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The MASTER (motivating, acquiring, searching, triggering, exhibiting, reflecting) learning model based on edutainment and motivation: Impact and interaction on mathematical connections skills

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Abstract

This study aimed to determine 1) the influence application of the MASTER learning model (Motivating, Acquiring, Searching, Triggering, Exhibiting, and Reflecting) based on Edutainment on students' mathematical connection skills in terms of learning motivation; 2) the influence of students' learning motivation on mathematical connection skills; and 3) the interaction between the groups of learning models (MASTER and Conventional) and the groups of learning motivation (high, moderate, and low) on students' mathematical connection skills. A quantitative research method with a quasi-experimental design was used in this study. The sample of the study was determined using cluster random sampling. The hypothesis was tested using two ways analysis of variance of unequal cells, provided that the data must be normally distributed and homogeneous. The results of the study show that 1) there was an influence of the MASTER learning model based on Edutainment on mathematical connection skills; 2) there was an influence of learning motivation on mathematical connection skills; and (3) there was no interaction between the groups of learning model (MASTER and Conventional) and the groups of learning motivation (high, moderate, and low) on mathematical connection skills.

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INTRODUCTION

Mathematics is a global knowledge that underlies the development of science and technology. It plays a vital role in various disciplines and advances the human mindset to solve life problems (Abdullah et al., 2019; Assidiqi, 2015; Indriani & Imanuel, 2018). National Council of Teachers of Mathematics (NCTM) states that mathematics in the classroom must consider five mathematical skills: connections, reasoning, problem-solving, communications, and representation (NCTM, 2000). The statement indicates that mathematical connection is an essential part of mathematical ability that students must master.

Mathematical connection skills can find relationships between concepts and procedures, understand various mathematical topics, and apply them in other fields or everyday lives (Isnaeni et al., 2019; Siagian, 2016; Widarti, 2013). Students must first master this skill in learning mathematics because mathematics is an interrelated science (Anita, 2014; Fauzi, 2011; Widyawati, 2016). Poor connection skills mastery will negatively impact problem-solving abilities (Masitoh, 2016) and learning outcomes (Zahwa 2020). Utilizing context conditions in learning mathematics makes abstract concepts easy to understand and can be connected based on the initial knowledge that students already have. One learning model with these characteristics is the MASTER learning model (Motivating, Acquiring, Searching, Triggering, Exhibiting, and Reflecting).

The MASTER learning model is part of Accelerated Learning which aims to make classroom learning activities more enjoyable (Ifda, 2015; Martinah et al., 2019; Putri et al., 2013; Zulfikar, 2017). 2017). Accelerated Learning is an effort made by students in groups to understand a concept quickly. This learning model requires students to understand the process of a concept so that there is a balance

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between process and product in learning(Anggreni, Dantes, and Candiasa 2014). Maximizing the application of this learning model is expected to improve students' low mathematical connection skills. One way to achieve it is to combine the MASTER model with Edutainment. The essence of Edutainment is the mastery of learning material by inserting entertainment (Oza & Zaman, 2016) so that learning takes place in a conducive and fun atmosphere (Santoso, 2018; Sianturi, 2014). Besides applying learning models that are considered to harm students' mathematical connection skills, the students' motivational factors in learning are also essential to investigate.

Learning motivation is one of the factors that affect a student's learning outcomes (Lestari, 2017). Good motivation in learning will provide harmony between physical and psychological aspects during the learning process. It will encourage student's enthusiasm for learning and affect student learning outcomes (Nurmala et al., 2014). Therefore, teachers must have the ability to develop students' learning motivation.

Relevant studies on the use of the MASTER learning model found that this learning affected learning outcomes (Anggreni et al., 2014; Ifda, 2015), critical thinking (Putri et al., 2013), reflective thinking (Zulfikar, 2017), mathematical literacy (Martinah et al., 2019), and mathematical concept understanding (Kastira, 2019). Likewise, research with learning motivation variables found that motivation affected learning outcomes (Darmawati 2017; Hamdu and Agustina 2011; Nurlaili and Febrina 2018; Nurmala, Tripalupi, and Suharsono 2014) and students' life skills (Kiswoyowati, 2011). This study proposed combining the MASTER learning model based on the Edutainment approach and its interaction with learning motivation on students' mathematical connection skills.

METHOD

This study employed the quantitative approach because the data had been collected numerically. Statistical testing was used to process the data and the hypothesis. The quasi-experimental design was applied in this study because not all influential external variables will be seen. The instruments used in this research were mathematical connection skills test instruments and student learning motivation questionnaires. The research used the 4×3 factorial posttest only control group design. The summary is shown in table 1:

Table 1. Research Design

Learning Motivation / Learning Models	Learning Motivation		
	High (B_1)	Moderate (B_2)	Low (B_3)
MASTER + Edutainment (A_1)	A_1B_1	A_1B_2	A_1B_3
MASTER (A_2)	A_2B_1	A_2B_2	A_2B_3
Conventional + Edutainment (A_3)	A_3B_1	A_3B_2	A_3B_3
Conventional (A_4)	A_4B_1	A_4B_2	A_4B_3

Information: A_iB_j = Groups of Mathematical Connection skills and learning model (i-th) and the learning motivation (j-th). $i = 1,2,3,4$, $j = 1,2,3$

The collected data was then tested using the normality test and the homogeneity test as a condition for the two-way ANOVA test. If the two-way ANOVA test finds that H_0 is rejected, then the test will be followed by the Scheffe test to see which group poses the best impact on students' mathematical connection skills.

RESULTS and DISCUSSION

The instruments were appropriate to be used based on the validity test results, reliability test, level of difficulty analysis, and discriminating index. Furthermore, the learning motivation questionnaire had also been tested (validity and reliability) so that it was feasible to be used. Below is the summary of the average marginal overall data:

Table 2. Marginal Mean

Groups	High motivation	Moderate motivation	Low motivation	Mean marginal
Experimental 1	94.67	73.59	53.34	73.86666667
experimental 2	85.71	67.11	48.89	67.23666667
Experimental 3	82.22	71.11	53.94	69.09
Control	73.33	58.98	41.03	57.78
Average	83.9825	67.6975	49.3	66.99333333

The results of the normality and homogeneity test are summarized in table 3 and table 4.

Table 3. The Results of the Normality Test (Kolmogorov-Smirnov)

Tests of Normality				
	Groups	Kolmogorov-Smirnov[a]		
		Statistics	Df	Sig.
Value	Experimental 1	.141	38	.053
	Experimental 2	.133	28	.200*
	Experimental 3	.152	32	.059
	Control	.138	31	.138

*. This is a lower bound of the true significance.
a. Lilliefors Significance Correction

Table 4. The Results of the Homogeneity Test (Bartlet Test)

Test of Homogeneity of Variance					
		Levene Statistic	df1	df2	Sig.
Value	Based on Mean	.639	3	125	.591
	Based on Median	.530	3	125	.663
	Based on Median and with adjusted df	.530	3	124.803	.663
	Based on trimmed mean	.617	3	125	.605

Based on Table 3 and Table 4, it can be concluded that all sample groups came from normally distributed populations and each group (learning model and learning motivation) had homogeneous variance. Next, a two-way ANOVA test was carried out to see the effect differences on each group. The test results are displayed in Table 5.

Table 5. The Results of the Two-Way ANOVA

Tests of Between-Subjects Effects					
Dependent Variable: Nilai					
Source	Type III Sum of Squares	Df	Mean Square	F	Sig.
Corrected Model	27671.284[a]	11	2515.571	11.327	.000
Intercept	434122.981	1	434122.981	1954.764	.000
Learning Model (A)	3188.419	3	1062.806	4.786	.004
Learning Motivation (B)	15765.154	2	7882.577	35.494	.000
Model * Motivation (A × B)	439.853	6	73.309	.330	.920
Error	25983.895	117	222.085		
Total	640396.668	129			
Corrected Total	53655.179	128			

a. R Squared = .516 (Adjusted R Squared = .470)

Table 4 shows that the two-way ANOVA test with a significant level of 0.05 obtained the following results:

a) $H_{0A}: \alpha_i = 0$ where sig $= 0.004 \leq 0.05 = \alpha$, which means that H_{0A} is rejected. This means that there is an influence of the MASTER learning model based on Edutainment on students' mathematical connections skills. A multiple comparison test (Scheffer test) is needed to see the effect differences between each learning model group.

b) $H_{0B}: \beta_i = 0$ where sig $= 0.000 \leq 0.05 = \alpha$ which means that H_{0B} is rejected. This means that there is an influence of learning motivation on students' mathematical connections skills. A multiple comparison test (Scheffer test) is needed to see the effect differences between each learning motivation group.

c) $H_{0C}: (\alpha\beta_{ij}) = 0$ where sig $= 0.920 > 0.05 = \alpha$ which means that H_{0AB} is accepted. This means no interaction between the MASTER learning model, the Edutainment method, and the learning motivation on students' mathematical connection skills. It can be concluded that each learning model group and learning motivation group give the same results as the previous two conclusions. Thus, there is no need to do a double comparison test on this third result.

Based on the conclusions, it was necessary to do a multiple comparison test for the learning model group and the learning motivation groups. The following is a summary of the test results:

Table 5. The Results of the Multiple Comparison Test on Learning Model Groups

Multiple Comparisons						
Dependent Variable: Value						
Scheffe						
(I) Groups	(J) Groups	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
					Lower Bound	Upper Bound
Experimental 1	Experimental 2	9.6866	3.71159	.084	-.8417	20.2150
	Experimental 3	9.2103	3.57554	.090	-.9321	19.3527
	Control	23.7796*	3.60671	.000	13.5487	34.0104
Experimental 2	Experimental 1	-9.6866	3.71159	.084	-20.2150	.8417
	Experimental 3	-.4763	3.85639	.999	-11.4154	10.4628
	Control	14.0929*	3.88531	.006	3.0718	25.1140
Experimental 3	Experimental 1	-9.2103	3.57554	.090	-19.3527	.9321
	Experimental 2	.4763	3.85639	.999	-10.4628	11.4154
	Control	14.5693*	3.75555	.003	3.9162	25.2223
Control	Experimental 1	-23.7796*	3.60671	.000	-34.0104	-13.5487
	Experimental 2	-14.0929*	3.88531	.006	-25.1140	-3.0718
	Experimental 3	-14.5693*	3.75555	.003	-25.2223	-3.9162
Based on observed means.						
The error term is Mean Square (Error) = 222.085.						
*. The mean difference is significant at the 0,05 level.						

Table 5 shows that the experimental class 1, the experimental class 2, and the experimental class 3 obtained sig values greater than α = 0.05. the results indicated that the classes that applied the MASTER learning model based on Edutainment, the MASTER learning model, and the conventional learning model based on Edutainment produced the same mathematical connection skills. Then, on the control class, it can be concluded that all sig values were smaller than α = 0.05, which indicated that the mean value of the control class was smaller than the three experimental classes. Therefore, the classes that applied the MASTER learning model based on Edutainment, the MASTER learning model, and the conventional learning model based on Edutainment produced better mathematical connection skills than the conventional learning model. Furthermore, the multiple comparison test results between learning motivation groups can be seen in Table 6.

Table 6. The Multiple Comparison Test between Learning Motivation Groups

Multiple Comparisons						
Dependent Variable: Value						
Scheffe						
(I) Learning Motivation	(J) Learning Motivation	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
					Lower Bound	Upper Bound
High	Moderate	16.8734*	3.25280	.000	8.8084	24.9385
	Low	37.7128*	3.72745	.000	28.4709	46.9547
Moderate	High	-16.8734*	3.25280	.000	-24.9385	-8.8084
	Low	20.8394*	3.18536	.000	12.9415	28.7372
Low	High	-37.7128*	3.72745	.000	-46.9547	-28.4709
	Moderate	-20.8394*	3.18536	.000	-28.7372	-12.9415
Based on observed means.						
The error term is Mean Square(Error) = 222.085.						
*. The mean difference is significant at the 0,05 level.						

Table 6 provides information that all rows' sig values are more significant than α = 0.05. Therefore, each group of learning motivations provided different results. Based on table 2, it can be seen that the marginal average of the high motivation group was higher than the moderate and low motivation group and the moderate motivation group had a higher marginal mean than the low motivation group. The results indicate that students with high motivation had better mathematical connection skills than

students with moderate and low motivation. Students with moderate motivation had better mathematical connection skills than students with low motivation.

Discussion

The study results showed that the combination of learning models (the MASTER learning model and conventional learning model) based on Edutainment provided the same mathematical connection skills. The results were also applied to the application of the MASTER learning model. During the learning process, the three groups gave good responses. Some students asked questions or proposed statements that supported the development of their mathematical connection skills. All students were actively involved in groups to solve all the problems given by the teacher.

However, the results did not apply to students who were given conventional learning only because they did not give a good response. They only answered if the teacher pointed or even forced one of the students to explain a problem. Therefore, their mathematical connection skills were not well developed.

The results of this study are in line with several previous studies (Kastira, 2019; Martinah et al., 2019; Oza & Zaman, 2016; Putri et al., 2013; Santoso, 2018; Sianturi, 2014). The studies revealed that the MASTER learning model based on Edutainment positively impacted students' performance in the classroom.

The following results of the study showed that students with high motivation had better mathematical connection skills than students with moderate and low motivation. During the learning process, students with high motivation responded well to the learning. The student also provided solutions to the problems in each learning group. Students with high motivation always excel in their mathematical connection skills compared to the other two motivation groups. The results of this study complement several previous studies (Darmawati, 2017; Hamdu & Agustina, 2011; Nurmala et al., 2014; Sunadi, 2013), which stated that students with high learning motivation will always have a positive impact compared to students with moderate and low motivation.

There was no interaction between the learning model groups and the learning motivation groups. Therefore, the third results of this study did not differ from the first and the second results of the study. Students with high motivation had better mathematical connection skills than students with moderate and low motivation because they gave the same response in any class.

CONCLUSION

Based on the results of the study, it can be concluded that 1) there was a significant influence of the MASTER learning model based on Edutainment on students' mathematical connections skills; 2) there was an influence of students' learning motivation (high, moderate and low) on students' mathematical connections skills; and 3) there was no interaction between the learning model groups (the MASTER learning model based on Edutainment and Conventional learning model) and learning motivation (high, moderate and low) on students' mathematical connection skills.

Further researchers should combine the MASTER learning model and the Edutainment approach to research other mathematical skills. This combination is expected to be useful for teachers in improving students' mathematical skills in the classroom.

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