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The Contribution of Self-Efficacy in Science, Technology, Engineering, and Math (STEM) to Career Interest Aspirations of DPTE FPTK UPI Students

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ABSTRACT
In the 4.0 industrial revolution era, Indonesia aims to produce a high-quality STEM workforce to be globally competitive. Balancing the demand for skilled workers is essential with students' interest in pursuing STEM careers. Students' understanding of STEM influences their self-efficacy and shapes their future career interest aspirations. Therefore, this research aims to determine the level of students' self-efficacy in STEM, their career interest aspirations in the STEM field, and the contribution of STEM self-efficacy to their career interest aspirations. This research employs a quantitative method with descriptive analysis and simple linear regression. Data were collected from 154 DPTE FPTK UPI students through a questionnaire distributed via Google forms. Prior to that, they were provided with video materials related to STEM learning. The respondents were selected as the research sample using the simple random sampling method. The research findings indicate that the overall level of respondent's self-efficacy in STEM falls within the good category, with the strength indicator having the highest percentage compared to the generality and magnitude indicators. Additionally, the overall career interest aspirations of respondent's in the STEM field are categorized as very good, with the highest percentage in the expected outcomes indicator compared to the personal goals and interest in STEM indicators. The final finding shows a positive relationship between STEM self-efficacy and students' career interest aspirations. Higher STEM self-efficacy leads to higher STEM career interest aspirations. This research suggests guiding students in recognizing their STEM self-efficacy level to cultivate their aspirations for STEM careers.

Keywords: *STEM, Self-Efficacy, Career Interest Aspirations.*

1. INTRODUCTION

In the 21st century, rapid technological and knowledge advancements have presented new challenges. Education must produce graduates who are ready to compete globally, particularly in the field of technology. Colleges play a crucial role in preparing a quality generation [1]. In the era of the 4.0 industrial revolution, STEM has emerged as a prominent and primary focus. Careers in STEM are rapidly growing globally, emphasizing the need for Indonesia to cultivate a skilled workforce in this field to remain competitive [2]. However, the number of students in Indonesia and many other countries choosing STEM fields remains low and is decreasing each year. One of the reasons is the lack of self-efficacy among students towards STEM before engaging in it [3]. In Bandura's social cognitive theory, *self-efficacy* [4–6] is Personal belief in one's ability to perform tasks that have an impact on their lives is referred to as self-efficacy. In the context of colleges, STEM self-efficacy pertains to students' belief in their ability to learn STEM subjects. Self-efficacy plays a crucial role in setting goals, perseverance, and effort to achieve desired outcomes. In fact, self-efficacy has a greater influence than students' ability and perseverance in the STEM field [7]. The negative perceptions of students towards STEM result in low self-efficacy in their learning and career expectations in STEM. This significantly impacts students' declining interest in STEM careers. Indonesia needs to change these negative perceptions and increase students' interest in the STEM field. One approach is to showcase STEM professionals as ordinary individuals and explain the relevance of their work to society. It is also important to emphasize students' abilities in STEM learning practices to strengthen their self-efficacy [8].

The application of STEM in education involves the integration of Science, Technology, Engineering, and Math [9]. Students' lack of interest in the STEM field can be attributed to perceptions of difficulty, exclusivity, lack of appeal, and the absence of role models [10]. Self-efficacy, as a psychological factor, influences students' career choices in the STEM field [11]. Teachers, peers, and family, especially parents, play a role in influencing students' interest and self-efficacy in the STEM field [12]. Interest and self-efficacy in STEM tend to be higher among males. Self-efficacy has a greater influence on students' achievement compared to other factors [13]. Research experiences can enhance students' self-efficacy and commitment to careers in STEM. Increasing academic interest and fostering a positive attitude towards STEM will encourage more students to pursue careers in this field [14, 15].

Research on career interest aspirations in STEM has been widely conducted, but the majority of studies have focused on efforts to enhance STEM education in vocational schools and colleges. Gender stereotypes are also often the focus of research, with vocational school or vocational students being the common subjects of study. Additionally, research linking self-efficacy to STEM career interests tends to examine self-efficacy from the perspective of teachers or vocational school students. Therefore, the author conducted research with a focus on DPTE FPTK UPI students to investigate the contribution of STEM self-efficacy to career interest aspirations. This study will explore the psychological factors of self-efficacy in STEM experienced by DPTE FPTK UPI students and their impact on the career interests they pursue.

1.1 Research Questions

Considering of research background, the research questions is as follows:

1. What is the level of students' self-efficacy in STEM?
2. What are career interest aspirations of students in the STEM field?
3. How does STEM self-efficacy contribute to students' career interest aspirations in the future?

1.2 Limitations

To ensure accurate and relevant research findings, it is important to establish the limitations. In this study, the following are the scope and limitations of the research:

1. The research is conducted on students of DPTE FPTK UPI.
2. Data collection is done using a Google forms questionnaire.
3. To determine the career interest aspirations of students in the STEM field, it is limited based on the level of self-efficacy possessed by the research subjects.

2. LITERATURE STUDY

2.1 Science, Technology, Engineering, and Math (STEM)

Based on Torlakson's presentation, the term STEM stands for Science, Technology, Engineering, and Math, which was introduced by the National Science Foundation (NSF) [16]. Here are the definitions of the four STEM aspects: (1) *Science*: It is a discipline taught to students to provide an understanding of the principles and concepts that govern the natural world; (2) *Technology*: It is a framework applied to organize societal and institutional systems, involving the application of scientific knowledge in the development and utilization of devices that enhance human life; (3) *Engineering*: It is the application of knowledge used to manage and prepare procedures for solving various problems; (4) *Math*: It is a scientific discipline that relates to quantities, numbers, and space, using logical thinking, whether based on empirical foundations or not.

2.2 Self-Efficacy

Self-efficacy can be explained as a personal belief in one's own capabilities and capacity to achieve optimal results or successfully engage in various activities [17]. Based on Bandura's theory [18], self-efficacy can empower individuals to achieve predetermined goals successfully. Self-belief significantly influences an individual's performance and outcomes, such as when completing tasks, the level of effort exerted, perseverance, and future performance. In Bandura's theory [19–21], several dimensions of self-efficacy that have been established as measures of an individual's self-efficacy level include: (1) Magnitude (Dimensions related to the complexity of tasks that individuals need to accomplish). (2) Strength (The level of strong or weak personal belief in their own capabilities). (3) Generality (To what extent individuals can exert effort to accomplish their tasks).

2.3 Career Interest Aspirations

According to Holland [22], the selection and alignment of a career are ongoing parts of an individual's identity. Individuals express their identity, interests, and principles through their career choices and work experiences. At the beginning of academic activities, students usually engage in career exploration motivated by various internal and external factors. Career exploration, particularly in the STEM field, may be hindered if students rely solely on information about professions and individuals from less credible popular media. Discrepancies between the information they obtain and their actual experiences can impact their career interest aspirations in the STEM field [23].

3. METHOD

3.1 Research Design

The research on the contribution of STEM self-efficacy to career interest aspirations utilizes a quantitative research approach with descriptive analysis and simple linear regression. Data for the research instrument are collected using an online questionnaire through Google forms.

3.2 Research Participants

The population in this study consisted of 304 individuals who were active students of the DPTE FPTK UPI from the batches of 2019, 2020, 2021, and 2022. The sample was obtained using simple random sampling method, with a sample size of 154 students. Therefore, the research respondents consisted of 154 students (n=154). Simple random sampling is a sampling design where n different units are selected from N units in the population in such a way that every possible combination of n units has an equal chance of being chosen as a sample [24]. The simple random sampling method was chosen because it provides an equal opportunity for every individual in the population to be selected as a sample. Thus, every member of the population has a fair chance of being part of the sample that represents the entire population. By using this method, the selected sample can more accurately represent the characteristics of the population, resulting in reliable research findings. The questionnaire was distributed to the respondents through a Google form from April 2nd, 2023, to April 21st, 2023.

3.3 Research Instrument

The research instrument used in this study was a modified version of the STEM-CIS (STEM Career Interest Survey) [25] based on the previous instrument that was developed [25, 26]. In addition to the modified STEM-CIS instrument, this research is also guided by the Social Cognitive Career Theory (SCCT) framework [27, 28]. The indicators for measuring individual self-efficacy levels in this research were developed based on previous studies in a similar context [29–32].

Three aspects of SCCT are used in research to measure students' STEM career interests, namely aspects of personal goals, expected outcomes, and interest in STEM (Science, Technology, Engineering, and Math). Meanwhile, to measure students' STEM self-efficacy, 3 aspects of indicators are used, namely magnitude, strength, and generality. The Likert type scale is used to answer questions from the STEM-CIS. The following is demographic data and research instruments in Table 1 and 2.

Table 1. Demographic Data of Participants

No	Question	Description
1	Gender	Options: a. Male b. Female
2	Year of Enrollment	Options: a. 2019 b. 2020 c. 2021 d. 2022

Table 2. Research Instrument

Aspect: *Self-Efficacy*	
Indicator: *Magnitude*	
Questions:	
During the course of my studies:	I am able to solve challenging problems in science and mathematics courses
	I am able to analyze difficult problems in science and mathematics courses
	I understand the problems in the field of engineering
	I am able to solve various problems in the field of engineering using my engineering knowledge
	I understand the utilization of technology according to current needs
Indicator: *Strength*	
Questions:	
During the course of my studies:	I am able to achieve good grades in science and mathematics courses
	I am able to complete science and mathematics assignments on time
	I am able to utilize technology according to current needs
	I am able to quickly learn new technologies
	I am able to perform laboratory activities effectively
	I am able to complete laboratory projects on time
Indicator: *Generality*	
Questions:	
During the course of my studies:	I am enthusiastic about science and mathematics courses
	I am enthusiastic about utilizing the latest technology
	I am enthusiastic about learning the latest technology
	I am enthusiastic about conducting laboratory activities
	I understand easy strategies to solve science and mathematics tasks

	I understand easy strategies to learn the latest technology
	I have easy strategies to complete tasks in the field of engineering
Aspect: STEM Career Interests	
Indicator: Personal Goals	
Questions:	
I am interested in pursuing a career in the field of science and mathematics	
I have a high motivation to study science and mathematics	
I will utilize the latest technology in my future career	
I will leverage new technologies that support my studies	
I am interested in pursuing a career in the field of engineering	
I have a high motivation to participate in laboratory activities	
Indicator: Expected Outcomes	
Questions:	
When I excel in science and mathematics classes, it will help me achieve my future career goals	
My parents will support me if I choose a career in the field of science and mathematics	
My proficiency in mastering technology will support me in working across various different fields	
I will achieve good grades when I use technology to complete my academic assignments	
I can apply for various different job positions if I have a mastery of the field of engineering	
My parents will support me if I choose a career in the field of engineering	
Indicator: Interest in STEM	
Questions:	
I am fascinated in pursuing a career in the field of science and mathematics	
I am fascinated in science and mathematics courses	
I find it easy to use technology in my studies	
I am fascinated in careers that utilize technology	
I am fascinated in pursuing a career in the field of engineering	
I find it easy to participate in laboratory activities	

Description:

Magnitude: In someone's belief in their capabilities to face and solve high-level challenging tasks, particularly in unfamiliar situations to them.

Strength: The strength and weakness of an individual's belief in their own abilities.

Generality: The extent to which an individual is capable of making efforts to complete their tasks.

3.4 Data Analysis

The collected data filled by respondents is then integrated into a Likert scale ranging from 1 (strongly disagree), 2 (disagree), 3 (neutral), 4 (agree), and 5 (strongly agree) in the Microsoft Excel application [25]. Next, data checking is conducted to eliminate outliers and reduce data defects. After that, testing is performed on classical assumptions, namely the normality test using the Kolmogorov-Smirnov method to check whether the data is normally distributed or not, as well as the linearity test to examine whether the relationship between the independent and dependent variables is linear. Then, data analysis is carried out using simple linear regression technique. This analysis aims to obtain the equation of a straightline $y = a + bx$. The simple linear regression technique aims to measure the strength of the relationship between the two variables. Descriptive data analysis is also used in the form of categorization and percentages to describe and summarize the data statistically, providing a comprehensive understanding of the basic characteristics of the research data. Subsequently, significance testing of the regression is performed using the t-test to determine whether the relationship between the two variables is statistically significant or not. All tests conducted in this data processing process utilize the SPSS software version 26 as a tool.

4. THE RESULTS AND DISCUSSION

4.1 Results of Data Normality Test

Requirements before conducting data analysis using simple linear regression technique include testing for normality. This test is performed to examine whether the data follows a normal distribution. The normality test in this research was conducted using the Kolmogorov-Smirnov method with SPSS 26 software. Data is considered to have a normal distribution if the significance value (Sig) > 0.05 (significant level). The results of this test are presented in Table 3.

Table 3. Results of Data Normality Test

One-Sample Kolmogorov-Smirnov Test		
N		Unstandardized Residual
		154
Normal Parameters	Mean	.0000000
	Std. Deviation	0.30926027
Most Extreme Differences	Absolute	0.049
	Positive	0.049
	Negative	-0.047
Test Statistic		0.049
Asymp. Sig. (2-tailed)		0.200

Based on Table 3, the obtained significance value (Sig) is 0.200, which is greater than 0.05. Therefore, it can be concluded that the data follows a normal distribution.

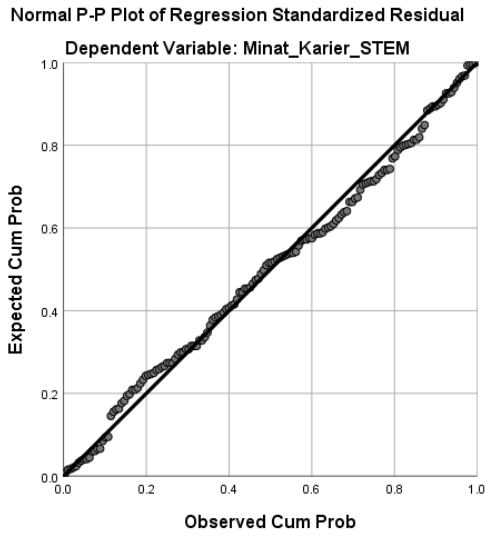

Figure 1. Graph of P-Plot for Data Normality Test

Figure 1 depicts the data points on the P-Plot graph that follow and closely align with the diagonal line. This indicates that the residuals or the data are normally distributed.

4.2 Results of Data Linearity Test

Linearity test is a requirement prior to analyzing data using simple linear regression technique. This test aims to examine whether there is a significant linear relationship between two variables or not. The relationship between variables X and Y is considered significantly linear if the deviation from linearity Sig. > 0.05 (significant level). The linearity test was conducted using SPSS 26 software, and the results can be seen in Table 4.

Table 4. Results of Linearity Test

Relationship of Variables / Analysis of Variance			Sum of Squares	Df	Mean Square	F	Sig.
STEM Career Interests*Self-Efficacy	Between Groups	(Combined)	11.506	26	0.443	4.486	0.000
		Linearity	9.402	1	9.402	95.302	0.000
		Deviation from Linearity	2.104	25	0.084	0.853	0.667
	Within Groups		12.529	127	0.099		
	Total		24.035	153			

Table 4 indicates that the deviation from linearity Sig. value is 0.667, which is greater than 0.05. Therefore, it can be concluded that there is a significant linear relationship between the self-efficacy variable (X) and the STEM career interest variable (Y).

When the data has been proven to be normally distributed and has a significant linear relationship between the variables, it meets the requirements to be analyzed using the simple linear regression technique.

4.3 Analysis of Findings from Simple Linear Regression Technique

The data processing in this study utilized the simple linear regression technique as it aims to examine the relationship between the independent variable (X), which is STEM self-efficacy, and the dependent variable (Y), which is career interest aspiration. Additionally, it was used to predict the level of career interest aspiration among students based on their STEM self-efficacy. Table 5 presents the results of data processing using the simple linear regression technique.

Table 5. Findings from Simple Linear Regression Technique

Coefficients						
Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	1.288	0.288		4.476	0.000
	STEM_Self_Efficacy	0.708	0.072	0.625	9.882	0.000

The results in Table 5 can be interpreted using the following simple linear regression equation:

$$Y = \alpha + \beta X + \varepsilon \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots (1)$$

$$Y = 1.288 + 0.708X \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots (2)$$

The value of α, which represents the constant/intercept, is shown as 1.288, obtained from the unstandardized coefficients column. This indicates that if there is no STEM self-efficacy (X), the career interest aspiration of students (Y) would be 1.288. Meanwhile, the value of β, which represents the regression coefficient/slope, is shown as 0.708. This means that for every 1% increase in the level of STEM self-efficacy of students (X), their career interest aspiration (Y) will increase by 0.708. The positive (+) value of the regression coefficient indicates that STEM self-efficacy has a positive influence on career interest aspiration.

Table 6. Coefficient of Determination

Model Summary			
R	R Square	Adjusted R Square	Std. Error of the Estimate
0.625	0.391	0.387	0.310

Based on Table 6, the coefficient of determination (R Square) is shown to be 0.391. This can be interpreted as the influence of the independent variable (X) or STEM self-efficacy of students on the dependent variable (Y) or their career interest aspiration is 0.391 or 39.1%. This means that the aspect of STEM self-efficacy has a 39.1% influence on students' career interest aspiration. Therefore, 60.9% of the career interest aspiration is influenced by factors not examined in this study.

4.4 Results of Significance Test

The significance test in this study uses the T-Test. The T-Test aims to determine whether the independent variable (X), which is STEM self-efficacy, has a significant influence on the dependent variable (Y), which is career interest aspiration, by comparing the obtained t_{value} with the t_{table}. The obtained t_{value} can be found in Table 7.

Table 7. Results of T-Test

Coefficients						
Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	1.288	0.288		4.476	0.000
	STEM_Self_Efficacy	0.708	0.072	0.625	9.882	0.000

The calculated t_{value} shown in Table 7 is 9.882. Meanwhile, the obtained t_{table} value for a significance level of 5% with n = 154 is 1.976. Therefore, it can be interpreted that the calculated $t_{value} > t_{table}$. Since the calculated t_{value} is greater than t_{table}, it can be stated that H_0 (null hypothesis) is rejected and H_a (alternative hypothesis) is accepted, which means "There is an influence of the independent variable (X) or STEM self-efficacy on the dependent variable (Y) or career interest aspiration".

4.5 Discussion

4.5.1. The Level of Self-Efficacy of Students towards STEM

Table 8 is a table that shows the mean, standard deviation, and rating intervals of the aspects of students' self-efficacy towards STEM. It consists of 3 indicators: magnitude, strength, and generality. These values were calculated using the SPSS software version 26.

Table 8. Level of Students' Self-Efficacy in STEM

	Indicators	Mean	Std. Deviation	Rating Interval (%)
STEM *Self-Efficacy*	***Magnitude***	3.818	0.459	76.36
	Strength	4.075	0.414	81.50
	Generality	4.069	0.419	81.38
Mean		**3.987**	**0.431**	**79.75**

Based on the values shown in Table 8, the indicator used to assess the level of students' self-efficacy in STEM with the highest percentage is the "strength" indicator, which is obtained as 81.50%. This means that 81.50% of the respondents have a strong belief in their STEM abilities. They are highly confident in their capability to work on STEM-related tasks and are motivated to complete their assignments diligently and persistently. The percentage of 81.50% falls into the category of excellent, indicating that the self-efficacy in STEM with the "strength" indicator possessed by the students of DPTE FPTK UPI is very good.

Furthermore, the second highest percentage of self-efficacy indicators obtained is the "generality" indicator, which is 81.38%. Therefore, 81.38% of the respondents have perseverance in working on STEM-related tasks, tend to be optimistic, and possess excellent tenacity, enabling them to perform tasks to the best of their abilities. The percentage of 81.38% falls into the category of excellent, indicating that the self-efficacy in STEM with the "generality" indicator possessed by the students of DPTE FPTK UPI is very good.

The last self-efficacy indicator for STEM is "magnitude," with a percentage of 76.36%. Therefore, 76.36% of the respondents have confidence in their ability to face and complete STEM-related tasks at a certain level of difficulty, even in situations they perceive as uncommon. The "magnitude" indicator possessed by the students of DPTE FPTK UPI is the lowest among the other self-efficacy indicators. However, with a percentage of 76.36%, it still falls into the category of good, indicating that the self-efficacy in STEM with the "magnitude" indicator possessed by the students of DPTE FPTK UPI is satisfactory.

Indeed, overall, the level of self-efficacy in STEM among the students of DPTE FPTK UPI obtained a percentage of 79.75%. This percentage falls into the category of good, indicating that the students of DPTE FPTK UPI possess a good level of self-efficacy in STEM.

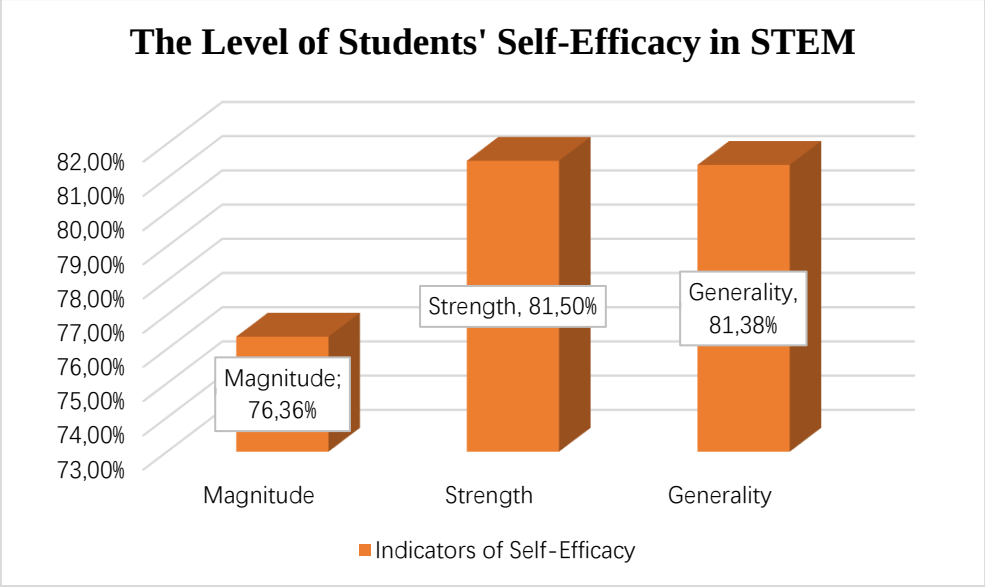

Figure 2. Graph of the Level of Students' Self-Efficacy in STEM

In the form of a graph, the level of students' self-efficacy in STEM is depicted in Figure 2. It can be clearly observed that the "strength" indicator has the highest level, followed by the "generality" indicator, and the lowest level is represented by the "magnitude" indicator.

4.5.2. The Career Interest Aspirations of Students in the STEM Field

Table 9 presents the mean, standard deviation, and rating intervals of the aspects of students' career interest in STEM. It consists of three indicators: personal goals, expected outcomes, and interest in STEM. These values were calculated using the SPSS software version 26.

Table 9. The Career Interest Aspirations of Students in STEM Field

	Indicators	Mean	Std. Deviation	Rating Interval (%)
Students' Career Interest in STEM	**Personal Goals**	4.107	0.449	82.14
	Expected Outcomes	4.212	0.465	84.28
	Interest in STEM	4.049	0.455	80.98
Mean		**4.123**	**0.456**	**82.47**

Based on the values shown in Table 9, the indicator with the highest percentage for the aspect of students' career interest in STEM is the "expected outcomes" indicator, which is obtained as 84.28%. This means that 84.28% of the respondents have high expectations regarding the outcomes of their careers in the STEM field. They make supportive efforts to achieve their career goals in STEM. The percentage of 84.28% falls into the category of excellent, indicating that the outcome expectations related to careers in STEM held by the students of DPTE FPTK UPI are very good.

Furthermore, the second highest percentage of indicators for the aspect of students' career interest in STEM is the "personal goals" indicator, which is obtained as 82.14%. This means that 82.14% of the respondents have goals to pursue a career in STEM. They have high motivation and strive to pursue careers in STEM fields. The percentage of 82.14% falls into the category of excellent, indicating that the personal goals related to careers in STEM held by the students of DPTE FPTK UPI are very good.

The last indicator for the aspect of students' career interest in STEM is "interest in STEM," with a

percentage of 80.98%. This means that 80.98% of the respondents have an interest in STEM. They are interested in engaging in STEM-related learning and are motivated to pursue careers in STEM fields. The "interest in STEM" indicator possessed by the students of DPTE FPTK UPI is the lowest among the indicators for the aspect of students' career interest in STEM. However, with a percentage of 80.98%, it still falls into the category of good. This indicates that the interest in STEM held by the students of DPTE FPTK UPI is satisfactory.

Overall, the career interest of DPTE FPTK UPI students in the STEM field obtains a percentage of 82.47%. This percentage falls into the category of excellent, indicating that the students of DPTE FPTK UPI have a strong career interest in STEM and tend to pursue future careers in STEM fields.

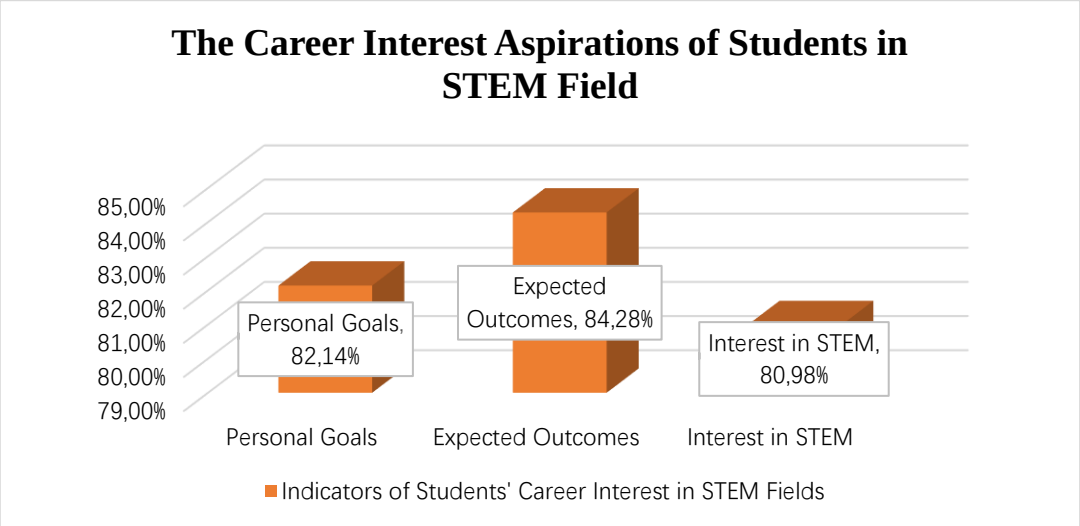

Figure 3. Graph of The Career Interest Aspirations of Students in STEM Field

In graphical form, the aspect of students' career interest in STEM fields is represented in Figure 3. It is evident that the indicator of "expected outcomes" has the highest level, followed by the indicator of "personal goals," and the lowest is the indicator of "interest in STEM".

4.5.3. The Contribution of STEM Self-Efficacy to Students' Career Interest Aspirations

Based on the data analysis, it can be observed that STEM self-efficacy (variable X) contributes to students' career interest aspirations (variable Y). This is supported by the fact that the calculated t_{value} is greater than the t_{table}, which is 9.882 > 1.976. This indicates that the null hypothesis (H_0) stating "There is no relationship between STEM self-efficacy and career interest aspirations" is rejected, and the alternative hypothesis (H_a) stating "There is a relationship between STEM self-efficacy and career interest aspirations" is accepted.

The relationship between STEM self-efficacy (variable X) and career interest aspirations (variable Y) shows a positive direction. This can be observed from the positive regression coefficient with the simple linear regression equation Y = 1.288 + 0.708 X. Additionally, the influence of STEM self-efficacy (variable X) on career interest aspirations (variable Y) is 0.391 or 39.1%. This is demonstrated by calculating the coefficient of determination using SPSS software version 26.

This finding is consistent with existing theories and provides empirical evidence that STEM self-efficacy has a positive contribution to individuals' aspirations in their career interests. The statistical analysis supports the notion that STEM self-efficacy plays a significant role in shaping and influencing students' career interest aspirations.

4. CONCLUSION

Based on the findings obtained from this research, it can be concluded that:

1. The overall level of self-efficacy of DPTE FPTK UPI students towards STEM obtained a percentage score of 79.75%, indicating a good category. When broken down, among the three indicators of STEM self-efficacy, the indicator with the highest percentage score is strength, with a score of 81.50% and falls into the category of very good. The second highest is the generality indicator, with a percentage score of 81.38%, also falling into the category of very good. Lastly, the magnitude indicator obtained a percentage score of 76.36%, which is categorized as good.
2. The overall aspiration and career interest of DPTE FPTK UPI students in the STEM field obtained a percentage score of 82.47%, which falls into the category of excellent. When further examined, there are three indicators that were investigated, namely

personal goals, expected outcomes, and interest in STEM. The indicator with the highest percentage score is expected outcomes, with a score of 84.28%, categorized as excellent. The second highest is the personal goals indicator, with a percentage score of 82.14%, also falling into the category of excellent. Lastly, the interest in STEM indicator obtained a percentage score of 80.98%, which is categorized as good.

3. There is a relationship between STEM self-efficacy and career interest aspiration among DPTE FPTK UPI students, as evidenced by the significant test results where the obtained t_{value} (9.882) is greater than the t_{table} (1.976). The relationship between STEM self-efficacy and career interest aspiration has a positive direction, as indicated by the positive coefficient in the simple linear regression equation Y = 1.288 + 0.708X. Furthermore, the influence between the two variables is quantified by a coefficient of determination, which is 0.391 or 39.1%.

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REFERENCES

[1] A. A. Zamista, "Increasing Persistence of Collage Students in Science Technology Engineering and Mathematic (STEM)," *Curricula*, vol. 3, no. 1, pp. 22–31, 2018, doi: 10.22216/jcc.2018.v3i1.1308.

[2] L. D. Falco and J. J. Summers, "Improving Career Decision Self-Efficacy and STEM Self-Efficacy in High School Girls: Evaluation of an Intervention," *J. Career Dev.*, vol. 46, no. 1, pp. 62–76, 2019, doi: 10.1177/0894845317721651.

[3] M. A. Samsudin, S. M. Jamali, A. N. M. Zain, and N. A. Ebrahim, "The effect of STEM project based learning on self-efficacy among high-school physics students," *J. Turkish Sci. Educ.*, vol. 17, no. 1, pp. 94–108, 2020, doi: 10.36681/tused.2020.15.

[4] J. Stewart, R. Henderson, L. Michaluk, J. Deshler, E. Fuller, and K. Rambo-Hernandez, "Using the Social Cognitive Theory Framework to Chart Gender Differences in the Developmental Trajectory of STEM Self-Efficacy in Science and Engineering Students," *J. Sci. Educ. Technol.*, vol. 29, no. 6, pp. 758–773, 2020, doi: 10.1007/s10956-020-09853-5.

[5] M. R. Connolly, Y. G. Lee, and J. N. Savoy, "The effects of doctoral teaching development on early-career STEM scholars' college teaching self-efficacy," *CBE Life Sci. Educ.*, vol. 17, no. 1, pp. 1–15, 2018, doi: 10.1187/cbe.17-02-0039.

[6] I. DeCoito and P. Myszkal, "Connecting Science Instruction and Teachers' Self-Efficacy and Beliefs in STEM Education," *J. Sci. Teacher Educ.*, vol. 29, no. 6, pp. 485–503, 2018, doi: 10.1080/1046560X.2018.1473748.

[7] J. A. Czocher, K. Melhuish, and S. S. Kandasamy, "Building mathematics self-efficacy of STEM undergraduates through mathematical modelling," *Int. J. Math. Educ. Sci. Technol.*, vol. 51, no. 6, pp. 807–834, 2020, doi: 10.1080/0020739X.2019.1634223.

[8] T. Luo, W. W. M. So, W. C. Li, and J. Yao, "The Development and Validation of a Survey for Evaluating Primary Students' Self-efficacy in STEM Activities," *J. Sci. Educ. Technol.*, vol. 30, no. 3, pp. 408–419, 2021, doi: 10.1007/s10956-020-09882-0.

[9] A. Fathoni, S. Muslim, E. Ismayati, T. Rijanto, Munoto, and L. Nurlaela, "STEM : Inovasi Dalam Pembelajaran Vokasi," *J. Pendidik. Teknol. dan Kejuru.*, vol. 17, no. 1, pp. 33–42, 2020.

[10] L. Halim, N. A. Rahman, N. A. M. Ramli, and L. E. Mohtar, "Influence of students' STEM self-efficacy on STEM and physics career choice," *AIP Conf. Proc.*, vol. 1923, 2018, doi: 10.1063/1.5019490.

[11] T. Ketenci, A. Leroux, and M. Renken, "Correction to: Beyond Student Factors: a Study of the Impact on STEM Career Attainment," *J. STEM Educ. Res.*, vol. 4, no. 2, pp. 246–247, 2021, doi: 10.1007/s41979-021-00052-4.

[12] H. Tzu-Ling, "Gender differences in high-school learning experiences, motivation, self-efficacy, and career aspirations among Taiwanese STEM college students," *Int. J. Sci. Educ.*, vol. 41, no. 13, pp. 1870–1884, 2019, doi: 10.1080/09500693.2019.1645963.

[13] C. M. Fernández-García, S. Torío-López, O. García-Pérez, and M. Inda-Caro, "Parental support, self-efficacy beliefs, outcome expectations and interests in science, technology, engineering and mathematics (STEM)," *Univ. Psychol.*, vol. 18, no. 2, pp. 1–15, 2019, doi: 10.11144/Javeriana.upsy18-2.psse.

[14] M. Syed *et al.*, "The Role of Self-Efficacy and Identity in Mediating the Effects of STEM Support

Experiences," *Anal. Soc. Issues Public Policy*, vol. 19, no. 1, pp. 7–49, 2019, doi: 10.1111/asap.12170.

[15] K. Miller, G. Sonnert, and P. Sadler, "The influence of students' participation in STEM competitions on their interest in STEM careers," *Int. J. Sci. Educ. Part B Commun. Public Engagem.*, vol. 8, no. 2, pp. 95–114, 2018, doi: 10.1080/21548455.2017.1397298.

[16] T. Torlakson and susan A. Bonilla, "Innovate A Blueprint for STEM Education - Science (CA Dept of Education)," *Californians Dedic. to Educ. Found.*, no. May, p. 52, 2014.

[17] N. A. Fadila and R. N. Khoirunnisa, "Hubungan Self Efficacy dengan Prokrastinasi Akademik Mahasiswa yang Sedang Mengerjakan Skripsi pada Masa Pandemi," *J. Penelit. Psikol.*, vol. 08, no. 02, pp. 189–198, 2021.

[18] R. Weinberg, D. Gould, and A. Jackson, "Expectations and Performance: An Empirical Test of Bandura's Self-efficacy Theory," *J. Sport Psychol.*, vol. 1, no. 4, pp. 320–331, 1979, doi: 10.1123/jsp.1.4.320.

[19] M. Johanda, Y. Karneli, and Z. Ardi, "Self-efficacy siswa dalam menyelesaikan tugas sekolah di SMP Negeri 1 Ampek Angkek," *J. Neo Konseling*, vol. 1, no. 1, pp. 1–5, 2019, doi: 10.24036/XXXXXXXXXX-X-XX.

[20] M. R. Muis, M. I. Nasution, M. E. Azhar, and Radiman, "Pengaruh Kepemimpinan Dan Self-Efficacy Terhadap Kelelahan Emosional Serta Dampak Terhadap Kepuasan Kerja Dosen," *J. Ris. Sains Manaj.*, vol. 2, no. 3, pp. 131–142, 2018, doi: 10.5281/zenodo.1477532.

[21] F. A. R. Putri and F. Fakhruddiana, "Self-efficacy guru kelas dalam membimbing siswa slow learner," *JPK (Jurnal Pendidik. Khusus)*, vol. 14, no. 1, pp. 1–8, 2019, doi: 10.21831/jpk.v14i1.25161.

[22] H. Bin Sheu, R. W. Lent, S. D. Brown, M. J. Miller, K. D. Hennessy, and R. D. Duffy, "Testing the choice model of social cognitive career theory across Holland themes: A meta-analytic path analysis," *J. Vocat. Behav.*, vol. 76, no. 2, pp. 252–264, 2010, doi: 10.1016/j.jvb.2009.10.015.

[23] J. Deshler, E. Fuller, and M. Darrah, "Affective States of University Developmental Mathematics Students and their Impact on Self-Efficacy, Belonging, Career Identity, Success and Persistence," *Int. J. Res. Undergrad. Math. Educ.*, vol. 5, no. 3, pp. 337–358, 2019, doi: 10.1007/s40753-019-00096-3.

[24] F. Olken and D. Rotem, "Simple Random Rampling From Relational Databases. 12th International Conference on Very Large Databases.Kyoto, Japan," *12th Internatinal Conf. Very Large Databases*, 2005, [Online]. Available: https://cloudfront.escholarship.org/dist/prd/content/qt9704f3dr/qt9704f3dr.pdf.

[25] M. W. Kier, M. R. Blanchard, J. W. Osborne, and J. L. Albert, "The Development of the STEM Career Interest Survey (STEM-CIS)," *Res. Sci. Educ.*, vol. 44, no. 3, pp. 461–481, 2014, doi: 10.1007/s11165-013-9389-3.

[26] N. A. Fouad, P. L. Smith, and L. Enochs, "Reliability and validity evidence for the middle school self-efficacy scale," *Meas. Eval. Couns. Dev.*, vol. 30, no. 1, pp. 17–29, 1997, doi: 10.1080/07481756.1997.12068914.

[27] T. Tyler-Wood, G. Knezek, and R. Christensen, "Instruments for Assessing Interest in STEM Content and Careers," *Jl. Technol. Teach. Educ.*, vol. 18, no. 2, pp. 341–363, 2010.

[28] R. Lent, S. D. Brown, and G. Hackett, "Toward a unifying scct and academic interest, choice and performance," *Journal of Vocational Behavior*, vol. 45. pp. 79–122, 1994.

[29] R. W. Lent, S. D. Brown, and G. Hackett, "Contextual supports and barriers to career choice: A social cognitive analysis," *J. Couns. Psychol.*, vol. 47, no. 1, pp. 36–49, 2000, doi: 10.1037/0022-0167.47.1.36.

[30] H. Hendriana and G. Kadarisma, "Self-Efficacy dan Kemampuan Komunikasi Matematis Siswa SMP," *JNPM (Jurnal Nas. Pendidik. Mat.*, vol. 3, no. 1, p. 153, 2019, doi: 10.33603/jnpm.v3i1.2033.

[31] A. P. Rahmadini, "Studi deskriptif mengenai self-efficacy terhadap pekerjaan pada pegawai staf bidang statistik sosial di Badan Pusat Statistik Provinsi Jawa Barat," *Dr. Diss.*, 2011.

[32] Y. Sunaryo, "PENGUKURAN SELF-EFFICACY SISWA DALAM PEMBELAJARAN MATEMATIKA DI MTs N 2 CIAMIS," *Teorema*, vol. 1, no. 2, p. 39, 2017, doi: 10.25157/.v1i2.548.

[33] D. Hartawati and S. Mariyanti, "Hubungan Antara Self-Efficacy Dengan Burnout Pada Pengajar Taman Kanak-Kanak Sekolah," *Di Jakarta J. Psikol.*, vol. 12, p. 54, 2014, [Online]. Available: https://www.esaunggul.ac.id/wp-content/uploads/2019/10/.