The Problem of Transferability Skills and Learning Environment to Enhance Engineering Students' Competence and Creativity in Entrepreneurial Subjects

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ARTICLE INFO	ABSTRACT
	Innovation ideas are needed to link business ideas to informatics. The purpose of this study is limited to measuring the effect of transferability indicators and learning environment on problem-based learning to improve student competence and creativity. The research method used is Path Analysis. Data were taken from 94 students in Information Technology Education study programs and divided into small groups to create business ideas. The conclusion is a very significant influence on the Transferability Skill indicator and Learning Environment on Problem-Based Learning in Improving Student Competence and Creativity. This way of research can be done for other objects. **Keywords:** e Transferability skills, Competence, Creativity, Entreprenurship, problem-based learning

INTRODUCTION

According to research, the greatest level of competencies and abilities required of workers today is working time (67%), followed by sector-specific skills in computer literacy, link skills, adaptability to new positions, exceptional learning, scripting, analytical and issue management skills, planning and organizational skills (53% – 62%).(Sulistiyo and Wibawa 2020). There are some key definitions to consider when developing a teaching strategy; therefore, teachers want to learn about skills (Handayani et al. 2020). Maximal methods we inspired by ideas from various learning and bookings is the definition given by poincaré maps (Klimovskaia et al. 2020). There are indicators of success in the application of transferability skills as shown in FIGURE 1, including(Burning Glass Technologies 2015):
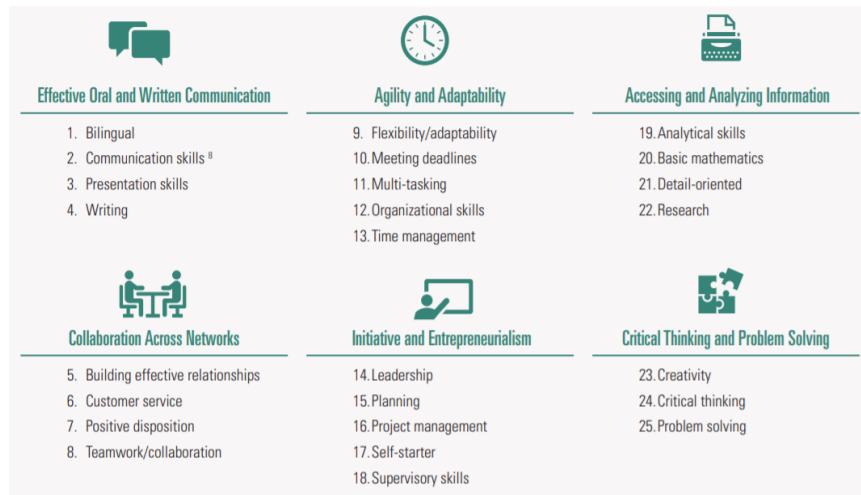
FIGURE 1. Transferability skills indicator

There are indicators of success in the application of transferability skills as shown in FIGURE 1, including(Burning Glass Technologies 2015): (1) effective oral and written communication, contains; a.1 bilingual(Adnyani 2018), a.2 communication skills(Yalçın and Erden 2021), a.3 presentation skills(Buenviaje et al. 2015), a.4 writing, (2) collaboration acrross networks, contains; a.5 building effective relationship(Ao and Huang 2020), a.6 customer service, a.7 possitive disposition, a.8 teamwork/ collaboration(Chase et al. 2020)(Wibawa 2013), (3) agility and adaptability, contains; a. 9 flexibility/ adaptability, a.10 meeting deadlines, a.11 multitasking(Vallejo et al. 2017), a.12 organizational skills(Patacsil and Tablatin 2017), a.13 time management(Postma and Schmuecker 2017), (4) initiative and entrepreneuralism, contains; a.14 leadership, a.15 planning, a.16 project management(Souza et al. 2017), a.17 self-starter, a.18 supervisory skills(Forte and Hansvick 1999)(Wagner 2020), (5) accessing and analyzing information, contains; a.19 analytical skills(Skovsgaard 2018), a.20 basic mathematics, a.21 detail-oriented, a.22 research, (6) critical thinking and problem solving, contains; a.23 creativity(Lee and Portillo 2022), a.24 critical thinking(Sari et al. 2021), a.25 problem solving(Fadiawati, Diawati, and Syamsuri 2020).

Students may acquire information and problem-solving techniques through problem-based learning, which is an efficient approach to teach them. These are two essential abilities that are required in practically every workplace. In short, independent groups, students learn to describe and accomplish specific real-life or study-based tasks (Phungsuk, Viriyavejakul, and Ratanaolarn 2017). However, precise knowledge of teaching techniques and supportive approaches is learned from specific generic abilities, such as problem-solving skills(Chase et al. 2020), critical thinking(Sari et al. 2021), and creativity(Trowbridge 2021), which are still lacking (Virtanen and Tynjälä 2019). In the presence of resource constraints, invention seems to be more significant than the state of resource-constrained innovation characteristics. It adds to problem-solving in situations with limits or resource shortages (Liu, Feng, and Wang 2020). Evidence-based learning skills training and intensive peer-led group problem solving with other problem interventions narrow the achievement gap while controlling self-selection, narrowing the achievement gap(Katz and Brown 2019), and leading to self-selection (Theobald et al. 2020).

The dynamic process of entrepreneurship generates prosperity and adds value for products and services(Marniati and Wibawa 2020). Entrepreneurs are innovators who implement changes in markets through new combinations. This new consolidation can be in the form of (1) announcing new products, (2) offering new production methods, (3) breaking new markets, (4) collecting sources of supply of new materials or components; and (5) working for a new organization in the industry (Lotulung, Ibrahim, and Tumurang 2018). As a result, higher education institutions will strengthen students' entrepreneurial skills through instructional programs(Ergün and Şeşen 2021). Anttiroiko et al. embodies numerous ideas For any economy to run, entrepreneurship is necessary. Accessible entrepreneurial options in the context of smart cities cause a shift in career concentration away from excellent service creation (Curşeu, Semeijn, and Nikolova 2021).

Such social enterprise and other forms of social entrepreneurship provide different ways to supply and grow the local economy, as opposed to promoting instrumental market-based techniques that largely benefit individuals who do not control the means of production (Jamal, Kircher, and Donaldson 2021). Several definitions have been adopted

by several students who are aggressively promoting entrepreneurship. But, what if a local business enables conformity and sanctions deviation that deviates from the norm(Chua, Huang, and Jin 2019). Notwithstanding its limitations, this study adds to the literature on entrepreneurship by making significant findings and implications. These, as well as future research ideas, are discussed (Vamvaka et al. 2020). There are a variety of symbols that can be used to illustrate a discipline of knowledge or to compare and contrast different features of it. AI and big data are becoming increasingly important in the field of more complex research, and they're increasingly being used as a guiding principle for entrepreneurship (Obschonka and Audretsch 2020). Various definitions of problem-based learning struggle with tasks that require creative problem solving, and we agree that adequate technical reasoning is necessary for innovation (Osiurak and Reynaud 2019). Path-Analysis is the relationship between independent, intermediate, and dependent variables usually presented diagrammatically. In the diagram, arrows show the direction of influence between exogenous, intermediary, and dependent variables. Sometimes the magnitude of the effect is represented by the arrow's thickness. Path analysis only deals with multiple regression with measured variables(Marniati and Wibawa 2018).

Path analysis is a different part of regression analysis. The regression analysis is generally used to test whether the self-reliant variable directly influences the dependent variable. Meanwhile, path analysis tries the direct effect and demonstrates whether or not the independent variable arranges an indirect effect over the intervening variable on the defenceless variable(Nurmawati and Kismiantini 2019).

Based on the description above, the purpose of this study is limited to measuring indicators of transferability and learning environment to problem-based learning to improve the competence and creativity of students in entrepreneurship courses.

METHODS

In order to increase student competency and creativity in multimedia subjects, this study used route analysis, as seen in FIGURE 2, which shows the path diagram of the impact of transferability skills and the learning environment on problem-based learning. In several trial classes, the division of business groups was carried out based on the ideas raised, then the selected Transferability skills and Learning Environment indicators were analyzed based on problems to determine competence and creativity.

As information: X_1 = Transferability Skills, X_2= Learning Environment, Y_1 = Problem Base Learning (The ability to solve the problem), Y_2 = Competency, Y_3 = Student creativity. The creation unit supports entrepreneurship and development of seeding universities, or creativity and entrepreneurship workshops, which are some of the initiatives developed at the university that aim to encourage students (Boldureanu et al. 2020). Leadership can be the most important factor influencing creativity and innovation in student creativity among all determinants of innovative behavior (Qi et al. 2019).

There are a few definitions. At the very least, it is subject to discovery, opening the proverbial door to greater creativity and flexibility of thought for academics and practitioners (Ketchen and Craighead 2020). Guilford's term embodies a slew of conventions. Creativity is the level of originality honed and suited to the entire sample, ranging from 1 to 4, with scores of 3 and 4 for only a few uses throughout the piece. The originality index is sometimes used to replace creativity ratings, awarded points for a sample of statistically rare use (Madore et al. 2019).

Various techniques to extract and analyze error features range from signal or information delivery tools or problem-based learning tools (Yuan, Wang, and Diallo 2019). Future research directions are bound to integrate outstanding feature performance and then use the latest robust classifiers, such as deep learning methods, to achieve optimum recognition (Cheng, Wang, and She 2020). These terms are two overlapping meanings of different skill formation systems, particularly job-specific learning (Bol et al. 2019).

Based on FIGURE 1 predetermined variables, problem formulations can be drawn such as:

1. Is there a direct effect of Transferability Skill and Learning Environment on Problem Base Learning in Multimedia courses?

2. Is there a direct effect of Transferability Skills and Learning Environment on Competence in Multimedia courses?

3. Is there a direct effect of Problem-Based Learning on student creativity in Multimedia courses?

4. Is there a direct influence of competence on student creativity in the multimedia course?

5. Is there a direct influence of Transferability Skills, Learning Environment, Problem Base Learning, and Competence on student creativity in Multimedia courses?
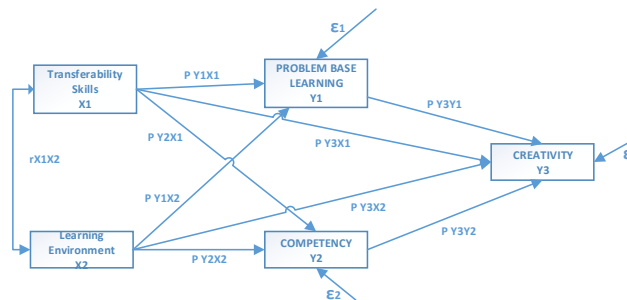

FIGURE 2. Path diagram of variabel

Stakeholders who possess self-management abilities, written and oral communication skills, teamwork abilities, cognitive abilities, systems thinking, and innovation and creativity exhibit the crucial job-ready competency deficiencies(Prikshat et al. 2020). Transversal competencies such as entrepreneurship, conversational nature, teamwork, and innovation are essential skills required in market work (Graczyk-Kucharska et al. 2020). It has expanded to the numbers-step to review introducing practical knowledge sharing methods and procedures into hearts. Their daily work process for review increases creativity, innovation, and costs of organizing (Abbas et al. 2019). Refer to expanded To determine how creativity can solve problems (Koepnick et al. 2019). The creativity researcher's drive to integrate creativity-supporting features in technology is less critical (Shneiderman 2020).

2.1. Hypothese Model

2.1.1. Y1 = F (X1; X2)

Transferability Skills and Learning Environment collectively and individually affect Problem Base Learning in Multimedia courses.

Ha=Transferability Skills and Learning Environment jointly and individually affect Problem Base Learning in Multimedia courses.

H0=Transferability Skills and Learning Environment collectively or individually affect Problem Base Learning in Multimedia courses.

2.1.2. Y2 = F (X1; X2)

Transferability Skills and Learning Environment collectively or individually affect Competence in Multimedia courses.

Ha=Transferability Skills and Learning Environment collectively and individually affect Competence in Multimedia courses.

H0=Transferability Skills and Learning Environment collectively or individually affect Competence in Multimedia courses.

2.1.3. Y3 = F (Y1)

Problem Base Learning affects student creativity in the multimedia course

Ha=Problem Base Learning affects student creativity in the multimedia course

H0=Problem Base Learning has no effect on student creativity in the multimedia course

2.1.4. Y3 = F (Y2)

Namely, Competence affects student creativity in the multimedia course

Ha=Competence affects student creativity in the multimedia course

H0=Competence has no effect on student creativity in the multimedia course

2.1.5. Y3=F (X1; X2; Y1; Y2)

Namely, transferability skills, learning environments, problem-based learning, and competencies affect student creativity in the multimedia course.

Ha=Transferability Skills, Learning Environment, Problem Base Learning, and Competence collectively affect student creativity in the multimedia course.

H0=Transferability Skills, Learning Environment, Problem Base Learning, and Competence do not affect together or individually on student creativity in the multimedia course.

RESULTS AND DISCUSSION:

Based on the proposed hypothetical model, a sub-structure is created which aims to explain and simplify calculations as follows(Field 2013):

3.1. Sub Structure -1 Hypothesis-1

Information: Y1=dependent variable (endogenous), X1 and X2 = independent variables (exogenous).

Structural equation:

$$Y_1 = PY_1X_1\,X_1 + PY_1X_2\,X_2 + PY1.\,\varepsilon1\ \varepsilon1 \qquad 1)$$

FIGURE 3 explain the Sub-structure-1 of the causal relationship X1 (Transferability Skills) and X2 (Learning Environment) to Y1 (Problem Base Learning-The ability to solve the problem).

FIGURE 3. Sub-structure-1 of the causal relationship X1 and X2 to Y1

3.2. Sub struktur -2 Hipotesis-2

Information: Y2=dependent variable (endogenous), X1 and X2 = independent variables (exogenous).

Structural equation:

$$Y2 = PY2X1\,X1 + PY2X2\,X2 + PY2.\varepsilon2\ .\varepsilon2 \qquad 2)$$

FIGURE 4 explain the Sub-structure of the causal relationship X1 (Transferability Skills) and X2 (Learning Environment) to Y1 (Problem Base Learning-The ability to solve the problem).
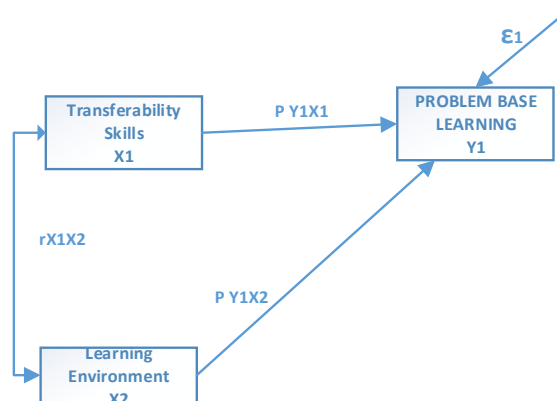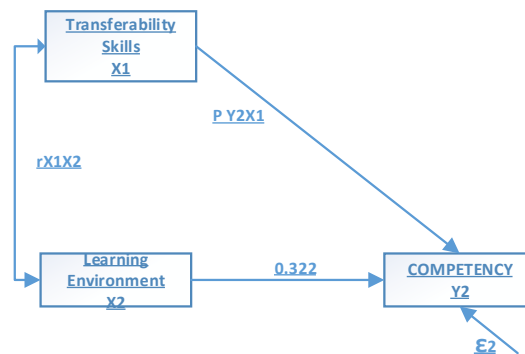
FIGURE 4. Sub-structure of the causal relationship X1 and X2 to Y1

3.3. Sub struktur -3 Hipotesis-3

Information: Y3=dependent variable (endogenous), X1, X2, Y1, and Y2 = independent variables (exogenous).

Structural equation:

$$Y_3 = PY_3X_1. X_1 + PY_3X_2 X_2 + PY_3Y_1 Y_1 + PY_3Y_2 Y_2 + PY_3\varepsilon_3.\varepsilon_3 \qquad 3)$$

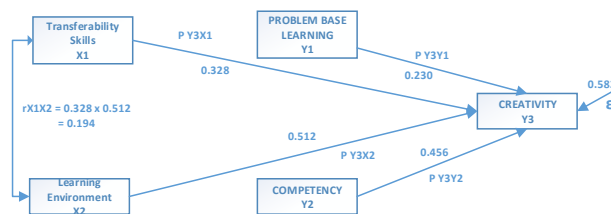FIGURE 5 explains the Sub-structure of the causal relationship X1 and X2 to Y1.

FIGURE 5. Sub structure-2 of the causal relationship X1 and X2 to Y1

Based on calculate the process using SPSS software, problem-based learning a dependent variable, then Transferability Skill (X1) and Learning Environment (X2) as the independent variable.

3.4. Dependent Variable: PBL (Y1)

The model I Path Coefficient The significant value of the two variables, X1 = 0.013 and X2 = 0.000, is less than 0.05, according to the Regression Model I output in the Coefficients TABLE section. These findings indicate that Y1 is greatly impacted by Perfect I Regression, specifically the X1 and X2. The Model Summary TABLE's R2 or R Square value is 0.366, meaning that X1 and X2 have a 36.6% impact on Y1, with other factors not included in the study accounting for the other 63.4%. In the meantime, the formula $\varepsilon_1 = \sqrt{(1-0.366)} = 0.796$ can be used to determine the value of ε_1. Thus, the path diagram for the structure model I is obtained in FIGURE 6 and TABLE 2.
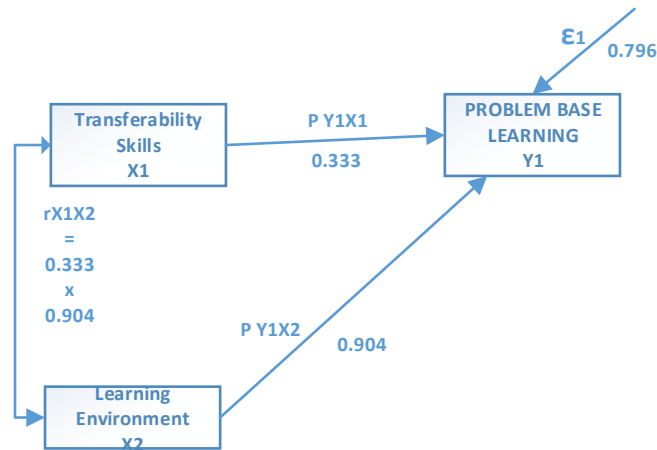
FIGURE 6. The model I path coefficient, dependent variable: PBL (Y1)

TABLE 2. Dependent variable: PBL (Y1)

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.605[a]	.366	.352	10.01006

a.Predictors: (Constant), Learning Environment (X2), Transferability Skills (X1)

Coefficients[a]

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
1. (Constant)	26.069	7.688		3.391	.001
Transferability Skills (X1)	-.442	.174	-.357	-2.545	.013
2. Learning Environment (X2)	1.017	.167	.853	6.084	.000

a.Dependent Variabel: PBL (Y1)

3.5. Dependent Variable: Competency (Y2)

Path Coefficient Model II: It is evident from the Coefficients TABLE section's Regression Model II output that the two variables' meaning values—X1 = 0.008 and X2 = 0.018—are less than 0.05. These findings indicate that Y2 is greatly impacted by Regression Model II, specifically the X1 and X2. The Model Summary TABLE's R2 or R Square value is 0.422, meaning that X1 and X2 have a 42.2% influence on Y2, with other factors not included in the study accounting for the remaining 57.8%. In the meantime, the formula $\varepsilon 1 = \sqrt{(1-0,422)} = 0.76$ can be used to determine the value of ε1.

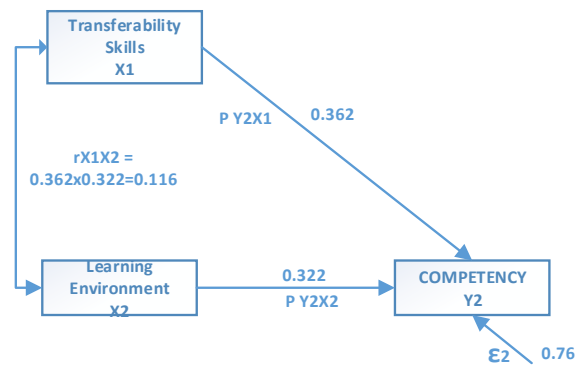Thus, the path diagram for the structure model II is obtained in FIGURE 7 and TABLE 3.

FIGURE 7. Model II path coefficient, dependent variable: competency (Y2)

TABLE 3. Dependent variable: competency (Y2)

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.605[a]	.422	.409	6.80983

a.Predictors: (Constant), Learning Environment (X2), Transferability Skills (X1)

Coefficients[a]

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
1. (Constant)	34.253	5.230		6.549	.000
Transferability Skills (X1)	.320	.118	.362	2.703	.008
Learning Environment (X2)	.274	.114	.322	2.406	.018

a.Dependent Variabel: PBL (Y1)

3.5. Dependent Variable-1: Creativity (Y3)

Model III Path Coefficient referring to the coefficients TABLE section's Regression Model III result, It is possible to determine that the two variables' significance value, Y1 = 0.000, is less than 0.05. According to these findings, Y1 has a considerable impact on Y3 in regression Model III. The Model Summary TABLE's R^2 or R Square value is 0.334, meaning that Y1's influence on Y2 accounts for 33.4% of the total, with the remaining 66.6% coming from the improvement of other volatiles that are not part of the class. Meanwhile, the formula $\varepsilon 1 = \sqrt{(1-0.334)} = 0.816$ can be used to find the value of $\varepsilon 1$.
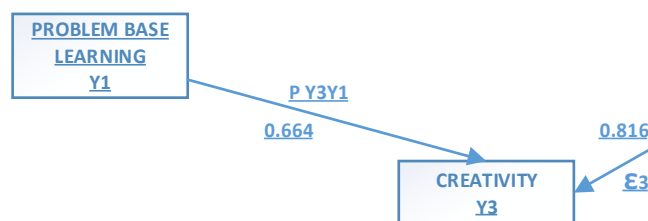
FIGURE 8. Model II path coefficient, dependent variable-1: creativity (Y3)

Thus, the path diagram for the structure model I is obtained in FIGURE 8 and TABLE 4.

TABLE 4. Dependent variable-1: creativity (Y3)

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.578a	.334	.327	7.14490

a.Predictors: (Constant), PBL (Y1)

Coefficientsa

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
1. (Constant)	34.253	5.230		6.549	.000
PBl (Y1)	.320	.118	.362	2.703	.008
	.274	.114	.322	2.406	.018

a.Dependent Variabel: PBL (Y1)

3.6. Dependent Variable-2: Creativity (Y3)

Model IV Path Coefficient refers to the implication is evident from the Model IV Regression output in the Coefficients TABLE section. Y2 = 0.000, the value of the two variables, is less than 0.05. Based on these findings, it can be concluded that the Y2 variable in Model IV Regression significantly affects Y3. The Model Summary TABLE's R2 or R Square value is 0.470, meaning that 47% of the variation in Y3 is due to Y2's effect, with the other 53% coming from other factors that were not part of the study. In the meantime, the formula $\varepsilon1 = \sqrt{(1-0,470)} = 0.728$ can be used to determine the value of $\varepsilon1$.

Thus, the path diagram for the structure model I is obtained in FIGURE 9 and TABLE 5.

FIGURE 9. Model II path coefficient, dependent variable-2: creativity (Y3)

TABLE 5. Dependent variable-2: creativity (Y3)

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.686[a]	.470	.464	6.37434

a.Predictors: (Constant), Kompetensi (Y2)

Coefficients[a]

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
2. (Constant)	28.095	5.741		4.894	.000
Kompetensi (Y2)	.674	.075	.686	9.033	.000

a.Dependent Variabel: Kompetensi (Y2)

3.7. Dependent Variable-3: Creativity (Y3)

Model V Path Coefficient refers to the two variables have the same significance value, Y2 = 0.000, which is less than 0.05, according to the Regression Model V result in the Coefficients TABLE section. These findings indicate that Y3 is significantly impacted by Model IV Regression, namely the variables X1, X2, Y1, and Y2. The Model Summary TABLE's R2 or R Square value of 0.661 indicates that X1, X2, Y1, and Y2 have a 66.1% influence on Y3, with the variable's contribution accounting for the remaining 33.9%. The study did not incorporate other variables. Meanwhile, the value of ε1 can be found with the formula ε1 = √ (1-0.661) = 0.582.

Thus, the path diagram for the structure model I is obtained in FIGURE 10 and TABLE 6.
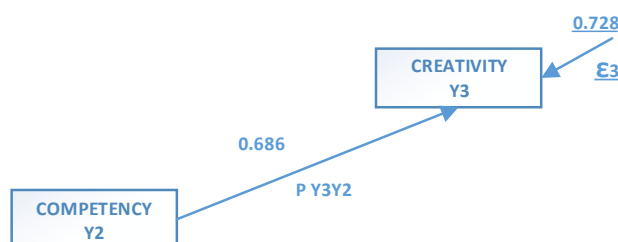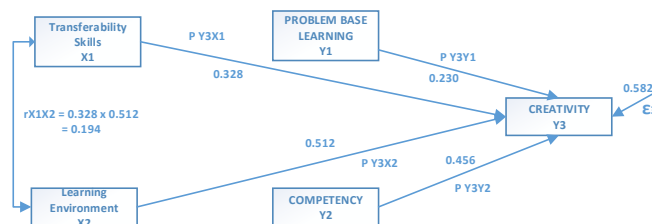

FIGURE 10. Model II path coefficient, dependent variable-4: creativity (Y3)

TABLE 6. Dependent variable-2: creativity (Y3)

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.813[a]	.661	.645	5.18689

a.Predictors: (Constant), Kompetensi (Y2), PBL (Y1), Transferability Skills (X1),

Learning Environment (X2)

Coefficients^a

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
1. (Constant)	24.138	4.859		4.968	.00
Transferability Skills (X1)	-.285	.099	-.328	-	0
Learning Environment (X2)	.428	.107	.512	2.865	.00
PBL (Y1)	.166	.063	.230	4.003	5
Kompetensi (Y2)	.448	.084	.456	2.646	.00
				4	0
				5.340	.010
					.00
					0

a.Dependent Variabel: Creativities (Y3)

Some students in the entrepreneurship course are shown in FIGURE 15; as an illustration, the lecturer shows videos and photos of inspiring business ideas. Each student is asked to look for business ideas. Each business idea is presented in front; the best is chosen to be a group business, branding, SWOT, Business Model Canvas (BMC), application flow diagrams, use cases, and filing for copyright.

Based on the pathway test above, the hypothesis test results and conclusions are obtained:

(1) Analysis of the effect of Transferability Skills (X1) on Problem Base Learning (Y1): from the above analysis, the significance value of Transferability Skills (X1) is 0.013 <0.05. As a result, Transferability Skills may be said to impact Problem-Based Learning (X1) (Y1) directly;

(2) Analysis of the influence of the Learning Environment (X2) on Problem Base Learning (Y1): from the above analysis, the significance value of Transferability Skill (X1) is 0.000 <0.05, so it can be achieved that there is a significant influence directly on the Learning Environment (X2) against Problem Base Learning (Y1);

(3) Analysis of the effect of Transferability Skill (X1) on Competence (Y2): from the above analysis, the significance value of Transferability Skill (X1) is 0.008 <0.05, so it can be concluded that there is a significant effect of Transferability Skill (X1) directly on Competence. (Y2);

(4) Analysis of the influence of Learning Environment (X2) on Competence (Y2): from the above analysis, the significance value of Transferability Skill (X1) is 0.018 <0.05. a result can be argued that the Learning Environment has a significant impact. (X2) on Competence directly. (Y2);

(5) Analysis of the effect of Transferability Skill (X1) on Creativity (Y3): from the above analysis, Competence (Y2) has a significance value of 0.0050.05. As a result, Transferability (X1) appears to significantly impact Creativity (Y3);

(6) Analysis of the influence of the Learning Environment (X2) on Creativity (Y3): from the above analysis, Competence (Y2) has a significance value of 0.0000. As a result, the Learning Environment (X2) appears to impact Creativity (Y3). 05 significantly;

(7) Analysis of the effect of Problem Based Learning (Y1) on Creativity (Y3): from the above analysis, the significance value of Problem Based Learning (Y1) is 0.000 <0.05. So it can be concluded that there is a significant effect of Problem Based Learning (Y1) directly) One towards Creativity (Y3);

(8) Analysis of the influence of Competence (Y2) on Creativity (Y3): from the above analysis, the significance value of Competence (Y2) is 0.000 <0.05. So it can be concluded that Competence (Y2) has a significant effect on Creativity (Y3)

CONCLUSIONS

This study concludes that both transferability skills and the learning environment significantly influence problem-based learning, which is crucial for improving student competence and creativity. The findings indicate that: (1) Transferability Skills are Essential: The research highlights that effective transferability skills, such as communication, collaboration, adaptability, and critical thinking, are vital for students to engage successfully in

problem-based learning scenarios. These skills enable students to navigate complex problems and develop innovative solutions, which are essential in entrepreneurship; (2) Learning Environment Matters: A supportive learning environment enhances the effectiveness of problem-based learning. Factors such as collaborative spaces, access to resources, and a culture that encourages experimentation contribute positively to student engagement and creativity; (3) Interconnectedness of Variables: The study demonstrates a clear pathway where transferability skills and the learning environment collectively enhance problem-based learning, which subsequently boosts student competence and creativity. This interconnectedness suggests that educational strategies should integrate these elements holistically rather than in isolation; (4) Implications for Curriculum Development: Educational institutions should consider incorporating targeted training for transferability skills within their curricula, alongside fostering an enriching learning environment. This approach will better prepare students for real-world challenges in entrepreneurship and other fields; and (5) Future Research Directions: The findings pave the way for further research into how these dynamics operate across different disciplines and educational contexts, potentially leading to broader applications of PBL methodologies. In summary, the research underscores the importance of developing both transferability skills and a conducive learning environment to enhance problem-based learning outcomes, ultimately fostering greater competence and creativity among students in entrepreneurial education.

Key Implications of the this research are: (1) Significant Influence of Transferability Skills: The study concludes that transferability skills have a substantial impact on problem-based learning, which in turn enhances student competence and creativity. This suggests that educational programs should prioritize developing these skills to prepare students for real-world challenges effectively; (2) Role of Learning Environment: The learning environment is shown to significantly affect both problem-based learning and student outcomes. This underscores the importance of creating supportive and resource-rich educational settings that foster collaboration, innovation, and practical problem-solving; (3) Integration in Curriculum Design: The findings imply that curricula should integrate transferability skills training within problem-based learning frameworks. By doing so, educational institutions can better equip students with the necessary competencies for entrepreneurship and adaptability in various job markets; (4) Practical Applications: Educational institutions can utilize these insights to design workshops and programs that enhance entrepreneurial skills among students, thereby contributing to economic development through innovation and creativity.

In summary, this research emphasizes the critical role of transferability skills and a conducive learning environment in enhancing student competencies and creativity, particularly in entrepreneurial education. It advocates for educational reforms that incorporate these elements into teaching practices.

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Appendix

TABLE 1. *Data TABLE of transferability skills, learning environment, problem-based learning. Competence and creativity.*

Respondent Code	Transferability Skills (X1)	Learning Environment (X2)	PBL (Y1)	Competency (Y2)	Creativity (Y3)
1	80.00	84.40	50.00	74.40	87.60
2	70.00	78.40	52.00	82.60	90.00
3	80.00	73.00	51.00	78.60	95.00
4	80.00	73.00	50.00	74.00	74.00
5	70.00	72.00	52.00	71.60	75.40
6	80.00	77.40	51.00	81.40	92.00
7	80.00	72.00	50.00	78.60	73.00
8	70.00	69.80	52.00	72.80	73.00
9	80.00	80.40	51.00	81.40	80.20
10	68.40	74.40	75.80	79.40	77.40
11	72.20	73.20	74.60	86.60	86.20
12	73.00	74.40	75.80	78.60	82.00
13	69.20	71.00	74.40	80.20	83.80
14	74.60	76.00	77.40	80.20	82.00
15	72.00	73.40	74.80	78.60	90.00
16	75.00	76.40	77.80	80.60	90.00
17	71.60	70.60	70.20	80.00	80.00
18	75.00	76.40	77.80	80.60	82.00
19	74.60	76.00	77.40	80.20	82.00
20	69.60	69.80	68.00	82.00	82.00
21	82.00	83.40	75.80	86.60	88.00
22	82.00	74.00	74.60	78.40	81.60
23	81.00	82.40	75.80	86.60	90.00
24	71.60	73.00	74.40	78.60	82.00

25	79.00	80.40	75.80	84.60	86.00
26	77.00	78.40	74.60	82.60	84.00
27	71.60	73.00	75.80	78.60	82.00
28	79.00	80.40	75.80	84.60	86.00
29	70.60	73.00	74.60	82.20	83.60
30	70.60	70.60	75.80	82.40	83.60
31	85.40	86.80	74.80	77.20	90.00
32	79.00	78.40	77.40	82.60	88.60
33	73.00	74.40	75.80	78.60	90.00
34	68.40	73.00	74.40	73.00	74.40
35	74.60	76.00	74.40	71.60	75.40
36	81.00	82.40	74.80	83.40	90.00
37	69.60	73.20	74.80	73.40	72.00
38	76.20	74.60	74.80	68.40	73.00
39	81.00	82.40	77.40	83.40	78.20
40	69.60	74.40	74.80	76.40	77.80
41	75.00	76.00	77.80	86.60	86.60
42	72.00	73.40	74.80	78.60	82.00
43	69.20	70.60	72.40	77.60	82.20
44	73.00	74.40	75.80	78.60	82.00
45	74.60	76.00	77.40	80.20	88.00
46	72.00	73.40	74.80	78.60	88.00
47	69.60	68.80	72.00	76.20	81.00
48	75.00	76.40	77.80	80.60	82.00
49	74.60	76.00	77.40	80.20	82.00
50	69.20	68.40	70.60	70.80	80.00
51	81.00	82.40	75.80	86.60	88.00
52	75.00	73.00	74.60	77.80	77.20
53	75.00	76.40	75.80	80.60	82.00
54	75.00	76.40	77.80	80.60	90.00
55	74.40	75.80	77.20	80.00	83.00
56	79.00	80.40	81.80	84.60	86.00
57	73.00	74.40	75.80	78.60	82.00
58	76.00	77.40	78.80	81.60	83.00
59	69.60	71.40	77.40	78.20	82.60
60	72.40	71.00	77.80	84.60	85.60
61	85.00	86.40	74.40	71.60	92.00
62	79.00	80.40	81.80	84.60	82.00
63	73.00	58.00	50.00	66.00	65.00
64	84.00	67.00	52.00	82.00	70.00
65	74.00	79.00	51.00	87.00	89.00
66	63.00	52.00	69.00	82.00	79.00
67	65.00	68.00	53.00	79.00	68.00
68	70.00	69.00	54.00	60.00	59.00
69	44.00	57.00	61.00	50.00	79.00
70	64.00	49.00	38.00	65.00	69.00

71	35.00	36.00	45.00	64.00	60.00
72	74.00	73.80	75.20	79.00	82.00
73	63.00	70.60	74.80	80.20	82.60
74	65.00	73.40	74.80	78.60	82.00
75	70.00	73.80	75.20	79.00	88.00
76	73.00	58.00	50.00	66.00	65.00
77	84.00	67.00	52.00	82.00	70.00
78	74.00	79.00	51.00	87.00	89.00
79	63.00	52.00	69.00	82.00	79.00
80	65.00	68.00	53.00	79.00	68.00
81	70.00	69.00	54.00	60.00	59.00
82	44.00	57.00	61.00	50.00	79.00
83	64.00	49.00	38.00	65.00	69.00
84	35.00	36.00	45.00	64.00	60.00
85	73.00	58.00	50.00	66.00	65.00
86	84.00	67.00	52.00	82.00	70.00
87	74.00	79.00	51.00	87.00	89.00
88	63.00	52.00	69.00	82.00	79.00
89	65.00	68.00	53.00	60.00	68.00
90	70.00	69.00	54.00	50.00	59.00
91	44.00	57.00	61.00	65.00	79.00
92	64.00	49.00	38.00	60.00	69.00
93	35.00	36.00	45.00	50.00	60.00
94	70.60	73.00	74.40	65.00	74.00