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The Implementation of PAIKEM (Active, Innovative, Creative, Effective, and Exiting Learning) and Conventional Learning Method to Improve Student Learning Results

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Abstract

The research aims to find the differences in students' learning results by implementing both PAIKEM (Active, Innovative, Creative, Effective, and Exiting Learning) and conventional learning methods for students with high and low motivation. This research used experimental design on two groups, a group of high motivation students and a group of low motivation students. Each group was divided into control group and experiment group. The results showed that there was a link between both PAIKEM and conventional learning method with the learning results of students with high motivation and low motivation, as different results were showed on each student group.

Keywords: *PAIKEM, conventional learning, learning motivation, learning outcomes.*

Introduction

PAIKEM is an abbreviation of meaning an Active, Innovative, Creative, Effective, and Exciting Learning. Active means that in a learning process a teacher ought to create an atmosphere where students feel free to actively ask and tell their ideas. Active instructional strategies include a range of activities sharing common elements such as involving students in doing things and thinking on what they are doing (Bonwell & Eison, 1991).

Previous research found that during lectures, student concentration began to decline after 10-15 minutes (e.g., Stuart & Rutherford, 1978 and Bligh, 2000, p. 44-56). Furthermore, Wilson and Korn (2007) supported the findings as well, after reviewing the articles (by conducting a survey using methodological and interpretive questions in the cited studies). Their critique, however, was not able to question the consistent findings of recent research as compared to 50-minutes conventional lecture; interactive lecture gave better leaning outcomes.

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Since the beginning of the 21st century, there have been some macro-level trends challenging conventional models on higher education (Doyle, Buckley, & Carroll, 2013). One of the most notable trends was the emergence of a new generation of groups (Elam, Stratton, & Gibson, 2007; Howe & Strauss, 2000; Howe & Strauss, 2003) called "Millennium" or "Generation Y" who are widely viewed as the first "digital native" for information technology. Another change coinciding with this new cohort is the "Mystification", a concept referring to student enrollment that is a rapid increase on the level required to reclaim academics and other high-status professions (Cornuel, 2007), and inevitably it leads to larger and more diverse classes, even with various background and abilities of students resulting in the change in the university's financing model (Altbach, Reisberg, & Rumbley, 2009). High-level institutions have adapted to changes in the financial environment by developing new revenue streams, including providing postgraduate graduate coursework and executive education and recruiting students from different regions or foreign countries, strengthening the negative effects of spawning.

Conventional schools were considered ineffective and boring by most students. To diverge this issue, utilizing educative toys and games as learning media is the best proposal in encouraging students to learn the lesson materials in enjoyment. Games generate strong motivational power that is capable to engage people even without any reward and only enjoyment offered (Kapp, 2012a). Thus, to adopt this kind of effect in learning activities, it requires certain technical infrastructure and proper pedagogical integration (Tarman, 2017; Tarman & Dev, 2018). Compared to use complex games that require a large number of design and development efforts, the "gamification" approach implies the use of game thinking and game design elements to increase learners' involvement and motivation. Teachers should create an active learning environment to enhance students' competences, by giving options and opportunities to learn independently and planning learning activities that enable them to develop their mastery (Baytak, Tarman & Ayas, 2011). As stated by Ferreira, Cardosob & Abrantesc (2011), intrinsic motivation proves to be a very important factor that can lead to higher perceived learning in the course.

In other words, motivation is energy or strength that drives us to do an activity. For example, when one wants something or to do things, one is motivated by it and tends to do it regardless anything else so long as it can be acquired or achieved. Motivation ought to be monitored by the teacher, and the teacher seeks to mobilize the students' ability and potential. Motivation is capable to boost the effort and energy used in activities related to needs and goals (Csikszentmihalyi & Nakamura,

1989). It accelerates the time consumed by students in doing their task and it becomes a significant factor influencing their learning (Larson, 2000). Chimombo (2005) mentioned the importance of education, especially in developing countries. It increases due to the pressure in order to catch up the developed countries, for example, global competitiveness (Hawkins 2002). Considerably, it is reflected in educational settings, such as education quality and the possibilities in experiencing education, especially in rural areas where the location is far from educational facilities. Chimombo (2005) argued that country-specific circumstances should be improved on mandatory and free education to encourage general access to education as mentioned as well in the Article 26 of 1948 of the United Nations universal human rights declaration of compulsory rights and free education (UN Human Rights, 1948).

Another concern with this situation is related to students' involvement and motivation. Reports mentioned the decrease of student attendance in the classroom (Massingham & Herrington, 2006) as well as coupled with difficulties in encouraging interaction and discussion (Race, 2010). Additionally, more destructive problems such as plagiarism and fraud increase (Flint, Clegg, & Macdonald, 2006). In response, educators develop innovative teaching practices to catch students' attention, especially the "Millennium". Considering this, "gamification" is an approach and a topic of interest that can be employed for this problem. Gamification uses "game-based mechanics, aesthetics and game thinking to engage people, motivate action, promote learning, and solve problems" (Kapp, 2012, p. 10). In general, gamification is a term applied to a series of motivational triggers, such as rewards and competitions, traditionally associated with games. Implementing "gamification" in education remains a trend (Dicheva, Dichev, Agre, & Angelova, 2015); it is very possibly used in improving student engagement and rapid learning.

In some studies, there were students who disliked non-lecture approaches because those approaches were contradictory to passive learning in which they are accustomed to. Other students prefer a new approach as it has clear-cut instructions on how to actively participate in learning activity in less conventional way. An article entitled "Helping Students to Learn in Student-Centered Environments: A Guide to Facilitate Learning in Higher Education" (Doyle, 2008) offers many useful suggestions and ideas, such as big class preventing the application of active learning strategies because big class limits the use of certain active learning strategies (e.g. it is difficult to engage all students in classroom discussions in groups greater than 40), but it is not a definite problem, because by dividing large classes into small groups enables teachers to create productive

classroom discussion activities Heppner 2007) and it was agreed by Stanley & Porter (2002) who offer similar idea as well.

However, the actual condition emerging in State Elementary Schools 2 and 3 Cakul Dongko of the academic year 2009/2010 was lack of mutual understanding in lesson plans, and this made teachers of both schools have to carry out their teaching independently.

Furthermore, the Ministry of National Education stated that PAIKEM provides more benefits for pupils, such as:

1) Making students learn more effectively/thoroughly;
2) Developing children to become more critical and creative;
3) Providing varied learning environments and experiences;
4) Improving emotional/social maturity;
5) Generating students with high productivity;
6) Being able to deal with changes and participate in the process.

The main components of PAIKEM are described as follow:

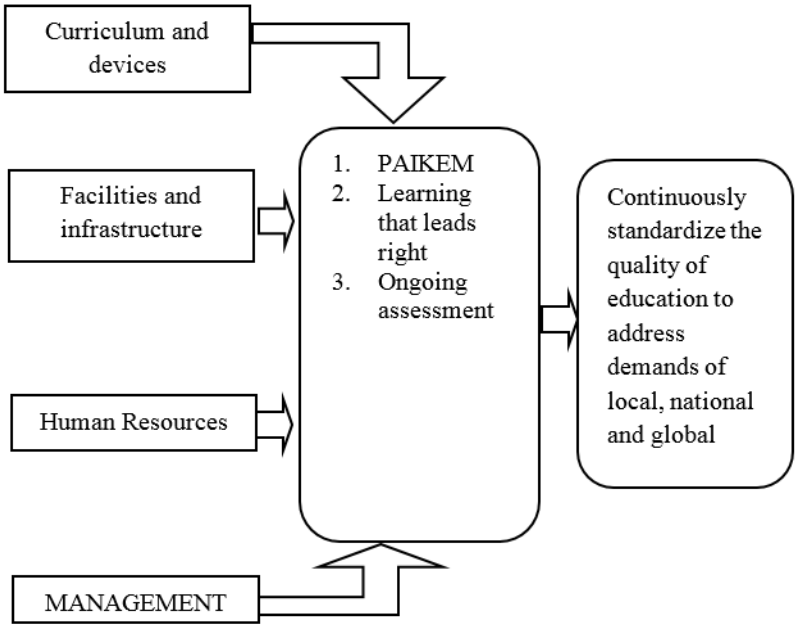

Figure 1, The main components of PAIKEM

The research aims to find the differences in students' learning results by implementing both PAIKEM and conventional learning methods for students with high and low motivation.

Method

Research design

This research applied an experimental design by giving a different treatment to two homogenous sample groups. One group was taught with PAIKEM and another group with n a conventional learning method. The groups were divided based on students' motivation in which one group was students with high motivation and another one was students with low motivation. Each group was divided into two small groups as control group and experiment group.

Population and Sample

The population is students in SDN 2 & 3 Cakul Dongko academic year 2009/2010, while the sample is a fifth grader

Data Collection Method

The data on this research were collected through:

1) Questionnaire

2) Test

Data Analysis Technique

Data were analyzed using two-way analysis of variance, preceded by a preliminary analysis of normality and homogeneity.

Findings

The results were showed in form of findings after conducting research activities in State Elementary School 2 & 3 in Cakul Dongko of the academic year 2009/2010.

Table 1

PAIKEM normality test results

One-Sample Kolmogorov-Smirnov Test

		PAIKEM
N		20
Normal Parameters [a.b]	Mean	81.8500
	Std. Deviation	7.99523
Most Extreme Differences	Absolute	.203
	Positive	.118
	Negative	-.203
Kolmogorov-Smirnov Z		.909
Asymp. Sig. (2-tailded)		.381

Note:

a. Test distribution is Normal
Calculated from data.

In table 1, K-S for data PAIKEM was 0.909 with the probability of 0.381 and α was above 0.05, meaning that H_0 was accepted or the learning results were normally distributed.

Table 2

Normality Test Result of Conventional Learning Model

One-Sample Kolmogorov-Smirnov Test

		CONVENTIONAL
N		28
Normal Parameters [a.b]	Mean	75.0714
	Std. Deviation	7.82176
Most Extreme Differences	Absolute	.236
	Positive	.121
	Negative	-.236
Kolmogorov-Smirnov Z		1.247
Asymp. Sig. (2-tailded)		.089

Note:
a. Test distribution is Normal
b. Calculated from data.

In table 2, K-S for conventional method was 1.247 with the probability of 0.089 and α was above 0.05, meaning that H_0 was accepted or the learning results were normally distributed.

Table 3

Homogeneity Calculations

Dependent Variable : mathematics learning outcomes

F	df1	df2	Sig.
1.248	3	44	.307

H_0 on tests showed by the error variance of the dependent variable is equal across groups.
*Design: Intercept + A_Factor +B_Factor + A_Factor*B_Factor*

Table 3 shows that the probability was 0.307, meaning that the probability > 0.05, and it proved that the data were homogeneous.

Table 4

Descriptive Results of Mathematics Learning

Descriptive Statistics
Dependent Variable: Mathematics learning outcomes

A_Factor	B_Factor	Mean	Std. Deviation	N
PAIKEM Learning Model	High Motivation	86.4615	5.04340	13
	Low Motivation	73.2857	4.46148	7
	Total	81.8500	7.99523	20
Conventional Learning Model	High Motivation	79.2727	5.25530	11
	Low Motivation	72.3529	8.12359	17
	Total	75.0714	7.82176	28

Total	High Motivation	83.1667	6.21825	24
	Low Motivation	72.6250	7.16157	24
	Total	77.8958	8.50842	48

Table 4 shows the differences in the average of mathematics learning results in both PAIKEM and conventional classes on the students with high motivation and low motivation.

Table 5

Descriptive Mean Factor A (Learning Model)

1. A_Factor

Dependent Variable: Mathematics learning outcomes

			95% Confidence Interval	
A_Factor	Mean	Std. Error	Lower Bound	Upper Bound
PAIKEM Learning Model	79.874	1.481	76.889	82.859
Conventional Learning Model	75.813	1.223	73.349	78.277

Table 5 shows that mathematics learning results in PAIKEM class were higher than those in conventional class.

Table 6

The average of PAIKEM and conventional Differential Test

Independent Samples Test

		Levene's Test for Equality of Variances		*t-test* for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	T	Df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
Mathematics Learning Outcomes	Equal variances assumed	.038	.845	2.933	46	.005	6.77857	2.31109	2.12659	11.43055
	Equal variances not assumed			2.922	40.529	.006	6.77857	2.31974	2.09211	11.46503

In the table 6, the significance was below 0.05 ($\alpha < 0.05$) meaning that there were differences in mathematics learning results of V graders at State Elementary School 2 & 3 Cakul Dongko District of the academic year 2009/2010.

Table 7

Descriptive Mean B_Factor

1. B_Factor

Dependent Variable : Mathematics learning outcomes

B_Factor	Mean	Std. Error	95% Confidence Interval	
			Lower Bound	Upper Bound
High Motivation	82.867	1.294	80.259	85.476
Low Motivation	72.819	1.419	69.960	75.679

Table 7 shows that mathematics learning results of students with high motivation were higher than those with low motivation.

Table 8

Test Different average of students with high motivation and low motivation in PAIKEM method

Independent Sample Test

		Levene's Test for Equality of Variances		*t-test* for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
Mathematics Learning Outcomes	Equal variances assumed	.102	.753	5.786	18	.000	13.17582	2.27708	8.39186	17.95979
	Equal variances not assumed			6.014	13.825	.000	13.17582	2.19092	8.47118	17.88047

Table 8 shows that the significance value was below 0.05 ($\alpha<0.05$) meaning that there were differences on Mathematics learning results between V graders at State Elementary School 2 & 3 Cakul Dongko District of the academic year 2009/2010 for students with high and low motivation by implementing PAIKEM method.

Table 9

Differences in test means of students with high and low motivation in conventional learning method.

Independent Sample Test

		Levene's Test for Equality of Variances		*t-test* for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
Mathematics Learning Outcomes	Equal variances assumed	4.883	036	2.498	26	.019	6.91979	2.76971	1.22657	12.61300
	Equal variances not assumed			2.737	25.993	.011	6.91979	2.52837	1.72257	12.11700

Table 9 shows that the significance value was below 0.05 ($\alpha < 0.05$), meaning that there were differences in mathematics learning results between the highly anf lowly motivated fifth-graders at State Elementary School 2 & 3 Cakul Dongko District in the academic year 2009/2010 following the implementation of conventional learning method.

Table 10

Descriptive Averages A_Factors and B_Factors

A_Factor * B_Factor
Dependent Variable: Mathematics learning outcomes

				95% Confidence Interval	
A_Factor	B_Factor	Mean	Std. Error	Lower Bound	Upper Bound
PAIKEM	High Motivation	86.462	1.752	82.930	89.993
	Low Motivation	73.286	2.388	68.473	78.099
Conventional	High Motivation	79.273	1.905	75.433	83.112
	Low Motivation	72.353	1.533	69.264	75.441

Based on table 10, implementing PAIKEM method for students with high motivation resulted in higher learning results than implementing conventional learning method for the same group of students. However, implementing conventional learning for students with high motivation gave better learning results than implementing PAIKEM learning for students with low motivation. Therefore, student motivation has an important role in determining learning results.

Table 11

Two-way Anova Results

Test of Between-Subjects Effects
Dependent Variable: Mathematics learning result

Source	Type III Sum of Squares	Df	Mean Square	F	Sig.
Corrected Model	1645.756[a]	3	548.585	13.740	.000
Intercept	262380.858	1	262380.858	6571.756	.000
A_Factor	178.506	1	178.506	4.471	.040
B_Factor	1092.881	1	1092.881	27.373	.000
A_Factor*B_Factor	105.918	1	105.918	2.653	.111
Error	1756.724	44	39.926		
Total	294655.000	48			
Corrected Total	3402.479	47			

Discussion, Conclusion and Implications

- The effect of implementing PAIKEM and conventional learning models on student learning results.

Based on the calculations and test results conducted for each class, Mathematics learning results of the fifth graders at State Elementary Schools 2 & 3 Cakul Dongko District of the academic year 2009/2010 at the beginning of the implementation were the same. After the implementation of PAIKEM method, significant differences in the learning results were indicated by the increase in mathematics learning results.

In contrast, students treated with conventional learning model had less significant learning results (either before or after implementing the learning method). It means that conventional learning method allowed only few of materials to be absorbed, unlike in PAIKEM method where most students were able to absorb the materials due to direct involvement of students and problems as those were given at the time of learning the lesson, doing the tasks, as well as understanding the lesson. Besides, students were happily engaged with the learning activities, so they easily mastered the materials.

There was a significant difference between PAIKEM classes and conventional classes indicated by the average value in A Factor and the higher value of the *t-value* compared to *t-table*, where the significance value between the two lessons was below 0.05.

In addition, The FA value of the 2-way analysis of variance (*F-arithmetic* for PAIKEM and conventional learning model) was higher than the *F-table*, meaning there was a significant difference in mathematics learning results between the classes of the fifth-graders who implemented PAIKEM and conventional learning methods at State Elementary Schools 2 & 3 Cakul Dongko District of the academic year 2009/2010. Therefore, the results indicated that the first hypothesis was accepted, meaning that there was a difference in the mathematics learning results of the fifth graders at State Elementary Schools 2 & 3 Cakul Dongko District of the academic year 2009/2010 who were given PAIKEM and those who were given conventional learning models.

- Differences in learning results of students with high and low motivation levels

The students' motivation in learning process is very likely different; some have high motivation while others have low motivation. The difference level of motivation influences the mathematics learning results of those students. Moreover, it was indicated by the descriptive of B_ Factor and the average value of the test of differences in the learning results of both groups (students with high motivation and low motivation) after given PAIKEM and conventional learning methods, showed by the value of *t-arithmetic* > *t-table*.

In addition, obtained *FB-valu*e in the two-way analysis of variance (*F-arithmetic* for both students with high motivation and low motivation) was higher than *F-table*, meaning that there were differences in mathematics learning results between students with high motivation and low motivation in grade 5 at State Elementary Schools 2 & 3 Cakul Dongko District of the academic year 2009/2010. Therefore, the second hypothesis was accepted, meaning that there was differences in the mathematics learning results of the fifth-graders at State Elementary Schools 2 & 3 Cakul Dongko District of the academic year 2009/2010 who were given PAIKEM method and those who were given conventional learning method.

- Interaction of learning model and level of student motivation

The calculation using two-way analyses of variance needed the understanding of the interaction between A_factor (PAIKEM and conventional learning model) and B_factor (students with high motivation and low motivation).

Based on the calculation, the result showed no significant interaction. It was indicated by the value of *F-arithmetic* < *F- table* (2.653 < 4.05) and the significance level was more than 0.05 (5%), meaning that there was no interaction between learning methods and student motivation. The result indicated that there was no interaction between PAIKEM method, conventional learning method, as well as learning motivation and Mathematics learning results of the fifth-graders at State Elementary Schools 2 & 3 Cakul Dongko District of the academic year 2009/2010.

Implementing PAIKEM method for students with high motivation gave higher mathematics learning results than for students with low motivation, while implementing conventional learning method for students with high motivation gave higher mathematics learning results than for students with low motivation. Furthermore, using appropriate learning methods (PAIKEM) and having high motivation were certainly able to improve students' learning results.

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