The Impact of Think Pair Share (TPS) Learning Models on Stoichiometry Lessons in Paket C Program

Tri Joko Raharjo[1(*)] and Harianingsih[2]
[1]Departement of Non Formal Education. Universitas Negeri Semarang. Indonesia
[2]Departement of Chemical Engineering. Wahid Hasyim University. Indonesia
(*)✉ (e-mail) trijokoraharjo@mail.unnes.ac.id

Abstract
Stoichiometry is one of the lessons given to paket C students. Chemical education, especially stoichiometry, is often considered a difficult and tedious lesson. For this reason, it is necessary to have an innovative learning model that can increase learning motivation and absorption capacity of C paket students in learning stoichiometry. The purpose of this study was to analyze the effect of using Think Pair Share (TPS) learning models on stoichiometric lessons in paket C PASCA 45 Demak District, Central Java, Indonesia.The research method was conducted using quantitative method by looking at the average value of the pretest and posttes in the experimental class, namely the class using the TPS learning model and the control class using the teacher center learning model. From the calculation results obtained data on average increase in the pretest value for the experimental class is 78% and the control class is 52%. Through the test "t" the value of t = 1.4 is obtained for the experimental class and t = 0.8 for the control class. This means that the results of the experimental class with the TPS learning model are better than the results of the control class.

Keywords: chemistry, learning model, paket c, think pair share

Introduction
Equality Education paket C is an alternative education given to people who cannot take the equivalent of high school education in formal schools. Paket C education is held by the Indonesian government for reasons of geographical, socio-cultural, economic and psychological conditions of people who cannot take formal education (Bodner, 2014). One of the subjects given in paket C is chemical education. This refers to the 2013 education curriculum for secondary education based on the Ministry of Education and Culture Regulation No. 24 of 2016. The 2013 curriculum is also used for paket C of course adjusted to the context and function of each of the basic competencies in the material provided. The hope is that students can more easily adapt in understanding each competency that is learned. Learning on equality education is flexible in accordance with the characteristics of students(Abdullah, 2013). This learning makes students have freedom in learning patterns and solving problems in learning.Students in paket C are invited to learn which is important to be able to at least change the character of the bad to be better, more positive, more beneficial for themselves and the surrounding environment (Garner, 2015). So that students can prepare themselves to face competition in the outside world. Paket C students can understand themselves, understand the changes that occur, follow the development of globalization. Positive behavior changes that can later be used as capital from students in finding work to earn income to meet their daily needs (Garner, 2014).

One curriculum in paket C equality education is the existence of chemical education. Chemistry is the study of matter, energy and even the interaction between the two. Chemistry can also be explained as the study of all matter which includes the composition of matter, the structure of matter and its changes. Chemistry also studies energy and its changes (Arikunto, 2009). Chemistry is a curriculum that must be given to paket C because it affects all aspects of human life. One of the competencies in chemical education for paket C is stoichiometry. Of the various types of learning

models available, this study uses a Think Pair Share (TPS) learning model. This TPS learning model is considered more appropriate to be used for paket C students because there are positive components that make students and tutors motivated to respond, among others (Arikunto, 2005): (1) Students respond to tutors to listen to what is delivered, (2) the tutor's response gives time to students to think before answering questions given by tutors, (3) Students give each other a signal to pair up with a friend next to them and discuss in answering questions, (4) Students share answers in their respective groups. The presence of student response components as above can mentally train to dare to answer and even argue with other students to defend their opinions. All students have the opportunity to share with other students(Nizar, 2014).

Frank Lyman from the University of Maryland is a person who has developed a TPS learning model, Lyman is able to change the belief that a discussion process must be set as a whole in the classroom, discussion can work on its own depending on the way the tutor teaches (Lie, 2014). For example, the tutor asks students about stoichiometry then the tutor asks students to think about the answers to be given, students are invited to discuss with their next friends in pairs, then from the results of the discussion are discussed again in a larger group.The steps of the Think Pair Share (TPS) learning model are described as follows (Rauch, 2015): (1) The first step is to think, the Tutor asks questions related to stoichiometry lessons and students are given 1 minute to think for themselves in answering the question. (2) The second step is Pairing, where the tutor asks students in pairs and then discusses what has been thought within 1 minute in the first step. Interaction when students pair up can produce answers to questions that have been given by the tutor. (3) The third step is Sharing. In this step the tutor asks students who have discussed answers in pairs to share with the whole student in class(Permana, 2009).

Stoichiometry which is one of the material in chemistry lessons comes from Greek stoichim which means elements and metron which means how to measure. So stoichiometry is a calculation of the elements in chemistry(Sarwono, 2016).Some points calculated in chemistry include relative atomic mass, chemical formula, reaction equation, and mole concept (Stuckey, 2013). Stoichiometry is the study of the size of reactants and models in chemical reactions so that later the amount of composition is the same so for stoichiometry there is a need for chemical equations(Bradley, 2015). We can see examples of stoichiometric calculations in the combustion reaction(Siregar, 2010). Combustion is a release reaction of combustible compounds from burning substances. From the things described above, this study was conducted with the aim of using innovative learning methods, namely Think Pair Share (TPS) in order to increase the interest and activities of paket C students in order to more easily understand stoichiometric material(Wena, 2009).

Research methodology

The research methodology is carried out by conducting a series of steps and process activities to produce a learning model that can be accepted and applied by paket C students (Trianto, 2014). From the series of activities the ultimate goal is the use of Think Pair Share method as an innovative model to improve student understanding. The study was conducted in paket C "PASCA 45" in Demak Regency, Central Java, Indonesia with 30 students of class X. The research steps can be described as follows at table 1:

Table 1. Design division of subjects

Experimental class	control class	Post test
E	X	O1
K	Y	O2

The data obtained in this study are qualitative description data about student activities in learning and quantitative data from questionnaires analyzed using a Likert scale, as well as data on the level of understanding obtained by students . The research design described above can be seen in the scheme of figure 1 (Hempellmann, 2014).

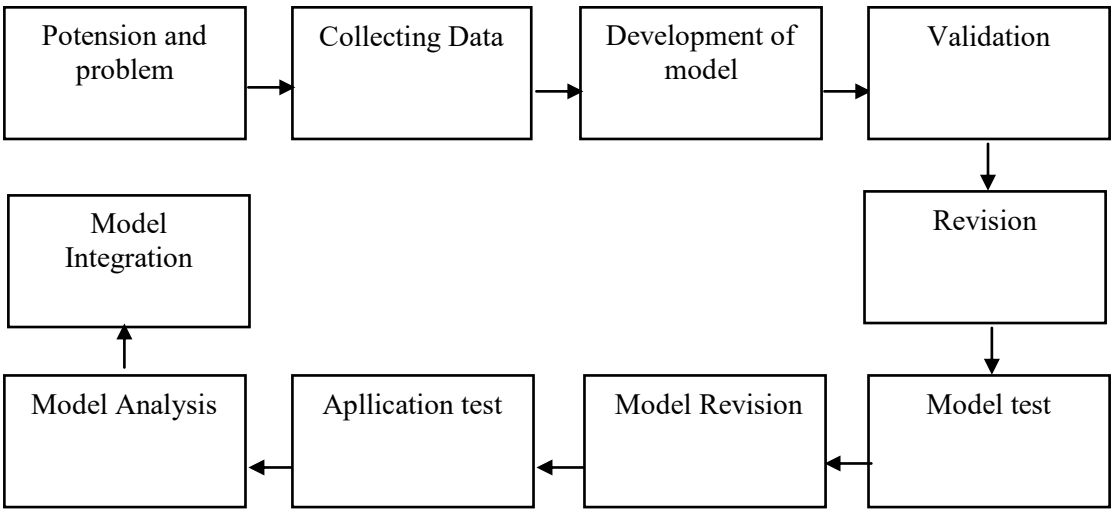

Figure 1. Research Design

Result and Discussion

Results of the Initial Phase Analysis

Early stage analysis is used to see the initial condition of the population as a consideration in sampling which includes the normality test. Data used to test the normality of population data is taken from the mid values semester 2.

The results of the calculation of the population data normality test are presented in Table 2.

Table 2. Calculation Results Normality Test for Population Data

No.	Class	X^2 hits	X^2 Table	Criteria
1	X1	3	8	normal
2	X2	5	8	normal
3	X3	4	8	normal
4	X4	6	8	normal
5	X5	3	8	normal

Final Phase Analysis Results

The results of the analysis of the final stage is the result of testing on learning outcomes data given on the two classes of samples after treatment given learning by using a different system of learning . The data obtained in this study include, cognitive aspect test results data, psychomotor and affective observation data, and questionnaires. Students 'cognitive learning outcomes are obtained from the value of students' post test treated by using a different learning system between the experimental class and the control class. Where in the experimental class students applied the Think Pair Share learning model , while the student control class applied the teacher centre learning model (Sarminto, 2010).

The results of the calculation of the postal test normality test can be seen in Table 3.

Table 3. Normality Test Results Results of the pretest and post-test

Class	Data	X^2 count	X^2 t abel	Criteria
Experiment	pre test	2	8	normal
Control	pre test	2	8	normal
Experiment	post test	8	8	normal
Control	post test	7	8	normal

Test the Similarity of Two Variances. The similarity test of two variances is used to find out whether the twothe sample group has the same level of variance and to knowI will use the formula t or t to calculate the difference in average resultsstudying chemistry, which will later be used in hypothesis testing.The calculation results of the two variance similarity tests between the control group andexperiment can be seen in Table 4.

Table 4. Similarity Test Results of Two Data Variance Pretest and Post-Test

Data	Calculate	F_{tabel}	Criteria
Pre test	2	3	the same variants of the experimental and control classes
Post test	2	3	the same variants of the experimental and control classes both classes have the same variance

Based on Table 4 data pretest and post-test obtained F_{value} = 1.Based on the table, to a significant extent dk = (32- 2: 32- 2) know the price F_{tabel} = 3. Price F $_{count}$. smaller F $_{Table}$ it can be concluded that the variance of the learning outcomes of the experimental class and the control class are not different. Because between the control class and the experimental class has the same variance, then in hypothesis testing using the formula t to see the difference in average learning outcomes.

Hypothesis Test

The hypothesis test is in the form of an average test of improvement in learning outcomes aimed at find out whether there are differences in the average learning outcomes of the experimental class studentswith control class students. The test results of the difference in average learning outcomes can be seenin Table 5.

Table 5. Test of Difference in Two Average Data on Pretest and Post-Test

Data	T_{count}	T_{table}	Criteria
Pretest	3	3	the average learning outcomes of the experimental class and the control class are the same
Post-test	5	3	the average experimental class learning outcomes are better thancontrol class

Based on the results of the initial test analysis, it can be seen that Tcount <T table , the it can be concluded Ho is accepted. which means the two classes in the initial test have a relative average of the same . The calculation of the test is the difference between two means learning outcomes, t count> t Table with dk = 60 and α = 6 %, it can be concluded that Ha is accepted. This means that the average learning outcomes of the experimental group are better than the control group.

Learning Outcomes Improvement Test

This test is used to determine whether there is an increase significant after the learning process has been carried out. The results of this test can be seen in Table 6.

Table 6. Learning Outcomes Improvement Test Results

Data	Experiment Class	Control Class
Enhancement	61	45
% Enhancement	78 %	52 %
Dk	40	40
t_{count}	1.4	0.8
$t_{0.95}$	2.04	2.04

Based on Table 6, it can be seen that t count for each group is between $-t_{table}$ and t_{table} . So that in the two groups, there was an increase in learning outcomes in the context of the related stoichiometry . The magnitude of the increase was measured from the difference between the post test and the pretest, so that there was a 78% increase for class X_2 and 52 % for class X_1

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The Coefficient of Determination

Hypothesis testing aims to determine how much influence the modellearning Think Pair Share the learning outcomes of students of class X on competence relating to the stoichiometry on the paket C PASCA 45 Demak. This hypothesis test consists of a correlation test to find the coefficient of determination.The coefficient of determination:

KD = 100% x rb^2

Coeffisient of determination seen in table 7.

Table 7. Correlation Test Results

Coefficient	determination
0.5	36 %

From Table 7 it can be seen that the value is 0.5, while the magnitude of the detemination coefficient is 36 %. This means that the Think Pair learning model has an effect of 36 % on student learning outcomes. Per minuteapplied to the Think Pair Share learning model, while the control group applied chemical learning to the teacher center learning model . At the end of the learning the final test was carried out using the same questions for both classes. The value obtained from this test is used to analyze the hypothesis andthen tested to find out how much influence the Think Pair Share learning model influences on class X student learning outcomes on competencies related to stoichiometry . The purpose of this study is to find out whether there is or notthe influence of the Think Pair Share learning model on class X student learning outcomes on competencies related to stoichiometry . After learning in the experimental class and the control class, a post test was held to see the learning outcomes of the cognitive domain students.Based on data of test can be seen that the average value of the post test obtained by students in the experimental class is better than the average value of students in the control class. Where in the experimental class the value of the class average is 81, while in the control class the value of the average class is 74.

Test the normality of the final test value data of the study conducted before doing hypothesis testing. In calculating the normality of data, data obtained from the two groups of samples were normally distributed. This is indicated by the value of X^2_{count} group experiments of 7 and X_{count} the control group 6 smaller than X^2_{Table} which is worth 8. The results of this analysis are used as consideration in the subsequent analysis, namely by using parametric statistics. To test the similarity of two variances, in Table 4 obtained $F_{count} = 2$, while $F_{Tabel} = 3$. Because $F_{count} < F_{Table}$then Ho is accepted which means that the two sample classes have the same variance. Furthermore, in Table 5, $t_{count} = 5$ is obtained and $T_{Table} = 3$. Because t count is in the rejection area of Ho, then Ho is rejected and Ha is accepted which means that there is an average difference between classesexperiment and control class. Ho proposed is learningThink Pair Share has no positive effecton student learning outcomes in the subject matter of stoichiometry . Because Ho is rejected, then it can be concluded that the alternative hypothesis says that the modelThink Pair Share learning positive effect on student learning outcomes in the subject matter of stoichiometry.Then the correlation test is used to test this hypothesis. From the calculation of the correlation test the rb value is obtained equal to 0.5. From the value of rb, The coefficient of determination is obtained, amounting to 36 %. From the explanation above, the results of the learning model are obtainedThink Pair Share has a positive effect of 36% on student learning outcomes in the subject matter of stoichiometry. From the value of the coefficient of determination obtained, the learning modelThink Pair Share is categorized quite influential on student learning outcomes. Obstacles which is an obstacle to the implementation of this Think Pair Share learning model is during the learning process , there are limitations to research time that affect

the smoothness of the learning process. Chemistry class X paket C in a week is only 1 meeting or in other wordsonly 2 hours a week . Based on the calculation of the learning completeness test, the experimental group has achieved complete learning outcomes. Number of students in the experimental groupwho have achieved a score of ≥ 67 as many as 30 students. This can be seen in the results of the learning completeness test calculation. With a value of t_{count} (13)> t_{table} (2), because t count in the Ho rejection area , it can be concluded that student learning outcomes after treatment have achieved learning completeness (≥ 67). While in the control group had also reached completeness b elajar. with the number of students who achieved a score of ≥ 67 as many as 27 students. This toocan be seen in the analysis of the learning completeness test, where the value of t_{count} (5)> t t_{able} (2). The difference in completeness, may be influenced by several factors, the management of the class, differences in interest and enthusiasm of students exposed to the learning process, the activeness of students in asking and answering questions, student saturation of learning activities provided by tutors, and students' readiness in attending lessons. In the experimental class that applies the think pair share model students become more active in the learning process so that tooaffect learning outcomes. And the completeness of the experiment class is better than the control class. Descriptive analysis of the results of affective and psychomotor learning has shown that the two sample groups get results that can each be very good and critical. To obtain affective and psychomotor learning outcomes data, researchers were assisted by observers with the instruments used were affective and psychomotor activity observation sheets. On the affective observation sheet consists of 10 aspects observed, while the psychomotor observation sheet consists of 6 observed aspects.

Conclusion

In this study it can be concluded that the use of the Think Pair Share learning model is very effective to be used for paket C students. Paket C as a learning medium for people who cannot learn in formal education requires an innovative learning model and Think Pair Share learning models have a positive impact on non-formal education. The successful use of the Think Pair Share learning model can be seen from 100% of paket C students passing the final exam and grades above the completeness score. The development of learning models must of course be carried out continuously by modifying the Think Pair Share learning model with other learning models. Of course there are obstacles from the application of this learning model, including the time to provide limited stoichiometric material. However, researchers do not make this obstacle a barrier to the use of models, but to add creativity to how this learning model can be effectively implemented for students. In this study it can be concluded that the use of the Think Pair Share learning model is very effective to be used for paket C students. Paket C as a learning medium for people who cannot learn in formal education requires an innovative learning model and Think Pair Share learning models have a positive impact on non-formal education. The successful use of the Think Pair Share learning model can be seen from 100% of paket C students passing the final exam and grades above the completeness score. The development of learning models must of course be carried out continuously by modifying the Think Pair Share learning model with other learning models. Of course there are obstacles from the application of this learning model, including the time to provide limited stoichiometric material. However, researchers do not make this obstacle a barrier to the use of models, but to add creativity to how this learning model can be effectively implemented for students.

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