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THE INFLUENCE OF TECHNOLOGICAL, PEDAGOGICAL, AND CONTENT KNOWLEDGE (TPACK) OF ECONOMICS TEACHERS ON LEARNING MOTIVATION THAT IMPACTS LEARNING CREATIVITY IN ECONOMICS SUBJECT AT SMA NEGERI 59 JAKARTA

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Abstract

This study aims to examine the impact of technological, pedagogical, and content knowledge (TPACK) of economics teachers on students' learning motivation and its subsequent influence on learning creativity in economic subjects at SMA Negeri 59 Jakarta. The research employs a quantitative approach with data collected through questionnaires from a sample of 107 students from class XI economics. The data analysis is conducted using SEM-PLS with SmartPLS software. The findings reveal significant direct effects of the teacher's TPACK ability on both student learning creativity (path coefficient: 0.335, t-statistic: 4.316, p-value: 0.000 < 0.05) and learning motivation (path coefficient: 0.378, t-statistic: 4.739, p-value: 0.000 < 0.05). Additionally, a significant direct effect of learning motivation on student learning creativity is observed (path coefficient: 0.315, t-statistic: 2.161, p-value: 0.031 < 0.05). Furthermore, the study also identifies an indirect effect of TPACK Ability on Learning Creativity through Learning Motivation, indicating a considerable influence (path coefficient: 0.119, t-statistic: 2.041, p-value: 0.042 < 0.05). Overall, these findings highlight the importance of economics teachers' TPACK in fostering students' learning motivation and creativity in economic subjects. The study provides valuable insights into the interplay between teacher knowledge, student motivation, and learning outcomes, contributing to the enhancement of educational practices and student engagement in the economics curriculum.

Keywords: *Learning Creativity, Learning Motivation, TPACK Ability*

1. INTRODUCTION

A life with advancing technology is witnessing the emergence of the fourth-generation phenomenon known as the Industrial Revolution 4.0, where cyber and automation technologies collaborate. This technology is now prevalent in all aspects of life, termed as digital technology. Education is no exception, as it utilizes technology to facilitate learning. In the era of Education 4.0, teachers are required to master technological skills as it is crucial for effective teaching. Additionally, teachers must also be adept in using technology to teach their subjects, considering the knowledge and skills essential in this modern era.

The competencies of teachers are regulated by the Indonesian Law No. 20 of 2003, emphasizing the importance of active, innovative, and enjoyable teaching. In active learning processes, teachers must effectively master the subject matter and technological skills, as well as communicate effectively with students to ensure comprehension of the

information conveyed. The rapid technological developments not only enable effective teaching but also provide opportunities for meaningful learning experiences that adapt to students' growth and development.

One of the frameworks for integrating effective teaching is the TPACK (Technological, Pedagogical, and Content Knowledge) framework. It is a useful framework for considering what knowledge teachers need to integrate technology into their teaching and how they can develop this knowledge (Schmidt et al., 2014). Utilizing TPACK as a framework for measuring teaching knowledge has the potential to impact the training and professional development experiences designed for pre-service and in-service teachers.

TPACK was developed by Mishra and Koehler and is an adaptation of Pedagogical Content Knowledge (PCK) by Shulman. TPACK aims to develop the foundational knowledge for teachers to learn the subject matter and understand how technology can enhance learning opportunities, while also knowing the appropriate pedagogy to improve the content of the teaching (Wahyuni, 2019). Teachers equipped with TPACK competencies can enhance students' learning motivation, leading to satisfactory and positive learning outcomes for their future. Therefore, TPACK empowers teachers with comprehensive knowledge of technology, competence, and content to ensure an effective learning process.

In the learning process, various challenges arise, such as students not fully engaging in the lessons, missing assignments, and less interactive learning. These challenges are more pronounced during the new normal learning situation, where students' learning motivation is said to decline due to many unsubmitted assignments, low student activity during the learning process, and lack of interest in learning.

Learning motivation plays a crucial role in students' learning process and significantly influences their academic achievements. Underachieving students are not solely limited by their capabilities but also due to their lack of learning motivation, hindering them from exerting their full potential. Motivation is a driving force within students that leads to their willingness to engage in learning and achieve desired goals. Motivation is closely tied to academic achievements, and its emergence is driven by both internal and external desires for learning success.

After teachers implement their skills in the learning process, there will be results obtained from students who have participated in the learning activities, which are reflected in their satisfactory academic performance and achievements. These results are evident in temporary report cards or various competitions attended by students on behalf of the school or individually.

Teachers are expected to engage in more creative activities during the teaching process to create a learning environment that enhances students' learning motivation. Students' motivation for learning drives their creativity, which is then applied in the learning process. Creativity is an essential aspect in various environments, such as schools, companies, and other settings. Fostering creativity is essential to face the challenges of the globalization era. Creativity can be seen as a process, especially in educational settings, where creativity stems from the joy of involvement in creative activities. Through the teaching and learning process, student creativity can be nurtured and developed, manifested in their enthusiasm for seeking knowledge, expressing ideas and opinions, active involvement in extracurricular activities, and more.

Student creativity in learning plays a significant role in the success of the learning process. According to Usman, students who possess creativity in learning exhibit creativity in various activities. They are eager to solve problems, take on challenging risks, sometimes constructive and sometimes destructive, prefer to work independently, and have confidence in themselves.

Hence, the TPACK framework enables teachers to enhance their technological, pedagogical, and content knowledge in the learning process, leading to effective teaching and improved learning motivation and creativity among students.

TPACK (Technological Pedagogical and Content Knowledge) has emerged as a theoretical framework aimed at determining the knowledge needed for teaching in the digital era to provide more complex instruction for teachers. According to (Shulman, 1986) and further developed by (Willermark, 2018), TPACK is an extension of the Pedagogical Content Knowledge (PCK) model. In this model, Shulman emphasizes the importance of integrating a teacher's content knowledge with pedagogical knowledge. He defines PCK as going beyond content or subject matter knowledge to include knowledge of how to teach specific content. In the development of the (Koehler & Mishra, 2005) model, the aspect of technological knowledge has been added, which refers to knowledge of how to work with and apply technological resources. The TPACK framework not only emphasizes the components independently but also highlights the complex interaction of content, pedagogy, and technological knowledge, and how to apply this knowledge in the unique context of the classroom.

According to (Emda, 2018), motivation is a series of efforts to provide certain conditions, so that a person is willing and wants to do something, and if they do not like it, they will try to eliminate or avoid that feeling of dislike. Thus, motivation can be stimulated by external factors, but it grows within a person. The environment is one external factor that can foster motivation in individuals for learning. Therefore, motivation is the drive that occurs within a person with a specific motive and leads to real actions to achieve certain goals. Thus, motivation is essential in learning to increase enthusiasm for learning.

Motivation for learning can also be interpreted as a series of efforts to provide certain conditions, so that a person is willing and wants to do something, and if they do not like it, they will try to eliminate or avoid that feeling of dislike. According to (Sardiman, 2011), the indicators of learning motivation include the following:

a. Diligence in facing tasks.
b. Perseverance in facing difficulties (not easily giving up).
c. Showing interest in various people's problems.
d. Preferring to work independently.
e. Easily getting bored with routine tasks.
f. Being able to maintain one's opinion.

Getzel and Jackson, as cited by (Slameto, 1988), also suggested that discussions about creativity are often associated with intelligence. They argue that those with high intelligence levels may not necessarily have high creativity levels, and similarly, students with high creativity levels may not necessarily have high intelligence levels (Setyowati & Widana, 2016).

According to (Angeli, 2021), learning creativity is the ability to find ways to solve problems faced by students in the learning situation, based on their behavior in dealing with inevitable changes in the process of student learning development.

Learning creativity is one of the indicators of students' success in learning and plays a crucial role in achieving successful learning outcomes. According to (Usman & Setiawati, 1993), students who have creativity in learning can be identified by demonstrating their level of creativity in various activities. They are always eager to solve problems, dare to take on difficult risks, sometimes showing destructive as well as constructive behavior, preferring to work independently, and having confidence in themselves.

2. RESEARCH METHODS

This research aims to describe the influence of Technological, Pedagogical, and Content Knowledge (TPACK) of Economics Teachers on Learning Motivation, which impacts Learning Creativity in the subject of Economics at SMA Negeri 59 Jakarta. The method used in this research is quantitative as it is suitable for the conducted study. The researcher wants to understand the relationship between exogenous and endogenous variables by measuring them in numerical form.

This study uses a descriptive method to describe each research variable based on the obtained data. With this descriptive method, the researcher adopts a survey approach. According to (Abdullah, 2015), the descriptive method is used to describe the nature of something and examine the causes of a phenomenon, while the survey approach is used to measure emerging phenomena and obtain data directly from respondents. Therefore, the researcher uses the quantitative descriptive research method to explain the direct and indirect influence of TPACK teacher's ability on learning motivation, which impacts learning creativity in this study.

This research employs non-probability sampling technique, where the sampling technique is determined by the researcher, and the type of sampling used is saturated sampling (Sugiyono, 2012), which includes the entire population with all its characteristics as the sample. Thus, the sample used in this research is from 3 classes of XI IPS 1 to 3 with a total of 107 students.

In this study, the researchers use a descriptive analysis approach with a quantitative method that adopts PLS-SEM (Partial Least Squares Structural Equation Modeling), and the data is processed using SmartPLS software. Structural Equation Modeling (SEM) is used to analyze the path model. According to (Hamid & Anwar, 2019), SEM is one of the analysis techniques used to test and estimate causal relationships by integrating path analysis and factor analysis. Using SEM allows data to be analyzed by combining factor analysis, structural model, and path analysis. Partial Least Squares (PLS) analysis, as described by (Hamid & Anwar, 2019), is a multivariate statistical technique that compares multiple dependent variables with multiple independent variables. PLS is one of the statistical SEM methods based on variance designed to solve multiple regression problems when specific issues occur in the data, such as small sample size, missing data, and multicollinearity. PLS is sometimes referred to as soft modeling because it relaxes strict OLS regression assumptions, such as no multicollinearity among independent variables.

3. RESULTS AND DISCUSSION

3.1. Outer Model Analysis

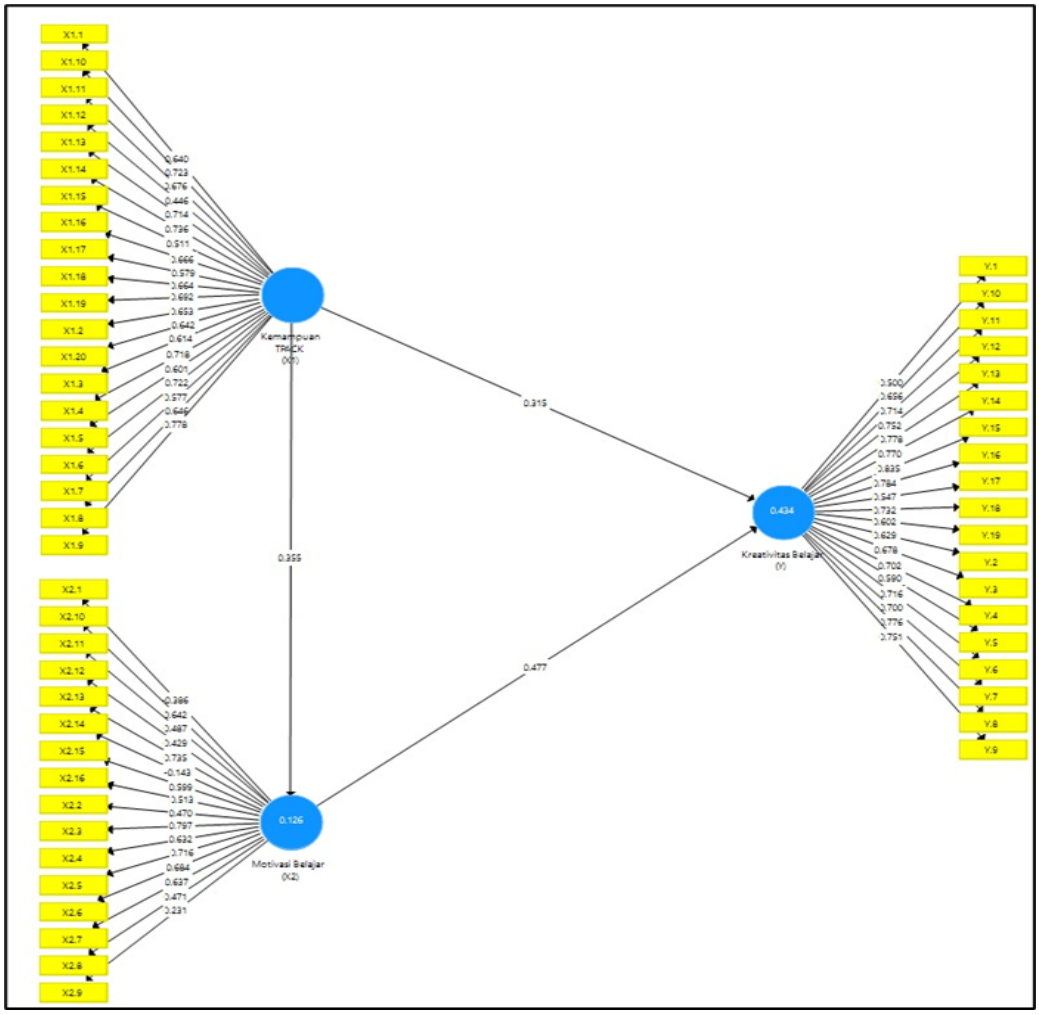

Figure 1. Outer Model

Based on the picture above, get the results of the value of discriminant validity, composite reliability, average variance extracted (AVE), convergent validity and Cronbach Alpha.

3.2. Convergent Validity

Table 1. Outer Loading Factor

	TPACK Ability_(X1)	Learning Creativity _(Y)	Learning Motivation _(X2)
X1.1	0.640		
X1.10	0.723		

X1.11	0.676		
X1.12	0.446		
X1.13	0.714		
X1.14	0.736		
X1.15	0.511		
X1.16	0.666		
X1.17	0.579		
X1.18	0.664		
X1.19	0.692		
X1.2	0.653		
X1.20	0.642		
X1.3	0.614		
X1.4	0.718		
X1.5	0.601		
X1.6	0.722		
X1.7	0.577		
X1.8	0.646		
X1.9	0.778		
X2.1			-0.386
X2.10			0.642
X2.11			0.487
X2.12			0.429
X2.13			0.735
X2.14			-0.143
X2.15			0.599
X2.16			0.513
X2.2			0.470
X2.3			0.797
X2.4			0.632
X2.5			0.716
X2.6			0.684
X2.7			0.637
X2.8			0.471
X2.9			0.231
Y.1		0.500	
Y.10		0.656	
Y.11		0.714	
Y.12		0.752	
Y.13		0.778	
Y.14		0.770	
Y.15		0.835	

Y.16		0.784	
Y.17		0.547	
Y.18		0.732	
Y.19		0.602	
Y.2		0.629	
Y.3		0.678	
Y.4		0.702	
Y.5		0.590	
Y.6		0.716	
Y.7		0.700	
Y.8		0.776	
Y.9		0.751	

From the table above, the outer loading value that is <0.7 will be eliminated. So that the outer loading value after elimination becomes as follows:

Table 2. Outer Model After Elimination

	TPACK Ability_(X1)	Learning Creativity _(Y)	Learning Motivation _(X2)
X1.10	0.834		
X1.13	0.784		
X1.14	0.773		
X1.5	0.730		
X1.8	0.826		
X1.9	0.831		
X2.3			0.903
X2.4			0.761
X2.5			0.856
X2.6			0.788
Y.11		0.734	
Y.12		0.773	
Y.13		0.774	
Y.14		0.765	
Y.15		0.841	
Y.16		0.798	
Y.18		0.730	
Y.4		0.714	
Y.6		0.706	
Y.7		0.725	
Y.8		0.791	
Y.9		0.779	

From this table, all outer loading values have> 0.7 which is the minimum limit. So, it can be concluded that all latent indicators in the table have met the validity. Apart from the outer loading value, convergent validity can be measured by looking at the AVE value with the standard that it can be said to be convergently valid and correlated, namely AVE> 0.5. The AVE value can be seen in the following table**:**

Table 3. Average Variance Extracted (AVE)

Variable	Average Variance Extracted (AVE)
TPACK Ability (X1)	0.636
Learning Creativity (Y)	0.580
Learning Motivation (X2)	0.687

From this table, it can be seen that the AVE value of the TPACK Ability variable is 0.636, Learning Creativity is 0.580 and Learning Motivation is 0.687. Therefore, it shows that the results on all research variables have met the requirements for the value> 0.5 and it is said that the measurement items of this variable have convergent validity.

3.3. Discriminant Validity

Table 4. Fornell-Larcker Criterion Results

Variable	TPACK Ability_(X1)	Learning Creativity _(Y)	Learning Motivation _(X2)
(X1)	0.797		
(Y)	0.454	0.762	
(X2)	0.378	0.442	0.829

From this table, it can be concluded that at the Fornell-Larcker Criterion stage, this study has a variable correlation value greater than other variables.

Table 5. Cross Loading

	TPACK Ability_(X1)	Learning Creativity _(Y)	Learning Motivation _(X2)
X1.10	0.834	0.383	0.267
X1.13	0.784	0.503	0.282
X1.14	0.773	0.173	0.173
X1.5	0.730	0.342	0.388
X1.8	0.826	0.341	0.297
X1.9	0.831	0.307	0.337
X2.3	0.288	0.341	0.903
X2.4	0.207	0.366	0.761
X2.5	0.389	0.369	0.856
X2.6	0.343	0.384	0.788
Y.11	0.252	0.734	0.323
Y.12	0.338	0.773	0.327
Y.13	0.242	0.774	0.276

Y.14	0.235	0.765	0.388
Y.15	0.309	0.841	0.336
Y.16	0.412	0.798	0.408
Y.18	0.422	0.730	0.349
Y.4	0.338	0.714	0.232
Y.6	0.293	0.706	0.488
Y.7	0.334	0.725	0.235
Y.8	0.543	0.791	0.299
Y.9	0.308	0.779	0.300

From the table, it can be concluded that at the Fornell-Larcker Criterion stage in this study, the variable correlation value is greater than the Table above shows that testing at the cross-loading stage can be said to be good because the correlation value between the variable and the variable and from each latent variable indicator has results that are greater than each other variable indicator.

3.4. Composite Reliability

Table 6. Results of Cronbach's Alpha and Composite Reliability other variables

Variable	Cronbach's Alpha	Composite Reliability
TPACK Ability (X1)	0.887	0.913
Learning Creativity (Y)	0.934	0.943
Learning Motivation (X2)	0.847	0.897

From the table above, it can be seen that all research variables have a value> 0.8. So, it can be concluded from the results of the Cronbach's alpha and composite reliability values that all measuring items on the research variables have good consistency and accuracy.

3.5. Inner Model Analysis

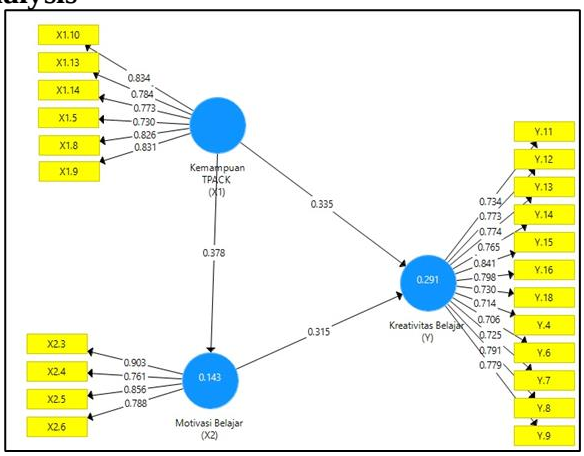

Figure 2. Inner Model

3.6. R-Square (R^2)

Table 7. R-Square (R^2)

Variable	R Square
Learning Creativity (Y)	0.591

The table above shows that the R^2 value in this study has a value of 0.591 or 59%. This shows that TPACK Ability and Learning Motivation in explaining Learning Creativity in the medium category. While the remaining 41% is influenced by other factors not examined in this study.

3.7. Q^2 Predictive Relevance (Q^2)

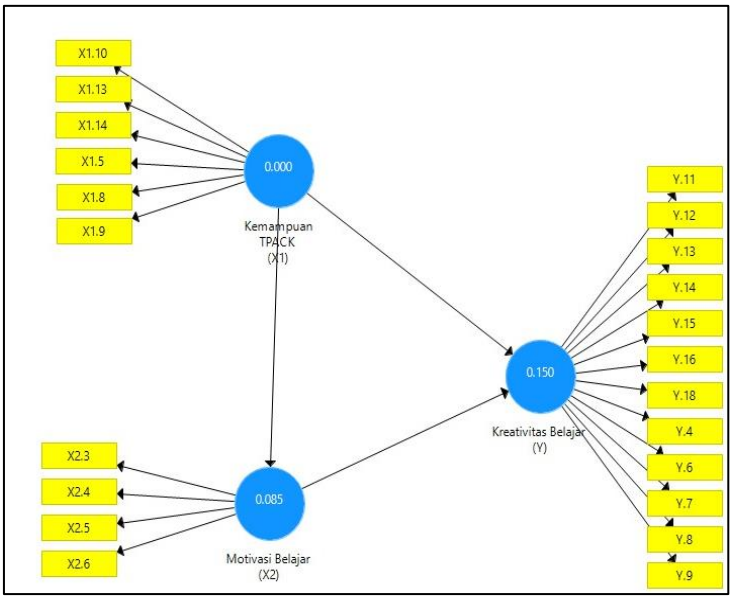

Figure 3. Blindfolding Q^2

Based on the figure, it shows that the TPACK Ability and Learning Motivation variables are smaller than learning creativity and have a Q^2 value of 0.150> 0.085> 0.000. So, it can be concluded that the latent variables in this study are able to predict the dependent variable.

3.8. Variance Inflation Factor (VIF)

Table 8. Variance Inflation Factor (VIF)

TPACK Ability (X1)	VIF	Learning Motivation (X2)	VIF	Learning Creativity (Y)	VIF
X1.10	2.408	X2.3	3.347	Y.11	2.904
X1.13	1.746	X2.4	1.608	Y.12	3.187
X1.14	2.186	X2.5	2.575	Y.13	3.826
X1.5	1.745	X2.6	1.709	Y.14	3.930

X1.8	2.521			Y.15	3.456
X1.9	2.916			Y.16	3.169
				Y.18	2.476
				Y.4	2.421
				Y.6	2.381
				Y.7	2.973
				Y.8	3.018
				Y.9	3.474

From this table, none of the VIF values are> 5.00, so it can be concluded that there is no collinearity problem in the correlation model of this study.

3.9. Goodness of Fit (GoF)

Table 9. Standardized Root Mean Square Residual (SRMR)

	Saturated Model	Estimated Model
SRMR	0.095	0.095

3.10. Hypothesis testing

Table 10. Path Coefficient Results

Variable	Original Sample	Mean	Standard Deviation	T Statistics	P Values
(X1) → Y)	0.335	0.343	0.078	4.316	0.000
(X1) → (X2)	0.378	0.391	0.080	4.739	0.000
(X2) → (Y)	0.315	0.325	0.146	2.161	0.031

From the table above, the results are obtained:

- **The direct effect of Teacher TPACK Ability on Learning Creativity**

The first hypothesis aims to test the direct effect of teachers' TPACK ability on students' learning creativity. Based on the table above, the path coefficient shows the original sample value of 0.335> 0, t-statistic 4.316> 1.96 and p-value 0.000 < 0.05. From this value, it can be concluded that the TPACK Ability variable has a direct and significant effect on Learning Creativity.

- **The direct effect of Teacher TPACK Ability on Learning Motivation**

The second hypothesis aims to test the direct effect of teachers' TPACK Ability on students' learning motivation. Based on the table above, the path coefficient shows the original sample value of 0.378 > 0, t-statistic 4.739 > 1.96 and p-value 0.000 < 0.05. From this value, it can be concluded that the TPACK Ability variable has a direct and significant effect on Learning Motivation.

- **The direct effect of Learning Motivation on Learning Creativity**

The third hypothesis aims to test the direct effect of learning motivation on student learning creativity. Based on the table above, the path coefficient shows the original sample value of 0.315> 0, t-statistic 2.161> 1.96 and p-value 0.031 < 0.05. From this value, it can be concluded that the learning motivation variable has a direct and significant effect on learning creativity.

Tabel 11. Specific Indirect Effect

Variable	Original Sample	Sample Mean	Standard Deviation	T Statistics	P Values
(X1) -> (X2) -> (Y)	0.119	0.123	0.058	2.041	0.042

- **Indirect effect of Teacher TPACK Ability on Learning Creativity through Learning Motivation**

The fourth hypothesis aims to test the indirect effect of TPACK Ability on Learning Creativity through Learning Motivation. Based on the table above, the path coefficient shows the original sample value of 0.119> 0, t-statistic 2.041> 1.96 and p-value 0.042 < 0.05. From the magnitude of the effect 0.119, it can also be interpreted that learning creativity increases along with the increase in teacher TPACK Ability but through student Learning Motivation first. If not through student Learning Motivation, then the teacher's TPACK Ability does not affect student learning creativity.

4. CONCLUSION

Based on the research findings regarding the influence of Technological, Pedagogical, and Content Knowledge (TPACK) among Economics Teachers on Learning Motivation and its Impact on Economics Learning Creativity at SMA Negeri 59 Jakarta, several key conclusions can be drawn. Firstly, teachers' TPACK skills have a direct impact on students' learning creativity. By employing TPACK-based teaching methods, teachers foster innovative activities that stimulate students' creativity during the learning process. Consequently, the higher the TPACK skills of teachers, the more pronounced the influence on students' learning creativity.

Moreover, teachers' TPACK skills also directly influence students' learning motivation. A teacher's proficiency in utilizing technology and incorporating pedagogical techniques creates an environment that motivates students to engage actively in their studies. With the advancement of TPACK competencies, teachers effectively contribute to enhancing students' motivation, leading to more dynamic and interactive learning experiences. Therefore, the development of teachers' TPACK skills is pivotal in instilling high levels of motivation among students, thereby positively impacting their overall learning experience and creativity in the subject of Economics at SMA Negeri 59 Jakarta.

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