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**Examining the Role of Mastery of Techniques (MT), Painting Materials (PM), Subject Matter (SM), and Teaching Methods (TM) on the Teaching Effect of Oil Painting (TE) Using PLS-SEM Approach and MGA Analysis of Demographic Variables**

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### **Abstract**

*This study investigates factors influencing the teaching efficacy of oil painting courses, focusing on Mastery of Techniques (MT), Painting Materials (PM), Subject Matter Selection (SM), and Teaching Methods (TM). A survey of oil painting students across various Chinese universities was conducted. The study involved demographic factors, including gender and study years. Smart-PLS version 3 and the PLS-SEM procedure were used for analysis. Results revealed positive and statistically significant effects of MT, PM, SM, and TM on Teaching Effect (TE). While age showed no significant differences as a moderator, study years influenced the relationships.*

**Introduction:** This article examines the four factors that influence the teaching efficacy of oil painting courses. Mastery of Techniques (MT), Painting Materials (PM), Subject Matter (SM), and Teaching Methods (TM) are examined as variables.

**Methodology:** This investigation involved a survey of oil painting students from multiple Chinese universities. Smart-PLS version 4 was utilised to implement the PLS-SEM procedure. These four variables, namely Mastery of Techniques (MT), Painting Materials (PM), Subject Matter Selection (SM), and Teaching Methods (TM), were found to have positive and statistically significant effects on Teaching Effect (TE). Tested demographic factors include gender, study years, and outcomes.

**Results and discussion/Themes and findings:** There are no significant differences for age as a moderator. For each relationship, there are significant differences based on the study year of the moderator. In contrast, for results as moderator, there are significant differences for nearly all relationships except TE.

**Conclusion and/or recommendations:** Relevant implications and suggestions are proposed to help improve the level of Teaching effects (TE) on students.

## **Keywords**

*PLS-SEM, Mastery of Techniques (MT), Painting Materials (PM), Choice of Subject Matter (SM), Teaching Methods (TM), Teaching Effect (TE)*

## **1. Introduction**

At present, people's material living standards are improving day by day, and their spiritual needs are becoming more and more diverse. Under the macro background of diversified art development, in order to effectively improve the overall effect of oil painting teaching in Colleges and universities, teachers need to uphold the guiding ideology of openness, development and keeping pace with the times, take effective measures to optimize the landing measures of oil painting teaching in Colleges and universities, and look at the current practical problems from the perspective of development. Only in this way can we improve the comprehensive quality and professional quality of college students and create favorable conditions for the overall development of China's social hard power and soft power. Based on the analysis of the main problems existing in the current oil painting teaching in Colleges and universities, this paper puts forward relevant solutions and suggestions. Under the background of promoting the development of art in an all-round and multi angle, this paper hopes to provide some reference for improving the overall effect of oil painting teaching in Colleges and universities.

## **2. Literature review**

### **2.1 Statement of The Problem**

Teaching Effect of oil painting (TE) is the major of this study. Perceptions on Oil painting education and teaching effectiveness have to evaluated. Oil painting teaching in colleges and universities need to be improved (Wu, 2017).

Mastery of techniques (MT) refers to the method used in the creation of a painting. Fan (2018) has stated that “Paying attention to and advocating the quality of painting will inevitably make it impossible for patterning and shoddy manufacturing. The research on the traditional materials and techniques of classical oil painting can broaden the horizons of artists, enrich the artistic language of oil painting, consolidate the

foundation of realism and picture control, and let people stand on the shoulders of previous artists and go further.”

Choice of subject matter (SM) refers to the choosing of the initial content, direction and meaning of the painting. Yan (2014) has stated that “the choice of subject matter is a very important issue in oil painting creation. Only by choosing the appropriate subject matter can painters express their thoughts and feelings, express their inner world, and create works that move the audience. The choice of theme should not only accumulate long-term through loving life and diligent thinking, but also do short-term excavation to clarify the theme.” The subject matter of an oil painting can affect the effectiveness of teaching because it can engage the students' interest and motivation, making them more likely to participate and learn. Additionally, certain subject matter may lend itself better to teaching specific techniques or concepts, such as landscapes for teaching perspective or still life for color theory. It is important for the teacher to consider the skill level and interests of their students when choosing the subject matter for a lesson.

While Teaching methods (TM) are often related to the ways of teaching and guidance methods used by teachers in the process of education. Li (2017) has stated that “Only by paying attention to cultivating students' innovative thinking, creating a good learning environment for students and tapping students' creative potential in the teaching process can we ensure that students' creation will not become a stagnant water and that students can promote the further development of oil painting art with a steady stream of creative inspiration.”

Lastly Painting materials (PM) refers to the types of pigments used in the process of oil painting and the choice of more materials can better express the content they want to express. Fan (2018) has stated that “Oil painting tools and materials determine the complexity of oil painting techniques. For centuries, from the early classical realistic oil painting to the contemporary new realistic oil painting, realistic oil painting has occupied a certain position in the history of painting. Even at the moment of seeking novelty, tradition is gradually ignored and forgotten, and many painters are still keen on it. Classical realistic paintings cannot be defined simply by a certain style or technique.”

There are many influential sociodemographic moderators. For instance, age is a very important sociodemographic factor. Age has been a moderating factor in several investigations using structural equation modelling (Biswas et al, 2020; Fisher et al, 2021). The mere fact that ageing often causes an attitude change while also affecting changes in behaviour and perception is why age can be a useful moderator. The impact of the independent variables on the investigated dependent variable in this study may

be moderated by age and other socio-demographic moderators. The description and testing of gender as a moderator has been widely studied by the researchers (Fisher et al, 2021). The differing perception between male and female usually bring about changes in behaviour and perception.

## **2.2 Objective**

In order to understand the factors affecting the effectiveness of the oil painting course, there are 5 research objectives in this study. They are:

1. To investigate the influence of the mastery of oil painting techniques (MT) on the teaching effect of oil painting (TE).
2. To investigate the influence of Choice of subject matter (SM) of oil painting on the teaching effect of oil painting (TE).
3. To Determine the impact of teaching methods (TM) on the teaching effect of oil painting (TE).
4. To investigate the influence of painting materials (PM) on the teaching effect of oil painting (TE).
5. To study the moderating effects of Socio-demographic characteristics on the proposed model in this study.

## **2.3 Research Question**

There are five research questions related to the factors affecting the effectiveness of oil painting course which are presented below. These questions are quantitative in nature and will assist in reaching the goal of this research that are to assess which factors predict the effectiveness of oil painting course. They are:

- Q1. Does students' mastery of oil painting techniques affect the teaching effect of oil painting?
- Q2. Does students' choice of oil painting theme affect the effect of oil painting teaching?
- Q3. Does the teacher's oil painting teaching method affect the effect of oil painting teaching?
- Q4. Do the painting materials of oil painting affect the effect of oil painting teaching?

Q5. What are the moderating effects of socio-demographic characteristics on the proposed model in this study?

## **2.4 Hypothesis**

In sum, there are five research hypotheses in this study. They are:

H1: The students' mastery of oil painting techniques has obviously positive influence on the teaching effect of oil painting.

H2: The students' choice of oil painting theme has obviously positive influence on oil painting teaching.

H3: The teacher's teaching method has obvious influence on oil painting teaching.

H4: The painting material of oil painting has obvious influence on oil painting teaching.

H5: There are effects of socio-demographic characteristics that are age, gender, year of study, results on the proposed model in this study.

## **3. Methodology**

The study is a Quantitative Survey using questionnaire and the data was processed using SEM-PLS. To test the hypothesized relationships, the quantitative survey research design will be employed (Zikmund et al, 2013).

A-priori Sample Size Calculator is a viable tool for sample size estimation for structural equation models (Soper, 2020). The sampling process of this study is shown in Figure 1 below. The sample calculator of Daniel Soper can be accessed at <https://www.danielsoper.com/statcalc/calculator.aspx?id=89>. The anticipated effect size is set at 0.3 which is the acceptance effect size. The desired statistical power level is set at 0.8 which is a high-power level. There are 5 latent variables in which 1 dependent variable and 4 Independent variables are found in this study. There are altogether 28 observed variables which represent the 28 items in this questionnaire. The probability level is set to 0.05. Thus, the minimum sample size is 148 and the recommended sample size is 150. However, in order to obtain better result as well as to prepare for any invalid data found, 300 to 400 samples will be used in this study.

A pilot study provides an excel-lent opportunity to uncover such problems ahead of time, minimizing the need to adapt procedures or to develop contingency plans on short notice when the larger study is being conducted (Viechtbauer et al, 2015).

30–40 participants per group at a minimum will be needed in order to yield confident results for pilot study (Hertzog, 2008).

Reliability test result of the pilot test is shown in table below. There were 54 samples in this pilot test. There were 21 items in this instrument.

Anticipated effect size:	<input type="text" value="0.3"/>	?
Desired statistical power level:	<input type="text" value="0.8"/>	?
Number of latent variables:	<input type="text" value="5"/>	?
Number of observed variables:	<input type="text" value="21"/>	?
Probability level:	<input type="text" value="0.05"/>	?
<input type="button" value="Calculate!"/>		
Minimum sample size to detect effect: 150		
Minimum sample size for model structure: 92		
Recommended minimum sample size: 150		

**Figure 1:** Sampling result

The total population under consideration comprises approximately 35,000 art students. For the purpose of this study, a purposive sampling method was employed to select a representative sample from this population. The rationale behind purposive sampling lies in the specific criteria relevant to the study's objectives. This approach allows for a targeted selection of participants who possess unique characteristics or experiences related to the factors under investigation—Mastery of Techniques (MT), Painting Materials (PM), Subject Matter Selection (SM), and Teaching Methods (TM). By using purposive sampling, the study aims to gather in-depth insights from art students with diverse perspectives, contributing to a comprehensive understanding of the influences on the teaching efficacy of oil painting courses.

The survey items that are used to measure the constructs of the model in this study are included below in Table 1 below. Table 2 shows the Cronbach's Alpha value if item deleted. All values are above 0.7 indicating higher and stronger reliability indices. The reliability indices for all dimensions were above 0.7 and below 0.95. Thus, no issues of multi collinearity and auto collinearity occurred. This instrument is suitable for PLS-SEM analysis later in this study.

The questionnaire employed in this study utilized a Likert Scale to assess the responses of oil painting students. The Likert Scale is a commonly employed psychometric tool that allows respondents to express their level of agreement or disagreement with

statements related to Mastery of Techniques (MT), Painting Materials (PM), Subject Matter Selection (SM), and Teaching Methods (TM). Participants were asked to rate each item on a predetermined scale, typically ranging from "Strongly Disagree" to "Strongly Agree," providing a structured and quantifiable measure of their opinions and perceptions. This scale choice aims to facilitate a nuanced and standardized evaluation of the factors influencing teaching efficacy in oil painting courses, ensuring clarity and consistency in the collected data.

Based on the findings of this study, several recommendations emerge to enhance the teaching efficacy of oil painting courses. Firstly, educational institutions should prioritize the development of instructors' Mastery of Techniques (MT) and diversify Teaching Methods (TM) to cater to varied learning styles. Additionally, attention should be given to optimizing Painting Materials (PM) and refining Subject Matter Selection (SM) to align with students' interests and contemporary art trends. Given the significant influence of study years on the identified variables, a targeted approach to curriculum adjustments and instructional strategies over the course of a student's academic journey is advised. Furthermore, institutions could implement regular assessments and feedback mechanisms to continually improve the quality of oil painting education. Overall, these recommendations aim to foster a dynamic and effective learning environment that positively impacts the teaching and learning experiences in oil painting courses.

TABLE 1: ITEMS IN THE INSTRUMENT OF THIS STUDY

	Item	Reference and justification:
Dv. Teaching Effect of oil painting. (TE) Perceptions on Oil painting education and teaching effectiveness.	TE1. I am confident that I can master oil painting course well. TE2. I can draw good works by studying this course TE3. The painting course is very helpful for my	“At present, influenced by various factors, there are many problems in the teaching of oil painting in colleges and universities in China. Therefore, in oil painting teaching, teachers should give full play to their leading role, help students establish self-confidence and bravely face various challenges in oil painting learning and creation. While emphasizing that students should master the basic knowledge and skills of oil painting, they should also cultivate students' aesthetic consciousness and innovative thinking, so that students can form an independent

	<p>learning of oil painting.</p> <p>TE4. I can master my painting style by taking this oil painting course.</p>	<p>personality with their own personality, inject their own views and thoughts into oil painting creation, and strive to cultivate a new generation of oil painting art talents. In short, there is still a long way to go in the reform and development of oil painting teaching in Colleges and universities in China. Only by finding suitable ones in continuous exploration can we make the road of oil painting art in China icing on the cake.” (LI, 2015) 。</p>
<p>Iv1. Mastery of techniques.(MT)</p> <p>The method used in the creation of a painting.</p>	<p>MT1. I am able to master the traditional realistic oil painting techniques on my oil painting works.</p> <p>MT2. I am able to master the oil painting techniques that my instructor taught.</p> <p>MT3. I am proficient the use of oil painting techniques in completing my art work.</p> <p>MT4. I always like to practice oil painting techniques taught by my instructors.</p>	<p>“In the era of masters, every successful painter is a part of the artistic tradition, just like a link in a solid chain. They have added their lifelong practice and efforts to the tradition. At first, through their apprenticeship in the painting workshop, they were familiar with the structure and function of various materials, and then mastered various painting skills, fully mastered the necessary painting materials and techniques, so as to lay the foundation of their personal painting style and ensure the permanent charm and artistic value of their works. The formation of painting style is inseparable from the innovation and progress of painting materials and techniques.” (GUI, 2014)</p>



<p>Iv2. Choice of subject matter. (SM)</p> <p>Choose the initial content, direction and meaning of the painting.</p>	<p>SM1. It is important to recognize suitable themes for oil paintings.</p> <p>SM2. It is not difficult for me to choose the theme of oil painting since I attend this course.</p> <p>SM3. I am able to master landscape themes of oil painting by attending this course.</p> <p>SM4. I am able to master figure themes of oil painting by attending this course.</p> <p>SM5. I am able to master still-life themes of oil painting by attending this course.</p>	<p>“The choice of subject matter is a very important issue in oil painting creation. Only by choosing the appropriate subject matter can painters express their thoughts and feelings, express their inner world, and create works that move the audience. The choice of theme should not only accumulate long-term through loving life and diligent thinking, but also do short-term excavation to clarify the theme.”(Xing, 2013)</p>
<p>Iv3. Teaching methods. (TM)</p> <p>Teaching methods and guidance methods used by teachers in the</p>	<p>TM1. The teaching methods used in this course can help me to learn oil painting better.</p> <p>TM2. I am willing to follow exactly as</p>	<p>"Oil painting teaching in Colleges and universities is an effective means to improve students' comprehensive quality and professional quality. The rationality of teaching content and the completeness of teaching system have an important impact on the training quality of art talents. Therefore, colleges and teachers</p>

<p>process of education.</p>	<p>the teacher taught on the oil painting techniques.</p> <p>TM3. I will revise my work after the teacher corrects my painting.</p> <p>TM4. The way teachers communicate in class makes it easy for me to understand.</p>	<p>should pay attention to the innovation and reform of oil painting teaching in Colleges and universities. Under the background of diversified development of art, colleges and teachers should innovate teaching methods with long-term vision and positive attitude, and gradually realize the initial teaching educational objectives. Based on the in-depth analysis of the problems existing in the current oil painting teaching in Colleges and universities, this paper puts forward some suggestions, such as establishing new teaching ideas and teaching consciousness, continuously improving the innovation level of oil painting teaching, improving students' cultural heritage and flexible and flexible use of advanced science and technology, hoping to provide help for improving the overall effectiveness of oil painting teaching in Colleges and universities. "</p> <p>(ZHOU,2021)</p>
<p>Iv4. Painting materials.(PM)</p> <p>The types of pigments used in the process of oil painting and the choice of more materials can better express the content they want to express.</p>	<p>PM1. I need the right paint for me to draw better works.</p> <p>PM2. I need appropriate painting tools to draw better oil paintings.</p> <p>PM3. I can make a perfect oil frame that suits me.</p> <p>PM4. In this course, I can learn</p>	<p>"As a tangible art form, oil painting has a strong artistry. The most obvious manifestation of this artistry is the role of expressing feelings in the scene through lines, colors and other aspects. In the oil painting of the current era, oil painting materials and painting skills are very important for oil painting creation, and improving painting skills is also the prospect trend of the development of oil painting in China."</p> <p>(XU,2019)</p>

	the selection of oil painting materials and material production.	
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TABLE 2: RELIABILITY INDICES OF THE DIMENSIONS

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
TE1	74.83	407.047	.777	.937
TE2	74.80	404.807	.796	.937
TE3	74.74	397.630	.857	.927
TE4	74.56	403.950	.822	.927
MT1	74.81	413.286	.684	.947
MT2	74.81	403.512	.833	.927
MT3	74.83	414.255	.577	.945
MT4	74.70	406.892	.704	.943
ST1	74.72	397.072	.842	.942
ST2	74.57	405.759	.790	.943
ST3	74.61	399.072	.848	.942
ST4	74.83	400.142	.837	.942
ST5	74.74	405.479	.799	.943
TM1	74.70	408.024	.771	.943
TM2	74.76	409.318	.783	.943
TM3	74.59	395.076	.901	.942
TM4	74.74	402.082	.807	.942
PM1	74.85	406.846	.769	.943
PM2	74.67	406.075	.764	.943
PM3	74.69	400.861	.809	.942
PM4	74.69	402.371	.808	.942

Multigroup analysis (MGA) is a statistical method used to compare the means of multiple groups or populations. It is typically used in research studies to determine if there are significant differences in a particular variable or set of variables between different groups. The purpose of MGA is to identify any group differences, such as demographic or treatment effects, in order to better understand the underlying causes of the outcome being studied. In other words, it tests and compares the effect of every structural path across various groups (Aguinis et al., 2017; Ting, Fam, Hwa, Richard, & Xing, 2019).

## 4. FINDINGS

### A. Descriptive statistics

Table 3 gives some information about the demographics of the participants, respectively, calculated in SPSS.

TABLE 3: DEMOGRAPHIC INFORMATION OF THE STUDY

Name	Missings	Mean	Median	Scale min	Scale max	Observed min	Observed max	Standard deviation	Excess kurtosis	Skewness
gender	0	-	2	1	2	1	2	0.5	-2.004	-0.074
year of study	0	-	2	1	2	1	2	0.5	-2.004	-0.074
result	0	-	1	1	2	1	2	0.397	0.375	1.54
item1	0	3.782	4	1	5	1	5	1.237	-0.008	-0.973
item2	0	3.853	4	1	5	1	5	1.244	-0.208	-0.927
item3	0	3.797	4	1	5	1	5	1.235	-0.15	-0.929
item4	0	3.797	4	1	5	1	5	1.243	-0.046	-0.974
item5	0	3.873	4	1	5	1	5	1.254	-0.022	-1.027
item6	0	3.831	4	1	5	1	5	1.231	-0.074	-0.963
item7	0	3.868	4	1	5	1	5	1.254	0.049	-1.049
item8	0	3.863	4	1	5	1	5	1.214	0.033	-0.996
item9	0	3.848	4	1	5	1	5	1.22	0.039	-0.997
item10	0	3.804	4	1	5	1	5	1.259	-0.135	-0.955
item11	0	3.851	4	1	5	1	5	1.231	-0.05	-0.968
item12	0	3.814	4	1	5	1	5	1.227	-0.297	-0.853
item13	0	3.79	4	1	5	1	5	1.268	-0.11	-0.978
item14	0	3.807	4	1	5	1	5	1.237	-0.064	-0.959
item15	0	3.866	4	1	5	1	5	1.166	0.08	-0.973
item16	0	3.856	4	1	5	1	5	1.242	-0.128	-0.963
item17	0	3.861	4	1	5	1	5	1.232	-0.018	-0.992
item18	0	3.841	4	1	5	1	5	1.279	-0.255	-0.933
item19	0	3.848	4	1	5	1	5	1.218	-0.063	-0.947
item20	0	3.822	4	1	5	1	5	1.272	-0.259	-0.92
item21	0	3.819	4	1	5	1	5	1.246	-0.177	-0.926

### B. Outer loadings

Table 4 below depicts the measurement model of this study. In this research, the factor outer loadings between items and their underlying constructs calculated by Smart-PLS version 3 showed that each item had an indicator loading that was greater than 0.707 and with significant value smaller than 0.050. As shown in table 4 below, all of the factor loadings of the items to corresponding constructs are above 0.7 and significant ( $p$ -value  $< 0.05$ ) which are excellent. Hence, the measurement model has indicator reliability.

TABLE 4: THE MODEL WITH OUTER LOADINGS

	MT	PM	SM	TE	TM
MT1	0.892				
MT2	0.881				
MT3	0.881				
MT4	0.880				
PM1		0.874			
PM2		0.870			
PM3		0.872			
PM4		0.871			
SM1			0.869		
SM2			0.871		
SM3			0.861		
SM4			0.861		
SM5			0.881		
TE1				0.876	
TE2				0.889	
TE3				0.885	
TE4				0.890	
TM1					0.881
TM2					0.872
TM3					0.885
TM4					0.882

### C. Internal Consistency Reliability and Convergent Validity Analysis

Besides, construct internal consistency reliability is an indicator of how well and to what extent the indicators of one construct measure that construct (Herzog & Tonchia, 2014). In other words, construct internal consistency shows that the items are measuring the same thing. Cronbach's alpha is a measure used to assess the internal consistency or internal reliability of a set of scales or test items (calculated in Smart-PLS version 3 in this study). In the other words, the reliability of any given measurement refers to the extent to which it is a consistent measure of a concept, and Cronbach's alpha is one way of measuring the strength of that consistency (Urbach & Ahlemann, 2010). The higher amount of  $\alpha$  indicates the items have more shared covariance and probably measure the same underlying concept. According to Gefen et al. (2011), in order to check internal consistency, the value of Cronbach's  $\alpha$  statistics for exploratory research should be more than 0.6 and for confirmatory research (i.e., CFA) should be more than 0.7. In addition, in CFA and SEM, internal consistency can be checked by composite reliability (CR) and should be more than 0.7 (Urbach & Ahlemann, 2010). The values of Cronbach's  $\alpha$  and CRs are shown in Table 5. As shown in Table 5, all values of Cronbach's  $\alpha$  and CRs are greater than 0.7 so the measurement model has internal consistency reliability.

TABLE 5: THE RESULTS OF INTERNAL CONSISTENCY RELIABILITY AND CONVERGENT VALIDITY ANALYSIS

	Cronbach's alpha	Composite reliability (rho_a)	Composite reliability (rho_c)	Average variance extracted (AVE)
MT	0.906	0.906	0.934	0.780
PM	0.895	0.895	0.927	0.760
SM	0.919	0.919	0.939	0.754
TE	0.908	0.908	0.935	0.783
TM	0.903	0.903	0.932	0.774

The results of both Model with Outer Loadings and Related P- Values as well as the results of Internal Consistency Reliability and Convergent Validity Analysis have confirmed that the instrument developed in this study is of no question. Therefore, the measurement model is of standard, and this instrument can be used for assessment of structural model.

#### D. Assessment of Structural Model

Table 6 below shows the Assessment of Structural Model of this study. According to table 6 below, the path coefficients between all constructs are significant (p-value < 0.01). The results show that all the independent variables have significant and positive effect on dependent variable.

TABLE 6: ASSESSMENT OF STRUCTURAL MODEL: PATH COEFFICIENTS BETWEEN ALL CONSTRUCT

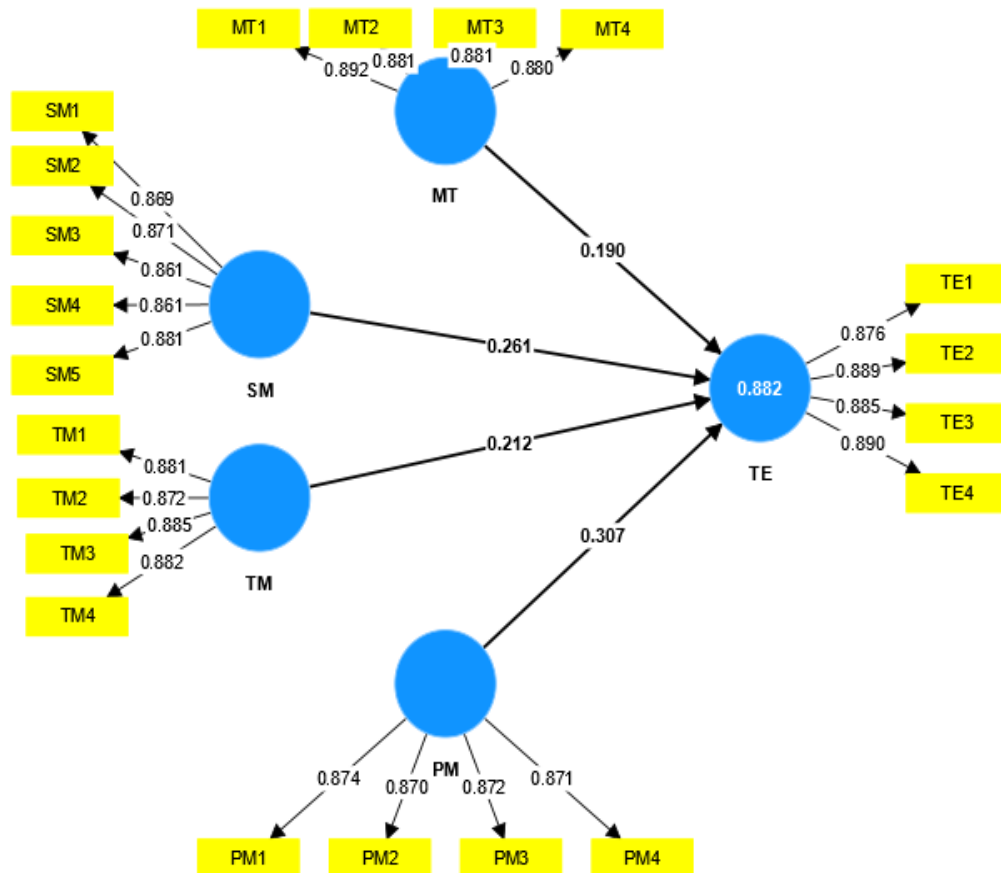
	Path Coefficients	P Values	Explained Variance (R <sup>2</sup> )
MT → TE	0.190	0.000	
PM → TE	0.307	0.000	
SM → TE	0.261	0.000	
TM → TE	0.212	0.000	

#### E. Graphic Representation of the Model

Besides, as shown in figure 2 below and table 6 above, the explained variance of all the constructs (r square is equal to 0.882 which means 88.2% of the variance in the dependent variable construct can be explained by its predictors which shows all the

independent variables are having a substantial effect on the dependent variable in this study, namely SPE.

Figure 2: The Graphic Representation of the Model with Path Coefficients, and Explained Variance



#### F. Hypotheses Testing

With the confirmation of Structural Model assessment results and the high value of r square as shown in figure 2 and table 6 above, hypotheses testing of this study can be carried out. Table 7 below shows the major findings on the hypotheses testing of this study.

TABLE 7: HYPOTHESES TESTING

Hypothesis	Relationships	T value	Decision	95% CILL	95% CIUL
H1	MT -> TE	3.776	Accepted	0.091	0.287
H2	PM -> TE	6.131	Accepted	0.211	0.403
H3	SM -> TE	4.788	Accepted	0.156	0.369
H4	TM -> TE	4.400	Accepted	0.118	0.306

For hypothesis 1, t value is 3.776. No zero value is between 95% CI LL and 95%CI UL. Hence, the hypothesis 1 is accepted. For hypothesis 2, t value is 6.131. No zero value is between 95% CI LL and 95%CI UL. Hence, the hypothesis 2 is accepted. For hypothesis 3, t value is 4.788. No zero value is between 95% CI LL and 95%CI UL. Hence, the hypothesis 3 is accepted. For hypothesis 4, t value is 4.400. No zero value is between 95% CI LL and 95%CI UL. Hence, the hypothesis 4 is accepted. The results of the study highlighted the positive relationships of the students towards tasks in blended learning courses. As such, the four hypotheses confirmed in this study were:

- 1) The students' mastery of oil painting techniques has significant positive influence on the teaching effect of oil painting.
- 2) The students' choice of oil painting theme has significant positive influence on oil painting teaching.
- 3) The teacher's teaching method has significant influence on oil painting teaching.
- 4) The painting material of oil painting has significant influence on oil painting teaching.

#### G. MGA analysis 1 – gender

Permutation multigroup analysis is used. Male and female groups are compared. No significant differences are found.

	Original (male)	Original (female)	Original difference	Permutation mean difference	2.5%	97.5%	Permutation p value
MT	0.915	0.898	0.017	0.001	-0.031	0.031	0.294
PM	0.895	0.895	0.000	0.001	-0.035	0.036	0.972
SM	0.923	0.914	0.009	0.001	-0.026	0.026	0.503
TE	0.914	0.901	0.013	0.000	-0.030	0.030	0.407
TM	0.904	0.901	0.003	0.001	-0.032	0.032	0.843



#### H. MGA analysis 2 – year of study

Permutation multigroup analysis is used. Year 1 and year 2 groups are compared. Significant differences are found for all relationships.

	Original (year1)	Original (year2)	Original difference	Permutation mean difference	2.5%	97.5%	Permutation p value
MT	0.899	0.899	0.000	0.000	-0.036	0.038	0.000
PM	0.898	0.898	0.000	0.000	-0.036	0.039	0.000
SM	0.925	0.925	0.000	0.001	-0.028	0.026	0.000
TE	0.906	0.906	0.000	0.000	-0.032	0.033	0.000
TM	0.908	0.908	0.000	0.000	-0.031	0.032	0.000

#### I. MGA analysis 3 – results

Permutation multigroup analysis is used. Excellent result and below excellent result groups are compared. Significant differences are found for almost all relationships except for TE.

	Original (excellent)	Original (below excellent)	Original difference	Permutation mean difference	2.5%	97.5%	Permutation p value
MT	-0.133	0.007	-0.139	0.003	-0.034	0.056	0.000
PM	-0.249	-0.128	-0.121	0.003	-0.036	0.060	0.000
SM	-0.079	-0.183	0.103	0.003	-0.028	0.049	0.000
TE	0.110	0.065	0.045	0.002	-0.033	0.057	0.052
TM	0.021	0.116	-0.095	0.002	-0.034	0.054	0.005

The tested demographic factors include gender, years of study, and results. For age as moderator, no significant differences are found. While for year of study as moderator, significant differences are found for all relationships. Whereas for results as moderator, significant differences are found for almost all relationships except for TE.

## 5. DISCUSSION AND CONCLUSION

The study has confirmed that Mastery of Techniques (MT), Painting Materials (PM), Choice of Subject Matter (SM) and Teaching Methods (TM) on Teaching Effect in this study. Therefore, efforts have to be done on these four factors in enhancing the level of perceived teaching effectiveness of the students.

Current study intensifies as pointed out by Xie et al (2018), oil painting techniques taught to the students have direct effect on the perceptions of the effectiveness of the oil painting courses attended. It is essential to find out how students perceived teaching techniques used in the course might affect their perception of the oil painting courses. Thus, instructors have to gather various oil painting techniques that perceived to be fundamental and should be mastered by the students. Checklist in mastery the vital skills can be prepared. Future studies can be carried out either quantitatively or qualitatively to sort out these fundamental oil painting techniques and skills. Oil painting techniques can greatly affect the effectiveness of teaching oil painting. Using a variety of techniques, such as layering, glazing, and impasto, can help students understand the different effects that can be achieved with oil paint. Additionally, demonstrating different techniques and encouraging students to experiment with them can lead to a more hands-on and engaging learning experience. However, the effectiveness of teaching oil painting also depends on factors such as the teacher's ability to communicate effectively, the students' prior knowledge and skill level, and the resources available in the classroom.

The selection of decent oil painting materials will definitely affect oil painting results and indirectly affect teaching effect. Instructor have to discuss with the students on the appropriateness in the selection of oil painting materials for their oil painting projects (Liu, 2021). Instructors may produce a reference of suitable oil painting materials for various oil painting effects. In this manner, students will be able to produce the more accurate painting projects by using the most suitable oil painting materials as directed by the experienced oil painting instructors (Liu, 2021). The materials used in oil painting can also affect the effectiveness of teaching the medium. High-quality paints, brushes, and canvases can provide students with a better understanding of the capabilities and limitations of oil paint, and can lead to more successful and satisfying results. Having a variety of materials available, such as different types of brushes or paint mediums, can also allow students to experiment and explore different techniques. Additionally, providing guidance and instruction on the proper care and maintenance of materials can help students develop good habits and prolong the life of their tools. However, like teaching technique, the effectiveness of teaching oil painting also depends on factors such as the teacher's ability to communicate effectively, the students' prior knowledge and skill level, and the resources available in the classroom.

The selection of oil painting themes is indeed affecting the effectiveness of the oil painting courses offered. The suitability of oil painting themes highly related to the experience, memory and imagination of the learners. These oil painting themes also determine the course contents. If the learners are made to draw oil painting themes that

are not in the familiar zones of their experience, memory and imagination, the effectiveness of the oil painting courses is definitely affected (Zhang, 2022). With the knowledge of understanding on the importance of the Choice of Subject Matter (SM), instructors again have to come out with a comprehensive list and checklist of oil painting themes that have to be included in the oil painting courses offered. At the same time, future studies can be carried out either quantitatively or qualitatively to sort out these oil painting themes as guide and references for all oil painting instructors. Mastery of techniques is important for effective oil painting teaching as it allows the instructor to provide clear and accurate instructions to the students, demonstrate proper techniques, and provide constructive feedback. Additionally, a teacher who has a strong understanding of oil painting techniques is better equipped to troubleshoot problems that may arise during the learning process.

Lastly, nowadays, the development of Internet technology has brought society into a new era, and its rapid development is bound to affect the traditional oil painting courses in colleges and universities, and bring huge changes to the teaching of oil painting courses (Jong et al, 2020; Tull et al, 2019; Jar et al, 2019). Hence, in order to improve teaching methods, a deliberate and systematic collection of recommended excellent teaching methods can be prepared as a reference for all oil painting instructors. This leads to the need of having future studies in both quantitative and qualitative methods in validation of the teaching methods as to be shared for all oil painting instructors. There are various teaching methods that can be used to increase the effectiveness of oil painting instruction. One approach is to use a step-by-step method, where the instructor demonstrates each step of the painting process and the students follow along. Another approach is to use a more hands-on, experiential method, where the students are given the opportunity to experiment and explore on their own with guidance from the instructor. Other methods may include critiques, group critiques, and individual assignments. Additionally, providing students with a range of resources and materials to work with, or incorporating the use of technology can also enhance the effectiveness of oil painting instruction.

In sum, table 8 below summarizes the efforts and suggestions in upholding the four aspects that will bring positive effects on Teaching effect of oil painting. These efforts should be implemented in making sure that the level of Teaching effect of oil painting is upholstered before the students graduated.

TABLE 8: EFFORTS AND SUGGESTIONS IN UPHOLDING THE FOUR ASPECTS THAT WILL BRING POSITIVE EFFECTS ON TEACHING EFFECT OF OIL PAINTING

Factor		Efforts and suggestions
1	Mastery of Techniques (MT)	<p>gather various oil painting techniques that perceived to be fundamental and should be mastered by the students</p> <p>Checklist in mastery the vital skills can be prepared</p> <p>demonstrating different techniques and encouraging students to experiment with them</p>
2	Painting Materials (PM)	<p>Instructor have to discuss with the students on the appropriateness in the selection of oil painting materials for their oil painting project</p> <p>Instructors may produce a reference of suitable oil painting materials for various oil painting effect</p> <p>High-quality paints, brushes, and canvases can provide students with a better understanding of the capabilities and limitations of oil paint</p>
3	Choice of Subject Matter (SM)	<p>come out with a comprehensive list and checklist of oil painting themes that have to be included in the oil painting courses offered.</p> <p>sort out these oil painting themes as guide and references for all oil painting instructors.</p>

		provide clear and accurate instructions to the students, demonstrate proper techniques, and provide constructive feedback pertaining to choice of subject matter
4	Teaching Method (TM)	<p>a deliberate and systematic collection of recommended excellent teaching methods can be prepared as a reference for all oil painting instructors.</p> <p>having future studies in both quantitative and qualitative methods in validation of the teaching methods as to be shared for all oil painting instructors.</p> <p>more hands-on, experiential method</p>

The tested demographic factors include gender, years of study, and results. For age as moderator, no significant differences are found. While for year of study as moderator, significant differences are found for all relationships. Whereas for results as moderator, significant differences are found for almost all relationships except for TE. It was found that age did not significantly affect the relationships being studied, but year of study and results did. Specifically, significant differences were found when year of study was used as a moderator, and almost all relationships had significant differences when results were used as a moderator. The exception was the relationship between TE and the other variables, which did not have significant differences when results were used as a moderator. The results of the study suggest that year of study and results have a greater impact on the relationships being studied than age does.

Since year of study can be a significant moderating factor in research studies as it can affect the participants' knowledge, skills, and experiences, which can in turn impact the results and conclusions of the study. It is important for researchers to consider and control for the moderating effects of year of study in their study design and analysis to ensure the validity and reliability of their findings. As confirmed by the study by Ketonen et al. (2018) which suggests that the year of study (such as freshman, sophomore, junior, senior) may act as a moderator, influencing educational

achievement. This means that students in different years of their education may experience different levels of success in their studies, potentially due to factors such as increased knowledge and experience, changes in curriculum or teaching methods, or differences in student populations.

When results of learning is considered a significant moderator for model testing, it means that the results of the testing may vary depending on the level of learning that has occurred. In other words, the effectiveness of the model may be influenced by the amount of learning that has taken place. This highlights the importance of taking into account the learning history of the individuals being tested when evaluating the performance of a model. As confirmed by Brunmair & Richter (2019) that the results of learning (or perhaps a specific aspect of learning) can serve as a moderating variable in a statistical model, meaning that it can influence the strength or direction of the relationship between other independent variables and a dependent variable. In other words, the study may have found that the impact of certain independent variables on the dependent variable changes depending on the level or outcome of the learning variable.

Additionally, the relationship between Teaching Effect and the other variables does not appear to be affected by results when used as a moderator. Further investigating on the relationship between Teaching Effect and year of study and results, as well as exploring other potential moderating variables that may impact the relationship should be carried out. Additionally, it may be beneficial to conduct a larger and more diverse study sample to ensure the generalizability of the findings.

There are some limitations in this study and some future suggestions are proposed in tackling these limitations. Similar as prior studies, current study also prone with some limitations. First, data collected through convenience sampling method which might be restrict generalizability of results. For future studies, large samples and with stratified sampling method can be employed to increase the generalizability of the findings.

Second, there were only four factors involved only in this study. For future studies, more determinants can be added in producing a more fruitful understanding for developing a better and comprehensive model which includes a multitude of factors in determining the enhancing the perceptions of satisfactions in teaching effectiveness among the students.

Third, current study taken only the effects of four selected independent variables on the dependent variable. Moderators and mediators that will affect the relationships studied in this study should be considered for future studies in order to yield greater

understanding on the effects of these moderators and mediators on the relationships studied.

Fourth, this study employed basic method of PLS-SEM in the assessment process. Future study should employ other more advanced techniques in PLS-SEM analysis, such as assessing the common method variance (construct level correction), using multi-group analysis (MGA) in evaluating the moderating factors effecting the relationships and etc.

In conclusion, this study has verified that Mastery of Techniques (MT), Painting Materials (PM), Choice of Subject Matter (SM) and Teaching Methods (TM) are having significant positive effects on Teaching Effect (TE). Thus, instructors have to ensure that various strategies and suggestions pertaining to the vital four factors examined in this study should be carried out as to assist the students in having better perception on Teaching Effect (TE) of the oil painting courses taken.

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