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Development of Creative Thinking Skills Among Teacher Trainees in Teacher Education Institution, Negeri Sembilan

Perkembangan Kemahiran Berfikir Kreatif Bagi Guru Pelatih di Institut Pendidikan Guru, Negeri Sembilan

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Abstract: Creative Thinking Skills (CTS) of teacher trainees will have influenced by two factors which are lecturer and students factors. Therefore, the purpose of this study is to identify the perspective of teacher trainees in Teacher Education Institution (TEI), Technical Education Campus, Negeri Sembilan towards the lecturer factors: lecturers strategies in teaching and learning (T&L) and assessment, and the students factors: level of motivation and CTS. Besides, this study also aims to determine the strength of relationship between the lecturer factors and students' level of motivation with the students' level of CTS. A total of 217 teacher trainees under the Bachelor Degree in Teaching Program taken major in Design and Technology, Science and Mathematics were involved in this study. The questionnaire comprises four sections., namely Section A: Respondent Demography, Section B: Factor Lecturer (T&L strategies of lecturer & the assessments), Section C: Level of Motivation Students and Section D: Creative thinking skills of student teachers. The obtained data were analyzed using mean values and Pearson correlation test. Overall, the result of study shown the perspective of teacher traineestowards teaching and learning strategies of lecturer (M=4.16, SD=.64) and assessments (M=4.20, SD=.65), motivation (M=4.20, SD=.68) and creative thinking skills of teacher trainees(M=4.02, SD=.70) was at a high level. In addition, this study shown there was a stronger strength of relationship between the motivation and CTS of teacher trainees(r = .566, p = <.001), followed by the relationship between teaching and learning strategies of lecturer and CTS of teacher trainees(r = .519, p = <.001), and the relationship between assessments and CTS of teacher trainees(r = .438, p = <.001) is relatively low. In conclusion, teacher trainees shown a good level of motivation and creative thinking skills, in fact motivational factors can influence the development of student teachers' creative thinking skills. Lecturers at TEI, Technical Education Campus have good teaching and learning strategies and this factor plays an important role in developing the creative thinking skills of student teachers.

Keywords: Teaching and learning strategies, assessments, motivation, creative thinking skills, student teachers

***Abstrak**: Kemahiran berfikir kreatif (KBK) guru pelatih boleh dipengaruhi oleh dua faktor iaitu faktor pensyarah dan guru pelatih. Oleh demikian, tujuan kajian ini adalah untuk mengenal pasti perspektif guru pelatih di Institut Pendidikan Guru Kampus Pendidikan Teknik terhadap strategi pengajaran dan pembelajaran dan pentaksiran pensyarah, serta tahap motivasi dan KBK guru pelatih. Dalam pada itu, kajian ini turut menentukan tahap kekuatan hubungan antara faktor pensyarah, dan tahap motivasi guru pelatih dengan KPK guru pelatih. Responden kajian ini adalah seramai 217 guru pelatih di bawah Program Ijazah Sarjana Muda Perguruan dalam pengkhususan , Reka bentuk dan Teknologi, Sains dan Matematik. Soal selidik kajian terdiri daripada empat bahagian iaitu Bahagian A: Demografi Responden, Bahagian B: Faktor Pensyarah (strategi pengajaran dan pembelajaran & pentaksiran),*

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Bahagian C: Tahap Motivasi Pelajar dan Bahagian D: Kemahiran Berfikir Kreatif Guru pelatih. Data dianalisis menggunakan ujian deskriptif min dan sisihan piawai, manakala menentukan kekuatan hubungan antara faktor pensyarah dan guru pelatih dengan KBK menggunakan ujian korelasi Pearson. Dapatan kajian menunjukkan perspektif guru pelatih ke atas strategi pengajaran dan pembelajaran pensyarah (M=4.16, SP=.64) dan pentaksiran (M=4.20, SP=.65), motivasi (M=4.20, SP=.68) dan kemahiran berfikir kreatif guru pelatih (M=4.02, SP=.70) adalah pada tahap tinggi. Dalam pada itu, kajian ini juga menunjukkan terdapat perkaitan yang kuat antara motivasi dan tahap berfikir kreatif guru pelatih (r = .566, p = <.001), diikuti dengan perkaitan antara strategi pengajaran dan pembelajaran pensyarah dan kemahiran berfikir kreatif guru pelatih (r = .519, p = <.001), manakala perkaitan antara pentaksiran dengan kemahiran berfikir kreatif guru pelatih (r = .438, p = <.001) adalah agak rendah. Kesimpulannya, guru pelatih di IPG Kampus Pendidikan Teknik menunjukkan tahap motivasi dan kemahiran berfikir kreatif yang baik, malahan faktor motivasi dapat mempengaruhi perkembangan kemahiran berfikir kreatif guru pelatih. Pensyarah di institut pendidikan mempunyai strategi pengajaran dan pembelajaran yang baik dan faktor ini memainkan peranan penting dalam mengembangkan kemahiran berfikir kreatif guru pelatih.

Katakunci: *Strategi pengajaran dan pembelajaran, pentaksiran, motivasi, kemahiran berfikir kreatif, guru pelatih*

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INTRODUCTION

Creative thinking skills are the ability of individuals to use their minds to generate novel ideas, solutions and inventions. It can provide confidence and improve academic achievement. Based on Nadara and Peng (2018), In the era of industrial economic competition, Malaysia necessitates individuals to possess critical, innovative, imaginative, and creative thinking skills.With that, creative thinking skills become very important to everyone especially the university students. However, the development of creative thinking skills of a university students will depend on two factors which are lecturer and students themselves.

In university life, the lecturer plays a pivotal role in conducting classes through lecture activities. Students enhance and refine their skills through these sessions. Consequently, the teaching and learning strategies implemented, as well as the assessments crafted by the lecturer, become influential factors shaping students' creative thinking skills. Today's Teaching and Learning (TnL) Strategies are heavily emphasized in education. The traditional teaching strategies have been gradually eliminated and replaced by new TnL Strategies. The study indicated that individuals who engaged in the new teaching and learning strategies rated their creative thinking skills higher than their peers in traditional classes (Forte-Celaya & Glasserman-Morales, 2021). In other words, if the TnL strategies in activity design do not provide opportunities for students to practice CTS, the students will have a low CTS (Rizal, Rusdiana, Setiawan & Siahaan, 2020). Therefore, TnL strategies factor is still crucial in TnL as it will influence the CTS of students.

Besides, assessment is a learning tools which can train students' CTS. Study from Solfitri, Siregar, Anggraini and Apristi (2023) demonstrated that the utilization of an enhanced e-worksheet in assessments can enhance students' mathematical creative thinking abilities. In other words, different types of assessments such as tasks and assignments will affect the development of CTS (Yakibova, 2021). If we need to develop the CTS of students, the assessments used should contain creative thinking elements or components. Therefore, assessment factor is still crucial in TnL as it will influence the CTS of students.

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Nevertheless, students factors also will influence their creative thinking skills indirectly. Many previous study have concluded that motivation is the factor closely related to the development of creativity of a person (Chasanah, Kaniawati, & Hernani, 2017; Fischer, Malycha, & Schafmann, 2019). When people feel motivated, deep involved & passionate about their work, they will be most creative in their work. Instead, when people feel less motivated, depress and stress about their work, they will be less creative in their work (Amabile Theory). Therefore, motivation factor is still crucial in TnL as it will influence the CTS of students.

In conclusion, creative thinking skills is very important and needed on an individual. Without it, complex problems will become difficult to solve. However, teaching and learning, assessment and motivation factors will affect the development of development of creative thinking skills. Therefore, this study will be focus on the development of creative thinking skills with those factors among teacher trainees at TEI, Technical Education Campus.

REVIEW OF LITERATURE

Creative teacher will produce a student who is desired by National Education Philosophy (NEP). However, study from Ika & Linda (2020) shown that the level of creative thinking skills among students in school still low. Many of the previous studies also found that the level of creative thinking skills of teacher traineesis low either in Malaysia or others countries (Ika & Linda, 2020; Handayani, Rahayu & Agustini, 2021; Rizal, Rusdiana, Setiawan & Siahaan, 2020). Therefore, the level of creative thinking skills of teacher traineesin this current situation has become a question as they are the prospective teachers to produce students who is desired by FPK. The two factors that may influence the development of creative thinking skills of teacher trainees which are lecturer factor and also student factors.

For the lecturer factor, teaching and learning strategies is the main aspect in the development of creative thinking skills. It has a relationship with creative thinking skills (Forte-Celaya & Glasserman-Morales, 2021). Study from Rizal, Rusdiana, Setiawan & Siahaan (2020) shown the teaching and learning of lecturer in a teacher institute is consider as low. Most of the respondent responded that the lecturers lack to apply creative thinking elements in TnL strategies. Therefore, their creative thinking skills is low as they do not have the chance to develop creative thinking skills in class activities. Besides, study from Ika & Linda (2020) also shown the creative thinking skills of students is low due to the learning strategies designed by teachers. Therefore, the perspective of teacher traineestoward the teaching and learning of their lecturer should be concerned as it has related to the development of teacher trainees creative thinking skills.

Besides, assessment is the other related aspect in the development of creative thinking skills. Assessment included assignment, worksheet, task, exam paper and so on. Different types of assessments will affect the development of creative thinking skills (Yakibova, 2021). Study from Rizal, Rusdiana, Setiawan & Siahaan (2020) shown majority of the lecture assignments involve answering problems that are concept-related. Reference books served as the assignment's primary source. Less actions and consideration was given to solving contextual and conceptual problems, which can aid in the development of creative thinking skills among respondents. Therefore, the perspective of teacher traineestoward the assessments given by lecturer should be concerned as it has related to the development of teacher trainees' creative thinking skills.

For the students factors, motivation is the main aspect in the developments of creative thinking skills. Students can lose motivation in college for a variety reasons, from being unsure about their major to hating their coursework to more serious issues like anxiety and depression

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(Ludovici, 2023). When a student loses his motivation, his creative thinking skills will also be lost. Study from Chasanah, Kaniawati and Hernani (2017) had obvious shown the low level of creative thinking skills of students is influenced by their motivation. In addition, study from Fischer, Malycha,and Schafmann (2019) also highlight there have a significant relationship between motivation and creativity. Therefore, the motivation of teacher traineesshould be concerned as it will affect his creative thinking and even the pupils he wants to teach in the future.

In addition, most of the studies were from others countries, in Malaysia there are still less studies conducted on the creative thinking skills and the two factor toward it especially among student teachers. Therefore, this study is carried out to identify the level of the creative thinking skills of teacher traineesand the relationship between the two factor which are the lecturer factor (T&L strategies and assessments) based on the perspective of students and the students' own factor (motivation) with their creative thinking skills.

METHODOLOGY

The design of this study is a survey using quantitative methods by collecting information through questionnaire instruments. The questionnaire in this study is divided into 4 sections which are parts A, B, C and D. Part A consists of three items to obtain the demographic information of the respondents. Part B consists of 10 items to determine the perspective of teacher traineestoward the teaching and learning strategies and assessments given by lecturer. Besides, Part C consists of 8 items to determine the level of motivation of teacher traineesand part D consists of 19 items to the level of creative thinking skills of student teachers.

In this study, the face validation was carried out by obtaining reviews and recommendations from three experts in the field of science and language. The overall reliability Cronbach's alpha coefficient value is .940 which shows that this questionnaire can be used in a real study. After collecting the data, it will be analysed by using descriptive statistical analysis and inferential statistical analysis via Statistical Package for the Social Sciences (SPSS) version 28. Descriptive analysis was used to identify the teaching and learning strategies of lecturer, the assessments given by lecturer, motivation and creative thinking skills of teacher traineesby referring to mean score interpretation which shown in Table 1.

Table 1. Mean Score Interpretation

Mean score	Level
1.00 – 2.33	Low
2.34 – 3.66	Moderate
3.67 – 5.00	High

Source: (Ghazali and Sufean, 2018)

Meanwhile, inferential statistical analysis was used to determine the relationship between the teaching and learning strategies of lecturer and creative thinking skills of student teachers, the relationship between the assessments given by lecturer and creative thinking skills of teacher traineesand the relationship between the motivation of trainee teachers and creative thinking skills of teacher traineeswhich is referring to Pearson Correlation Table Interpretation show in Table 2.

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Table 2. Pearson Correlation Table Interpretation

Value Correlation Coefficient	Relationship Interpretation
0.00 - 0.10	Negligible
0.10 – 0.39	Weak
0.40 – 0.69	Moderate
0.70 – 0.89	Strong
0.90 – 1.00	Very strong

Source: (Schober & Schwarte, 2018)

Samples

The sample in this study are students in a Teacher Institute, Negeri Sembilan. A total of 217 people from 3 options namely Science, Mathematics and Design and Technology will take part in this survey by referring to the Krejcie and Morgan (1970) Sample Size Determination Table. Therefore, stratified random sampling technique has been used to ensure that each option group is accurately represented.

RESULTS

Perspective of Teacher traineesTowards the Teaching and Learning Strategies of Lecturer

Table 3 shown the overall of mean score, standard deviation and score interpretation about the perspective of teacher traineestowards the Teaching and Learning strategies of lecturer. The perspective of teacher traineestowards the teaching and learning strategies of lecturer is at a high level with a mean of 4.16 and a standard deviation of .64. The item with the highest mean score value is B2 (I am always encouraged and acknowledged by my lecturer when I come up with a creative solution to the problem). Meanwhile, the item with the lowest mean score value is B5 (I am always encouraged by my lecturer to engage in collaborative groups based on the diversity of our ability to conduct assignment.).

Table 3. The overall of mean score, standard deviation and score interpretation about the perspective of teacher traineestowards the Teaching and Learning strategies of lecturer

No.	Statement	Mean	Standard Deviation	Score interpretation
B1	I always get creative thinking question from my lecturer which can attract my attention and keep me active in class activities.	4.07	0.67	High
B2	I am always encouraged and acknowledged by my lecturer when I come up with a creative solution to the problem.	4.17	0.68	High
B4	I always learn in situations created by lecturer that require to link more than one concept, relationship or skill.	4.19	0.62	High
B5	I am always encouraged by my lecturer to engage in collaborative groups based on the diversity of our ability to conduct assignment.	4.29	0.57	High
B7	I can generate creative ideas in a variety style of discussions that conducted by my lecturer.	4.07	0.67	High

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B9	I have built new knowledge with the help from lecturers by using different techniques such as stories telling, hand out activities and others.	4.18	0.66	High
	Overall	4.16	0.64	High

Perspective of Teacher traineesTowards the Assessments Given by Lecturer

Table 4 shown the overall mean score, standard deviation and score interpretation about the perspective of teacher traineestowards the assessments given by lecturer. The perspective of teacher traineestowards the assessments given by lecturer is at a high level with a mean of 4.20 and a standard deviation of .65. The item with the highest mean score value is B3 (I always receive tutorials tasks and tests questions contained open-ended questions from my lecturer) and B8 (I receive challenging assignments from lecturers which can stimulate my creative thinking and positive-activating mood.) Meanwhile, the item with the lowest mean score value is B10 (I realised that the questions that come out on exam paper were designed based on diversity and different level of difficulties).

Table 4. The overall mean score standard deviation and score interpretation about the perspective of teacher traineestowards the assessments given by lecturer

No.	Statement	Mean	Standard Deviation	Score interpretation
B3	I always receive tutorials tasks and tests questions contained open-ended questions from my lecturer.	4.19	0.67	High
B6	I have done many meaningful assignments given by lecturers which can help me to understand the lecture effectively.	4.24	0.65	High
B8	I receive challenging assignments from lecturers which can stimulate my creative thinking and positive-activating mood.	4.17	0.67	High
B10	I realised that the questions that come out on exam paper were designed based on diversity and different level of difficulties.	4.20	0.62	High
	Overall	4.20	0.65	High

Motivation of Student Teachers

Table 5 shown the overall of mean score, standard deviation and score interpretation about the level of motivation of student teachers. The motivation of teacher traineesis at a high level with a mean of 4.20 and a standard deviation of .68. The item with the highest mean score value is C8 (I think it is important to me to get good grades in exams.). Meanwhile, the item with the lowest mean score value is C4 (I enjoy the class that I attend in this semester very much.) and C7 (I am confident I can do an excellent job on the assignments and tests that I do in this semester.).

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Table 5. The overall of mean score, standard deviation and score interpretation about the level of motivation of student teachers

No.	Statement	Mean	Standard Deviation	Score interpretation
C1	I have a high motivation to change for the better.	4.24	0.65	High
C2	I would ask someone who is more knowledgeable about things I understood less.	4.39	0.63	High
C3	I will not give up easily when I fail doing something, I will even try to do better.	4.22	0.67	High
C4	I enjoy the class that I attend in this semester very much.	4.06	0.77	High
C5	I prefer course materials that really challenge me so I can learn new things.	4.07	0.74	High
C6	I think the amount of time and effort that I spend in class is worthwhile to me.	4.13	0.67	High
C7	I am confident I can do an excellent job on the assignments and tests that I do in this semester.	4.06	0.72	High
C8	I think it is important to me to get good grades in exams.	4.41	0.55	High
	Overall	4.20	0.68	High

Creative Thinking Skills of Student Teachers

Table 6 shown overall and every aspect of mean score, standard deviation and score interpretation about the level of creative thinking skills of student teachers.

Table 6. The overall and every aspect of mean score, standard deviation and score interpretation about the level of creative thinking skills of student teachers

No.	Statement	Mean	Standard Deviation	Score interpretation
D1	I have many creative ideas when participating in group activities.	4.06	0.69	High
D2	I like to play around with ideas for the fun of it.	4.20	0.68	High
D3	The number of ideas that I may offer is used more than other groupmates.	3.97	0.71	High
D4	I am able to determine the truth of a question or the truth of a problem-solving plan.	4.09	0.70	High
D5	I come up with an idea or solution other people have never thought of.	3.90	0.75	High
D6	I would rate myself highly in being able to come up with diverse ideas.	3.83	0.76	High
D7	I come up with a lot of ideas or solutions to problems about the topic during the discussion.	4.04	0.66	High
D8	I am able to express the reasons for the truth of answers or statements.	4.12	0.63	High
D9	I am interested in participating in a group project which is based on original ideas.	4.21	0.69	High

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D10	I often find that one of my ideas has led me to other ideas that have further led me to multiple ideas, and I end up with an idea and do not know where it comes from.	4.06	0.65	High
D11	Sometimes I feel so interested in a new idea that I forget about other things.	4.01	0.71	High
D12	I am able to develop and enrich my groupmates' ideas.	4.06	0.66	High
D13	I am able to think up answers to problems that have not already been figured out.	3.95	0.69	High
D14	I try to think of a variety of methods from different perspectives during solving a problem.	4.13	0.66	High
D15	When having discussion with group mates in the class, I often have trouble staying with one topic because I think of so many things to express.	3.93	0.81	High
D16	I can find out the weakness of a product and add details to it to fix its weakness.	3.98	0.67	High
D17	I have ideas about new inventions or making further improvement on existing work.	3.97	0.67	High
D18	I am good at combining ideas in assorted ways that others have not tried.	3.97	0.75	High
D19	I may develop a variety of ideas at once.	3.97	0.69	High
	Overall	4.02	0.70	High

Based on Table 6, the creative thinking skills of teacher traineesis at a high level with a mean of 4.02 and a standard deviation of .70. In detail, there are 4 sub-constructs namely originality, flexibility, fluency and elaboration under creative thinking skills. Table below (Table 7) shows the mean and standard deviation of 19 items about creative thinking skills based on 4 sub-constructs.

Table 7. Mean score, standard deviation and interpretation of the score by item of the creative thinking skills

No Item	Mean	Standard Deviation	Score interpretation
Originality			
D1	4.06	.69	High
D5	3.90	.75	High
D9	4.21	.69	High
D13	3.95	.69	High
D17	3.97	.67	High
	4.02	**.70**	**High**
Flexibility			
D2	4.20	.68	High
D6	3.83	.76	High
D10	4.06	.65	High
D14	4.13	.66	High
D18	3.97	.75	High
	4.04	**.70**	**High**

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Fluency			
D3	3.97	.71	High
D7	4.04	.66	High
D11	4.01	.71	High
D15	3.93	.81	High
D19	3.97	.69	High
	3.98	**.72**	**High**
Elaboration			
D4	4.09	.70	High
D8	4.12	.63	High
D12	4.06	.66	High
D16	3.98	.67	High
	4.06	**.67**	**High**
Overall	4.02	.70	High

The level of elaboration skills for trainee teachers is the highest (M=4.06), followed by the level of flexibility (M=4.04), level of originality (4.02) and level of fluency (M=3.98). Based on originality sub-construct, item D9 has a high mean (M=4.21) compared to other items. This can be proven that almost all teacher traineesare interested in participating in a group project which is based on original ideas. Based on flexibility sub-construct, item D2 has a high mean (M=4.20) compared to other items. This can be proven that majority of teacher traineesare like to play around with ideas for the fun of it. Based on fluency sub-construct, item D7 has a high mean (M=4.04) compared to other items. This can be proven that majority of teacher traineesthink that they can come up with a lot of ideas or solutions to problems about the topic during the discussion. Based on elaboration sub-construct, item D8 has a high mean (M=4.12) compared to other items. This can be proven that almost all trainee teachers are able to express the reasons for the truth of answers or statements.

Relationship between Teaching and Learning (T&L) Strategies and Creative Thinking Skills

The result of Pearson's correlation analysis 'r' about the strength of relationship between the teaching and learning strategies of lecturer and creative thinking skills of teacher trainees is shown in Table 8 below:

Table 8. The relationship between the teaching and learning strategies of lecturer and creative thinking skills of student teachers

		Teaching and Learning Strategies	**Creative Thinking Skills**
Teaching and Learning Strategies	*Pearson Correlation*	1	.519**
	Sig. (2-tailed)		<.001
	N	217	217
Creative Thinking Skills	*Pearson Correlation*	.519**	1
	Sig. (2-tailed)	<.001	
	N	217	217

Based on Table 8, the results of the study found that the Pearson Correlation coefficient between the teaching and learning strategies of lecturer and creative thinking skills of teacher traineesis r = <.001, p = .519 which shows that both variables are positively related to relationship strength at a moderate level. In conclusion, the findings of this study show that

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there is a significant relationship between the teaching and learning strategies of lecturer and creative thinking skills of student teachers.

Relationship between Assessments and Creative Thinking Skills

The result of Pearson's correlation analysis 'r' about the strength of relationship between the assessments given by lecturer and creative thinking skills of teacher traineesis shown in Table 9 below:

Table 9. The relationship between the assessments given by lecturer and creative thinking skills of student teachers

		Assessments	**Creative Thinking Skills**
Assessments	*Pearson Correlation*	1	.438**
	Sig. (2-tailed)		<.001
	N	217	217
Creative Thinking Skills	*Pearson Correlation*	.438**	1
	Sig. (2-tailed)	<.001	
	N	217	217

Based on Table 9, the results of the study found that the Pearson Correlation coefficient between the assessments given by lecturer and creative thinking skills of teacher traineesis r = <.001, p = .438 which shows that both variables are positively related to relationship strength at a moderate level. In conclusion, the findings of this study show that there is a significant relationship between the assessments given by lecturer and creative thinking skills of student teachers.

Relationship between Motivation and Creative Thinking Skills

The result of Pearson's correlation analysis 'r' about the strength of relationship between the motivation and creative thinking skills of teacher traineesis shown in Table 10 below:

Table 10. The relationship between the motivation and creative thinking skills of student teachers

		Motivation	**Creative Thinking Skills**
Motivation	*Pearson Correlation*	1	.566**
	Sig. (2-tailed)		<.001
	N	217	217
Creative Thinking Skills	*Pearson Correlation*	.566**	1
	Sig. (2-tailed)	<.001	
	N	217	217

Based on Table 10, the results of the study found that the Pearson Correlation coefficient between the motivation and creative thinking skills of teacher traineesis r = <.001, p = .566 which shows that both variables are positively related to relationship strength at a moderate level. In conclusion, the findings of this study show that there is a significant relationship between the motivation and creative thinking skills of student teachers.

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DISCUSSION

The level of creative thinking skills of teacher traineesfrom four aspects namely originality, flexibility, fluency and elaboration in this teacher institute is high. This study is against with Rizal, Rusdiana, Setiawan, and Siahaan (2020) which shown the level of creative thinking skills of prospective physic teacher in Indonesia were low. Apart from student teachers, this study is also opposite to other studies on college students and elementary school students. For example, this study against with Handayani, Rahayu and Agustini (2021) which shown the eight-grade students in Bangkalan Regency have a low level of creative thinking skills. Besides, this study also against with Ika, L., & Linda, Z. (2020) which stated the students at elementary Jakarta school have a low level of creative thinking skills.

In Malaysia, there are not many studies have been carried out after 11 years of the government taking the initiative in emphasizing 21st Century Teaching and Learning and STEM activities. Therefore, this study can fill the gap and add reference sources to identify the level of creative thinking skills of teacher traineesat teacher institute. In conclusion, the creative thinking skills teacher traineesat this teacher institute is at a high level. This also proved that the teacher traineeshave a high level of creative thinking to deliver the knowledge or solve the problem in future classroom.

However, the skill of fluency of trainee teacher earned a lowest score compare to others skills even though it also at a high level. This difference will occur probably due to linguistic factors. The sample of this study is teacher traineeswho take SN, MT and RBT as major options. For SN and MT students, the language they need to use in the major subject while studying in class, making discussions or doing assignments is English. As Malaysian may be more familiar with speaking Malay rather than English. Most respondents disagreed with items stated such as “When having discussion with group mates in the class, I often have trouble staying with one topic because I think of so many things to express.”, “The number of ideas that I may offer is used more than other groupmates.” and “I may develop a variety of ideas at once.”. All these responses may indicate that teacher traineesare having difficulty to generate ideas, express ideas smoothly or communicating with group members in English during class activities. The mispronunciation, grammatical error and lack of vocabulary will be the hindrance for their development of fluency skill (Putri, Pedo & Pawestri, 2020).

In addition, the level of creative thinking skills of teacher traineesin this teacher institute is high. The result of this finding is related to 3 factors namely teaching and learning of lecturer, assessments and also motivation. Motivation of teacher traineeshave the stronger strength of relationship with their creative thinking skills. This study supported by Fischer, Malycha & Schafmann (2019) which shows a significant relationship between motivation and creativity and innovation. Besides, this study is also in the line with Chasanah, Kaniawati and Hernani (2017) which found that the level of creative thinking skills of students is influenced by some own factor such as motivation.

In this study, what makes the teacher traineesinterest and more creative in learning is their own motivation. Most respondents agreed with items stated such as “I think it is important to me to get good grades in exams.”, “I would ask someone who is more knowledgeable about things I understood less.” and “I have a high motivation to change for the better.”. All these responses are the reflection of intrinsic motivation among student teachers. Based on Buntat, Nasir and Sharliana (2021), intrinsic motivation is one's own attitude. If the individual is very interested and excited about the challenges in the work he/she doing, he/she will focus and work hard to find the solution in different ways for solving any problems without think the time, money or spirit. At this moment, the motivation is at a high level and it drive one’s creativity to do something. Therefore, it can be concluded that motivation have a great relationship with

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creative thinking skills among the student teachers. They have the interest and internal strength drive them creative to explore as well as solve problems (Chen, 2022).

Besides, Teaching and Learning (TnL) Strategies of lecturer is the second factor which have a medium strength of relationship with creative thinking skills. This study supported by Forte-Celaya and Glasserman-Morales (2021) which shown the type of teaching and learning had greater effects on creative thinking of students. The respondents who engaged in creative TnL strategies classes have higher creative thinking skills than their peers in the traditional classes. Besides, this study also in the line with Ika and Linda (2020) which stated the creative thinking skills of students is caused by instructional and learning patterns both given by the lecturer and within students. Furthermore, this study also supported by Rizal, Rusdiana, Setiawan & Siahaan (2020) which shown that the level of creative thinking skills of prospective physic teachers is related with the teaching and learning strategies that applied by their lecturer.

In this study, teaching and learning strategies of lecturer help the development of creative thinking skills among student teachers. Most respondents agreed with items stated such as "I am always encouraged by my lecturer to engage in collaborative groups based on the diversity of our ability to conduct assignment.", "I always learn in situations created by lecturer that require to link more than one concept, relationship or skill." and "I have built new knowledge with the help from lecturers by using different techniques such as stories telling, hand out activities and others." All these responses have shown their lecturer are using the new pedagogy method which is 21st century pedagogy in the classes. 21st century pedagogy can help students to develop certain skills such as critical, creative thinking, collaboration and so on (González-Pérez & Ramírez-Montoya, 2022). Lecturer have used the 21st century method to carry out activities such as collaborative group, stories telling, hand out activities… which help teacher traineesto explore and think from different angles whether it is by themselves or with friends. Indirectly, their creative thinking skills can be trained. In conclusion, teaching and learning strategies of lecturer also have a significant relationship with creative thinking skills among student teachers.

Moreover, assessment is the third factor which have a significant relationship with creative thinking skills. This study supported by Yakibova (2021) which shown different types of assessments such as tasks and assignments will affect the development of creative thinking skills. For example, the study from Solfitri, Siregar., Anggraini and Apristi (2023) shown that assessment (e-worksheet) used can improve students' mathematical creative thinking abilities. Besides, study from Ritter, Gu, Crijns and Biekens (2020) also proved that creativity tasks helping the student to apply creative thinking skills to solve problems.

In this study, assessment can help the development of creative thinking skills among student teachers. Most respondents agreed with items stated such as "I have done many meaningful assignments given by lecturers which can help me to understand the lecture effectively.", "I realised that the questions that come out on exam paper were designed based on diversity and different level of difficulties." and "I always receive tutorials tasks and tests questions contained open-ended questions from my lecturer.". All these responses have shown their lecturer have designed assessments which can help teacher traineesto train their creative thinking elements. It undeniable that assessments used should be adapted to the teaching and learning method (Fatmawati, Wazni & Husnawati, 2021). If the TnL method is 21st century (creative thinking), the assessments used also contain creative thinking elements or components. This can give the assessment to achieve relatively high effectiveness in improving student teachers' creative thinking. Therefore, it can be concluded that assessment also have a significant relationship with creative thinking skills among the student teachers.

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CONCLUSION

The results of the study found that the perspective of teacher traineestowards the teaching and learning strategies of lecturer, the perspective of teacher traineestowards the assessments given by lecturer, the motivation of teacher traineesand creative thinking skills of teacher traineesin this teacher institute was high. The results of this study also show that there was a stronger strength of relationship between motivation and creative thinking skills of student teachers, followed by the relationship between teaching and learning strategies of lecturer and creative thinking skills of student teachers, and the relationship between assessments and creative thinking skills of student teachers.

This study is expected to give impact on the teacher institute lecturer and teacher traineesas a guide in ensuring that the two factor which are the lecturer factor (included teaching and learning strategies as well as assessments) and also students' own factor (namely motivation) can help the development of creative thinking skills among student teachers. Moreover, this study also expected to increase the specific field of knowledge in Malaysia because most of the latest studies are from foreign countries and there is still less related study conducted in Malaysia. Since this study has its own limitations, further study recommendations can be implemented by expanding the scope of the study to include other options and other teacher institute. In addition, further study is also suggested using mixed methods to make the research question more comprehensive than using only one study method.

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