 0.626.

Table 4: The Mean Distribution and Standard Deviation of Constructs Implementing Creative Teaching and Learning

Item	Statement	Frequency and Percentage					Mean	Std	level
		Never	Rarely	medium	Frequent	Very Often			
C19	I often model myself as a creative personality.	0 (0.0)	0 (0.0)	12 (40.0)	10 (33.3)	8 (26.7)	3.67	0.566	Medium
C20	I always recognize the diversity of students.	0 (0.0)	0 (0.0)	4 (13.3)	14 (46.7)	12 (33.3)	4.07	0.663	High
C21	I use creativity to innovate on existing TL.	0 (0.0)	3 (10.0)	8 (26.7)	16 (53.3)	3 (10.0)	3.43	0.628	Medium
C22		0	0 (0.0)	6 (20.0)	13 (43.3)	11 (36.7)	4.02	0.604	

	I use ICT optimally.	(0.0)							High
C23	I create and manage a diverse and interesting TL environment that suits the needs of students.	0 (0.0)	0 (0.0)	10 (33.3)	11 (36.7)	9 (30.0)	3.77	0.552	Medium
C24	I act as an instructor and facilitator according to the needs and content of the subject.	0 (0.0)	0 (0.0)	6 (20.0)	19 (63.3)	5 (16.7)	3.77	0.778	Medium
C25	I guide students to interact and communicate effectively.	0 (0.0)	0 (0.0)	7 (23.3)	13 (43.3)	10 (33.3)	4.01	0.587	High
Average Mean							3.79	0.626	Medium

3.5. Levels of Creativity Practice in the Assessment and Assessment Domain

The analysis of Table 5 shows the distribution of the mean and standard deviation of the construct of evaluation and assessment of ED Teacher Teaching Creativity Practice. The highest mean is item D26, i.e. "I give students the opportunity to get involved in making decisions as a group" (mean = 3.77), while the lowest mean is item D29, i.e. "I will encourage students to use learning outcomes from various disciplines to solve problems" (mean = 3.63). Item D28 recorded the second highest mean (mean = 3.75), followed by item D27 with a mean of 3.70. The overall average mean of the construct of evaluation and assessment of Teachers' Teaching Creativity Practices is at a moderate level (mean average = 3.71) with a standard deviation of 0.656.

Table 5: The Mean Distribution and Standard Deviation of Creativity Construct in evaluation and assessment

Item	Statement	Frequency and Percentage					Mean	Std	level
		Never	Rarely	medium	Frequent	Very Often			
D26	I give students the opportunity to be involved in	0 (0.0)	0 (0.0)	8 (26.7)	10 (33.3)	12 (40.0)	3.77	0.566	Medium

	decision making.								
D27	I help and encourage students to conduct self-assessment.	0 (0.0)	0 (0.0)	6 (20.0)	21 (70.0)	3 (10.0)	3.70	0.875	Medium
D28	I encourage students to answer more than one way.	0 (0.0)	1 (3.33)	7 (23.3)	15 (50.0)	8 (26.7)	3.75	0.606	Medium
D29	I encourage students to use various disciplines to solve problems.	0 (0.0)	0 (0.0)	12 (40.0)	11 (36.7)	7 (23.3)	3.63	0.579	Medium
Average mean							3.71	0.656	Medium

3.6. A Review of the Needs of a Framework or Guide to Teaching Creativity for ED Teachers

The analysis of Table 6 shows the distribution of the mean and standard deviation of the review of the needs of a framework or a complete guide for ED teachers' Teaching Creativity Practices. The results found that 17 out of 30 respondents strongly agreed (56.67%), while 13 out of 30 respondents agreed (43.33%) and 2 out of 30 respondents (6.67%) agreed that a complete Teacher Teaching Creativity Practice Framework or guide can be used as a reference for all ED teachers.

Table 6: Mean Distribution Survey of requirements Framework or guidance for ED Teachers' Teaching Creativity Practices

Item	Statement	Frequency and Percentage					Mean	Std
		Never	Rarely	medium	Frequent	Very Often		
E30	I agree that a complete Teacher Teaching Creativity Practice Framework or guide can be used as a reference for all ED teachers.	0 (0.0)	0 (0.0)	2 (6.67)	13 (43.33)	17 (56.67)	4.65	0.681

4. Discussion

4.1. Levels of Engineering Drawing Teachers' Teaching Creativity Practices

Overall, the level of creativity of ED teachers in terms of planning, presentation, evaluation, and assessment is at a moderate level and requires attention and action. This study disclosed that the level of teachers' understanding of creativity was at a moderate level, with the lowest mean score of 3.64. The study showed that the level of practice of planning creative teaching and learning, the level of practice of implementing creative teaching and learning, and the level of practice of creative assessment and assessment are at a moderate level, ranging from 3.64 to 3.79. This low level of creativity in teaching and learning in ED revealed concern and guidance in realizing various Ministry of Education policies, in addition to prepare the students to face various changes. This concern was also expressed by Sabri et al. (2020), who discovered that one of the main elements emphasized in PAK-21 is the element of creativity, which is also at a moderate level and is not only dependent on technology, but also requires the knowledge and skills of the teacher to plan and manage their teaching and learning. Through the analysis of the research that has been carried out, it has been found that the practice domain of creative teaching displays the highest mean score (mean score = 3.79 and standard deviation = 0.66), but is still at a moderate level. Apart from that, the study also found that 100% of respondents agreed that a complete framework or guide is needed as a reference for teachers in practicing creativity in teaching ED.

5. Conclusion

In general, this study was conducted as a preliminary survey to identify the needs of the Creativity Practice of Teaching ED framework. It aimed to identify teachers' knowledge and understanding of creativity in teaching, as well as the level of their teaching creativity in terms of planning, implementing and evaluating teaching and learning. The results showed that the level of understanding of ED teachers towards creativity in teaching was at a moderate level and required appropriate attention. Furthermore, the level of creativity practices from the aspects of planning, implementing and evaluating teaching and learning was also at a moderate level and had not yet reached the expected maximum level. All respondents agreed that a guideline was needed as a reference in practicing creative teaching of ED subjects. ED Teachers understand, be proactive in practicing creative and committed, dedicated and interesting teaching based on various new approaches in line with the transformation of education in Malaysia. Therefore, ED teachers need to They should ensure that culture and creative practices become catalysts for the effectiveness of teaching and learning in line with the vision of the Malaysian Education Development Plan (MEDP) 2013-2025.

Ethics Approval and Consent to Participate

The researchers used the research ethics guidelines provided by Universiti Teknologi Malaysia (UTM) Research Ethics Committee. All procedures performed in this study involving human subjects were conducted in accordance with the ethical standards of the institutional research committee. Permission and consent to participate in the study was also obtained from all study participants.

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Conflict of Interest

The authors reported no conflicts of interest for this work and declared that there was no potential conflict of interest with respect to the research, authorship, or publication of this article.

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