The Effect of Implementing Paikem Case-Based Learning And Cooperative Learning On Learning Competency And Quality

Indrayati*, Basuki Rahmat, Apit Miharso
Accounting Program, Politeknik Negeri Malang, Indonesia

Abstract:
Financial PKA (*Praktek Kerja Akuntansi*/ Accounting Work Practices) at State Polytechnic of Malang is expected to fulfill the cognitive, psychomotor, and affective aspects. Therefore, in the current learning, the researchers developed a new method namely PAIKEM through student-centered learning, case-based learning, and cooperative learning for learning competence and quality. This research aimed at developing and implementing PAIKEM method through student-centered learning, case-based learning, and cooperative learning so that the learning in the accounting department at State Polytechnic of Malang can generate high-quality human resources. The research method conducted was applied-quantitative research method and descriptive research with a classroom action research, primary data source, data processing using multiple linear regression using classical assumption test, t-test, F-test, and R square. The researchers identified the problems in the classroom, observing the field, then constructed a case plane for practicing solving a problem in real life, learning with a collaboration method. The emerged problems were analyzed and solved by the students with the ability based on the existing theory. The research finding were there was a significant effect of case-based learning, cooperative learning, and effective learning on learning competency and coefficient of determination as much as 0.621 and a significant effect of student-centered learning, cooperative learning, creative learning, and effective learning ton the learning quality with the coefficient of determination as much as 0.744.
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INTRODUCTION

State Polytechnic of Malang is a higher education with a professional education background which prioritizes its improvement on skill application or to prepare the students to be citizens with professional abilities which can apply, develop, and disseminate their knowledge and technology as well as have an adequate skill. The accounting study program is one of the departments at State Polytechnic of Malang which holds the responsibilities to generate graduates who are ready to work, skillful in the accounting field, and able to compete in the global market according to their vision and mission.

The assessment on the educational product quality is firstly observed from the development of basic attitudes such as scientific academic critical behavior and the willingness to seek the truth continuously (Yumarma, 2006). Therefore, the concept of education is not reduced on the tests which only measure the transfer of knowledge (*cognitive*), but broader including the shaping of skills (*psychomotor*) and basic attitude or affective, such as criticality, creativity, and openness on innovation and various discoveries. All of them are significantly required so that students can survive and answer dynamic challenges. In this case, educators are demanded not only as knowledge transferrer, but also beyond that which is as agents of enlightenment.

Helts 2003-2010 mandated by Directorate General of Higher Education in April 2003 gave trust, one of which is the application of Student-Centered Learning (SCL) principles in the learning process. There are various learning methods in Student-Centered Learning (SCL), among them are Case-based Learning, Cooperative Learning, and Project-based Learning.

Currently, the learning process which is commonly practiced is in the form of lecturing. This method of learning pattern in which a passive lecturer and passive students have low learning effectiveness. Therefore, current learning method cannot sharpen the students' analysis ability and awareness of problems, train problem solving and ability to evaluate a problem holistically. Hence, a new method namely case-based learning PAIKEM is developed. The following is the score of Financial PKA course before the PAIKEM method was applied.

Table 1. The percentage of students' ability in Financial PKA course in 2018 (Total students: 400)

Final score	Financial PKA course
A	30%
B+	23%
B	10%
C+	20%
C	7%
D	10%

Based on Table 1, the traditional learning method in Financial PKA course contributes A score as much as 30%, B+ score as much as 23%, B score as much as 10%, C+ score as much as 20%, C score as much as 7% and D score as much as 10%. Therefore, according to HELTS, the new learning strategy which will be used for learning is based on student-centered learning with the implementation of case-based learning and cooperative learning for Financial PKA course to improve students' competency.

LITERATURE REVIEW

The research on students' active learning and cooperative learning have been conducted by Felder and Brant (1996) who stated that this approach improves motivation for learning, knowledge memory, the depth of understanding, and the appreciation on the taught subject. The research also shows that the cooperative learning practice directs the students on achieving higher achievements, more efficient, and more effective process of information exchange, improving productivity, a positive relationship among students, and fostering trustworthy among friends, compared to competitive and/or individualistic learning experiences.

PAIKEM learning concept

PAIKEM is an abbreviation from *Pembelajaran Aktif, Inovatif, Kreatif, Efektif, dan Menyenangkan* which means active, innovative, creative, effective and fun learning. Active is defined as in the learning process, teachers/ lecturers must create a specific condition so that the students ask questions actively, questioning, and express their ideas.

According to Ahmadi (2011:30), PAIKEM is active, innovative, creative, effective and fun learning. According to Syah and Kariadinata (2009:1), PAIKEM is the abbreviation of *Pembelajaran Aktif, Inovatif, Kreatif, Efektif dan Menyenangkan* which means active, innovative, creative, effective and fun learning. Furthermore, PAIKEM can be defined as an approach to teaching which is used along with a specific method and various teaching media and environmental management in such a way that the learning process becomes active, innovative, creative, effective and fun. The purpose of each of the words PAIKEM according to Suparlan *et al.* (2008:70) are as follows.

1. Active means in the learning process, the teacher/ lecturer must create a condition in such a way so that the students actively ask questions, express ideas, and solving problems.
2. *Innovative means teacher/ lecturer must create new learning condition and learning activities according to the demands and educational development such as the use of project-based-learning, cooperative-learning, and case-based-learning.*
3. Creative means that teachers create diverse learning activities to fulfill various levels of students' ability or students' creativities in problem-solving.
4. Effective means generating what needs to be mastered by the students after the learning process which is achieving the predetermined objective/ competency.
5. Fun means that teacher/ lecturer must be able to create fun and not boring teaching and learning conditions so that the students can obtain a sharp focus and the learning can be faster such as the availability of teaching aids and handout in learning, as well as the use of multimedia and website.

According to Tarmizi (2009), PAIKEM is the abbreviation of active, creative, effective, and fun learning. Active means in the learning process, the teacher/ lecturer must create the condition in such a way so that the students can be active, ask questions, questioning, express ideas, and solve problems. Innovative learning can adapt fun learning models such as project-based learning, cooperative learning, case-based learning, and the use of multimedia and teaching aids.

PAIKEM method is one of the ideal learning models. PAIKEM method helps students obtain their ideas in learning through the approach of the surrounding environment. The positive impact of implementing PAIKEM model is that the students can be encouraged in terms of their curiosity in their surroundings. If we reflect on the four pillars of education, they are learning to how, learning to be, learning to do, and learning to live together.

To create an effective learning situation, Combs (1976) asserts that three characteristics are required, namely:

1. Conducive atmosphere to explore the meaning of learning. The students must feel safe and accepted. They want to understand the risks and benefits of obtaining knowledge and new understanding. The class must be conducive for involvement, interaction, and socialization with an approach similar to the business world.
2. Students must be given opportunities to find new information and experience. These opportunities are given not only in the form of information but also encouragement for students to find information.

3. New understanding must be obtained by the students through the personal discovery process. The method used must be personal and according to their personality and the student's learning style.

Case-based learning

Several aspects differentiating cooperative-based learning and traditional learning are described by Thomas, Mergendoller, & Michaelson (1999) as shown in Table 2.

**Table 2. The Difference between Case-based Learning and Traditional Learning**

EDUCATIONAL ASPECT	TRADITIONAL EMPHASIS	CASE EMPHASIS
Curriculum Focus	Content coverage	The depth of knowledge
	Knowledge on Facts	The mastery of concepts and principles
	Learning "building-block" skill in isolation	The development of complex problem-solving skill
Scope and Sequence	Following the sequence of curriculum strictly	Following the learning interest
	Progressing from block to block or unit to unit	Big units formed from the complex cases and issues
	Centered, discipline-base focus	Broadening, interdisciplinary focus
Role of teacher/ lecturer	Lecturer and director of learning	Learning source provider and participant in learning activities
	Expert	Supervisor/ partner
Measurement focus	Product	Process and product
	Test score	Real achievement
	Comparing with others	Standard performance and progress over time
	Reproduction of Information	Understanding demonstration
Learning materials	Text, lecture, and presentation	Direct original sources: printed materials, interviews, documents, etc.
	Activities and worksheet developed by teachers	Data and materials developed by the students
Technology usage	Supporter, peripheral	Primary, integral
	Implemented by the teacher	Directed by students
	Aimed at broadening teacher's presentation	Usability for expanding student presentations or strengthening student abilities
Class context	Students work independently	Students work in groups
	Students compete with each other	Students collaborate one and another
	Students receive information from the teacher	Students construct, contribute, and synthesis the information
Role of students	Carry out teacher's orders	Conducting learning activities directed by themselves
	Reminder and repeater of facts	Reviewers, integrators, and presenters of ideas
	Students receive and complete short report assignment	Students receive assignments and work independently in an abundant time
Short-term goals	Knowledge on facts, terms, and content	Understanding and application of complex ideas and processes
Long-term goals	The breadth of knowledge of the graduates who are successful in the learning achievement standard test	In knowledge, Graduates who have character and are skilled at developing themselves, independently, and learning throughout their lives.

RESEARCH METHOD

Research design: Classroom action research

One of the popular definitions of classroom action research by Lewin's model is interpreted by Kemmis and Carr (2005). Both authors state that classroom action research is a reflective form of research performed by the researcher in society and aim at improving their work, understanding the work and situation, as well as this work, is conducted, including in the field of education. (Kemmis & Carr, 2005). Classroom action research is described as a dynamic process in which the four aspects are planning, acting, observing, and reflecting must be understood as non-static stages, auto-completed, but more of moments in the spiral form related to planning, acting, observing, and reflecting.

Figure 1. the Action Research Spiral by Kemmis & Taggart (1988)
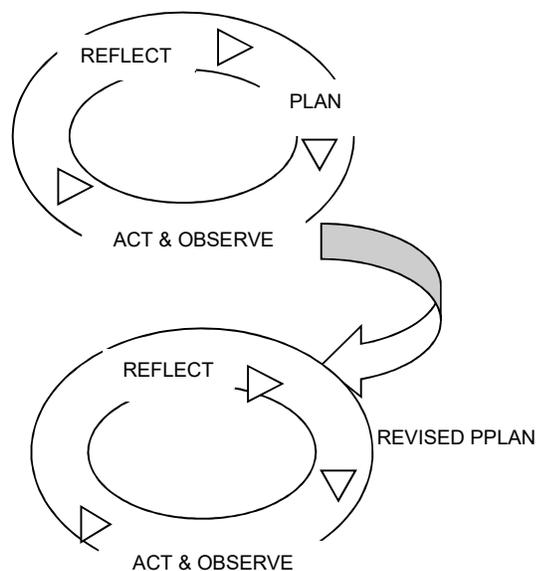
Classroom action research according to Moleong, 2006 is as follow:
1. Identifying a problem, which is identifying the occurring problems in the classroom.
2. Discussing a problem, discussing the problem with the team to find a solution.
3. Reviewing a problem, reviewing the problems by seeking alternative problem-solving.
4. Redefinition of a problem, redefining the occurring problem to find the solution through problem-solving.
5. Selecting a method, conducting learning method selection to find the appropriate way method.
6. Implementing a change, implementing a change of the old method to the new one.

In the management of Financial PKA learning, assessment or evaluation on students are also conducted by the lecturer using the method suggested by Michaelson (1998) which is classifying the assessment criteria into three performance areas, namely: 1) individual performance, 2) group performance and 3) performance of individual contribution to group (measured using peer-evaluation sheet).

RESULTS AND DISCUSSION

The research results of implementing modified learning model in Financial PKA course is the production of PAIKEM new learning method development through case-based learning and competency, the learning quality of Financial PKA course, lesson study (RPS), and the construction of Financial PKA course syllabus, GBPP, SAP, teaching materials using power point and animation.

Table 3. The percentage of assessment results on the ranking of students participating in Financial PKA course

Score	Financial PKA Course
A	80%
B+	10%
B	5%
C+	5%
C	-
D	-

Students who obtained A score are 85 %, B+ score of 10 %, B score of 5 %, and C+ score of 5%. Meanwhile, the students' response to the new learning model in Financial PKA course namely case-based learning was 95 % agreed on the implementation of PAIKEM learning model since this learning made the students active, innovative, effective, and fun, more competent, understand the Financial PKA course well in the knowledge and skills, while the other 5% perceived that they preferred the traditional learning method which was lecture method.

This method implemented a new learning method on Financial PKA course through case-based learning and the utilization of teaching materials, exercises, multimedia teaching aids, and the distribution of cases or assignment to complete the questions on the application of financial accounting in the company.

The questions were based on the previously taught theory and concepts or according to the competency-based curriculum (KKNI), teaching materials made by the lecturer. The completion of cases regarding the application of accounting questions will be significantly helpful for companies in making a financial report, calculation of the cost of production and cost of goods sold, income statement, PKA Finance with the PAIKEM method are easier to understand and solve problems in the real world. Learning becomes easier and not boring, the students understand more about theory, and then solve problems in the real world so that cognitive, psychomotor and affective aspects can be achieved.

The statistical test results showed that the effects of case-based PAIKEM method on learning competency are as follows.

1. Validity and reliability tests. Validity test showed that if the coefficient of correlation between the score of an indicator is higher than 0.3, then the instrument is stated as valid, while the reliability test showed that if the Cronbach's alpha shows a higher number than 0.6, then the instrument is stated as reliable.

Table 4. The validity test of questionnaire on Variable X

Item	r	Significance	Description
X1	0.805	0.000	Valid
X2	0.798	0.000	Valid
X3	0.806	0.000	Valid
X4	0.828	0.000	Valid
X5	0.842	0.000	Valid
X6	0.828	0.000	Valid
X7	0.768	0.000	Valid

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Table 5. The validity test of questionnaire on Variable Y

Item	r	Significance	Description
Y1	0.873	0.000	Valid
Y2	0.864	0.000	Valid
Y3	0.843	0.000	Valid
Y4	0.890	0.000	Valid

Table 6. The Reliability Test of Variables

Variable	item	Alpha Coefficient	Description
X	7	0.912	Reliable
Y	4	0.889	Reliable

2. Classical assumption test on the effect of X on Y shows that the normality test using Kolmogorov-Smirnov showed normal data, no multicollinearity, no heteroskedasticity, and no autocorrelation.

3. Multiple Regression Analysis

The multiple linear analysis results are shown in Table 7.

Table 7. The Summary of Multiple Linear Regression Test

Variable	B	T_{count}	*Significant*	Description
Constant	0.698			
TCL (X1)	-0.034	-0.441	0.659	Not Significant
SAL (X2)	0.089	1.308	0.193	Not Significant
CBL (X3)	0.273	4.504	0.000	Significant
Coop_L (X4)	0.187	2.923	0.004	Significant
Cre-L (X5)	0.083	1.270	0.206	Not Significant
Ef-L (X6)	0.182	2.585	0.011	Significant
Fun-L (X7)	0.040	0.744	0.458	Not Significant
α	= 0.050			
Coefficient of Determination (R^2)	= 0.621			
F-count	= 40.176			
F-table ($F_{7,172,0.05}$)	= 2.063			
F significance	= 0.000			
t-table ($t_{172,0.05}$)	= 1.974			

Based on Table 4.8, the regression model obtained is as follow.

Y = 0.698 – 0.034 X1 + 0.089 X2 + 0.273 X3 + 0.187 X4 + 0.083 X5 + 0.182 X6
   + 0.040 X7+ e$_i$

F-test (Simultaneous test / joint influence)
    Based on Table 7, the score of F$_{count}$ is higher than F$_{table}$ (40.176>2.063) and has a smaller significance value than α (0.000<0.050), so that **H$_0$ is rejected**. It means that simultaneously, the independent variables namely X1 (TCL), X2 (SAL), X3(PBL), X4(Coop_L), X5(Cre-L), X6(Ef-L), and X7 (Fun-L) has a significant effect on Y1 variable (Competency).

T-test (Partial test/ each influence)
    Based on Table 7, the results are as follows:
a. X1 (TCL) variable has a negative and not significant effect on Y1 variable (Competency). Observed from the t-test statistics with a smaller |t$_{count}$| than t$_{table}$ (0.441<1.974) and higher t significant value than *α* (0.659>0.050). This test showed the decision that **H$_0$ was accepted**. The negative coefficient showed that the increase in X1 variable decreased Y1 variable but not significantly.
b. X2(SAL) variable has a positive and not significant effect on Y1 variable (Competency). Observed from the t-test statistics with a smaller |t$_{count}$| than t$_{table}$ (1.308< 1.974) and higher t significant value than *α*(0.193>0.050). This test showed the decision that **H$_0$ was accepted**. The negative coefficient showed that the increase in X2 variable could increase Y1 variable but not significantly.
c. X3(CBL) variable has a positive and significant effect on Y1 variable (Competency). Observed from the t-test statistics with a higher |t$_{count}$| than t$_{table}$ (4.504 > 1.974) and smaller t significant value than *α*(0.000 <0.050). This test showed the decision that **H$_0$ was rejected**. The positive coefficient showed that the increase in X3 variable could increase Y1 variable significantly.
d. X4(Coop_L) variable has a positive and significant effect on Y1 variable (Competency). Observed from the t-test statistics with a higher |t$_{count}$| than t$_{table}$ (2.923 > 1.974) and smaller t significant value than *α*(0.004

<0.050). This test showed the decision that **H₀ was rejected**. The positive coefficient showed that the increase in X4 variable could increase Y1 variable significantly.

e. X5(Cre-L) variable has a positive and not significant effect on Y1 variable (Competency). Observed from the t-test statistics with a smaller $|t_{count}|$ than t_{table} (1.270 < 1.974) and higher t significant value than α(0.206 >0.050). This test showed the decision that **H₀ was accepted**. The positive coefficient showed that the increase in X5 variable could increase Y1 variable but not significantly.

f. X6(Ef-L) variable has a positive and significant effect on Y1 variable (Competency). Observed from the t-test statistics with a higher $|t_{count}|$ than t_{table} (2.585> 1.974) and smaller t significant value than α(0.011<0.050). This test showed the decision that **H₀ was rejected**. The positive coefficient showed that the increase in X6 variable could increase Y1 variable significantly.

g. X7(Fun-L) variable has a positive and not significant effect on Y1 variable (Competency). Observed from the t-test statistics with a smaller $|t_{count}|$ than t_{table} (0.744< 1.974) and higher t significant value than α(0.458>0.050). This test showed the decision that **H₀ was accepted**. The positive coefficient showed that the increase in X7 variable could increase Y1 variable but not significantly.

Coefficient of Determination (R^2)

The amount of contribution from the independent variables simultaneously on dependent variables is based on the calculation results in Table 4.5 with the coefficient of determination (R Square) of 0.621. the results explained that the contribution of independent variables namely (X1 (TCL), X2 (SAL), X3(CBL), X4(Coop_L), X5(Cre-L), X6(Ef-L), and X7 (Fun-L)) involved in the regression equation on Y1 variable (Competency) was 62.1%, while another 37.9% was contributed by other variables uninvolved in this equation.

The classical assumption on the effect of X on Y2 (quality) showed that normal data did not show the presence of multicollinearity, heteroskedasticity, and autocorrelation.

Multiple Regression Analysis

The regression results of X influence on Y2 is shown in Table 4.6 as the following.

Table 8. Summary of Multiple Linear Regression Testing

Variable	*B*	T_{count}	Significant	Description
Constant	0.615			
TCL (X1)	-0.102	-1.706	0.090	Not Significant
SAL (X2)	0.262	4.987	0.000	Significant
CBL (X3)	0.076	1.608	0.110	Not Significant
Coop_L (X4)	0.106	2.150	0.033	Significant
Cre-L (X5)	0.164	3.244	0.001	Significant
Ef-L (X6)	0.274	5.037	0.000	Significant
Fun-L (X7)	0.063	1.508	0.133	Not Significant
α	= 0.050			
Coefficient of Determination (R^2)	= 0.744			
F-count	= 71.299			
F-table ($F_{7,172,0.05}$)	= 2.063			
F significance	= 0.000			
t-table ($t_{172,0.05}$)	= 1.974			

Based on Table 8, the regression model obtained is as follow.
Y = 0.615 – 0.102 X1 + 0.262 X2 + 0.076 X3 + 0.106 X4 + 0.164 X5 + 0.274 X6 + 0.063 X7 + eᵢ

F-test (Simultaneous test / joint influence)

Based on Table 8, the score of F_{count} is higher than F_{table} (71.299> 2.063) and has a smaller significance value than α (0.000 <0.050), so that **H₀ was rejected**. It means that simultaneously, the independent variables namely X1 (TCL), X2 (SAL), X3(CBL), X4(Coop_L), X5(Cre-L), X6(Ef-L), and X7 (Fun-L) have a significant effect on Y2 variable (quality).

T-test (Partial Test/ each influence)

Based on Table 8, the results are as follows:

a. X1 (TCL) variable has a negative and not significant effect on Y2 variable (Quality). Observed from the t-test statistics with a smaller $|t_{count}|$ than t_{table} 1.706< 1.974) and higher t significant value than α(0.090>0.050). This test showed the decision that **H$_0$ was accepted**. The negative coefficient showed that the increase in X1 variable decreased Y2 variable but not significantly.

b. X2(SAL) variable has a positive and significant effect on Y2 variable (Quality). Observed from the t-test statistics with a higher $|t_{count}|$ than t_{table} (4.987 > 1.974) and smaller t significant value than α(0.000<0.050). This test showed the decision that **H$_0$ was rejected**. The positive coefficient showed that the increase in X2 variable could increase Y2 variable significantly.

c. X3(CBL) variable has a positive and not significant effect on Y2 variable (Quality). Observed from the t-test statistics with a smaller $|t_{count}|$ than t_{table} (1.608 < 1.974) and higher t significant value than α(0.110>0.050). This test showed the decision that **H$_0$ was accepted**. The positive coefficient showed that the increase in X3 variable could increase Y2 variable but not significantly.

d. X4(Coop_L) variable has a positive and significant effect on Y2 variable (Quality). Observed from the t-test statistics with a higher $|t_{count}|$ than t_{table} (2.150> 1.974) and smaller t significant value than α(0.033<0.050). This test showed the decision that **H$_0$ was rejected**. The positive coefficient showed that the increase in X4 variable could increase Y2 variable significantly.

e. X5(Cre-L) variable has a positive and significant effect on Y2 variable (Quality). Observed from the t-test statistics with a higher $|t_{count}|$ than t_{table} (3.244 > 1.974) and smaller t significant value than α(0.001<0.050). This test showed the decision that **H$_0$ was rejected**. The positive coefficient showed that the increase in X5 variable could increase Y2 variable significantly.

f. X6(Ef-L) variable has a positive and significant effect on Y2 variable (Quality). Observed from the t-test statistics with a higher $|t_{count}|$ than t_{table} (5.037> 1.974) and smaller t significant value than α(0.000<0.050). This test showed the decision that **H$_0$ was rejected**. The positive coefficient showed that the increase in X6 variable could increase Y2 variable significantly.

g. X7(Fun-L) variable has a positive and not significant effect on Y2 variable (Quality). Observed from the t-test statistics with a smaller $|t_{count}|$ than t_{table} (1.508< 1.974) and higher t significant value than α(0.133>0.050). This test showed the decision that **H$_0$ was accepted**. The positive coefficient showed that the increase in X7 variable could increase Y2 variable but not significantly.

Coefficient of Determination (R^2)

The amount of contribution from independent variables simultaneously on dependent variables based on the calculation in Table 4.6 with the coefficient of determination (R-Square) is as much as 0.744. The results describe the contribution from independent variables namely (X1 (TCL), X2 (SAL), X3(CBL), X4(Coop_L), X5(Cre-L), X6(Ef-L), and X7 (Fun-L)) involved in the regression equation on Y2 variable (quality) is as much as 74.4%, while another 25.6% was contributed by other variables uninvolved in this equation.

Conclusion

Based on the research results, the conclusion was drawn as follows. First, case-based learning PAIKEM learning method has been successfully applied in the vocational education namely State Polytechnique of Malang. The constructed curriculum-based learning competence (KKNI) through lesson plan (RPP) and syllabus, lesson plan in GBPP and SAP, teaching material and exercises in Financial PKA course, teaching aids using multimedia in Financial PKA learning, new learning method namely case-based learning and cooperative learning, as well as student-centered learning. The survey results showed that the students preferred taught using case-based learning method and their scores were better than before the implementation.

Second, the analysis results of the effect of X_i variable on Y1 (Competency) showed simultaneously, independent variables of X1 (TCL), X2 (SAL), X3(CBL), X4(Coop_L), X5(Cre-L), X6(Ef-L), and X7 (Fun-L) has a significant effect on Y1 (Competency). Partially, independent variables of X3(CBL), X4(Coop_L), and X6 (Ef-L) has a significant effect on Y1 (Competency). Coefficient of determination as much as 0.621 (62.1%). The analysis results of the effect of X_i on Y2 (Quality) showed: Simultaneously, independent variables of X1 (TCL), X2 (SAL), X3(CBL), X4(Coop_L), X5(Cre-L), X6(Ef-L), and X7 (Fun-L) has a significant effect on Y2 (Quality). Partially, independent variables of X2 (SAL), X4(Coop_L), X5(Cre-L), and X6(Ef-L) has a significant effect on Y2 (Quality). Coefficient of determination as much as 0.744 (74.4%).

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