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21ST CENTURY LEARNING: FOSTERING MATHEMATICAL CONCEPTS UNDERSTANDING STUDENTS' THROUGH BAMBOO DANCE MODEL INTEGRATED COURSE REVIEW HORAY

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Abstract

Education in the industrial revolution era can provide students with learning experiences. Learning experiences can influence each individual's growth. The purpose of this study was to determine the effect of the integration of the Bamboo Dance Learning model and Course Review Horay on the students' mathematical concepts understanding. The population of this study consisted of 160 students. The design of this study is quasi-experimental. Data collection instruments were in the form of mathematical concept understanding test questions. The data analysis techniques used were the normality test and the homogeneity test. The hypothetical testing was performed using one-way ANOVA and Scheffe's method ANOVA. The results of the analysis showed that the data were normally distributed and homogeneous. The students' mathematical concepts understanding, as the result of the application of the Bamboo Dance learning model integrated with Course Review Horay, was better compared to the conventional learning model. The Bamboo Dance Model can provide information equally. Review Course Horay learning model can make students happy during the learning. Thus, this learning could be used as an alternative in improving students' mathematical concept understanding.

Keywords: Course Review Horay; Mathematical Concept Understanding; Bamboo Dance

INTRODUCTION

Education in the industrial revolution era can provide students with learning experiences. Learning experiences can influence individual's growth in the environment (Cantor et al., 2019; Capel et al., 2019; Duerden & Witt, 2010), in harmony between society, nature, and character (Ruihong, 2007; Ruyadi, 2010; Sukmawan & Nurmansyah, 2014; Yuanpei, 2005). Good education in a country can have an impact on the quality of competent human beings (Komarudin, 2017; Magier-Łakomy & Rozkwitalska, 2013; Pantić & Wubbels, 2010). Education can provide experience for every human being (Hidayat & Suherman, 2016; Ibrahim, 2015; Komarudin et al., 2020; Suherman et al., 2018). This experience can be gained through learning. Through the learning process (Andriani et al., 2019; Darling-Hammond et al., 2020; Hayashi et al., 2020; Siregar et al., 2020; Vickers et al., 2015), humans can develop and to progress (Efendi et al., 2019; Hakim, 2016; Purwanti et al., 2016; Syazali et al., 2019), be prosperous, and happy.

One effort to educate the nation's life is to improve the existing components of schools (Andriani et al., 2019; Hartinah et al., 2019; Hasanah et al., 2019). One of the components is creative educators (Anggoro, Efendi, et al., 2019; Huda et al., 2019; Kamandoko & Suherman, 2017) and innovative in the learning process such as in the selection of learning models to be applied (Huang et al., 2015; Kozma, 2008; Ruihong, 2007; Sudarsana, 2016). Educators who have the motivation to develop learning methods will create new learning models (Fauzi et al., 2017; Komariyah & Syam, 2016; Marcus, 2014). Students do not need to experience boredom and their knowledge could be improved instead (Berk, 2010; Permatasari et al., 2018; Putra & Anggraini, 2016; San Pedro et al., 2013).

The right learning model can create a pleasant learning atmosphere (Andriani et al., 2019; Hardianto, 2005; Hasanah et al., 2019; Huda et al., 2020; Irwandani, 2015; Sumarni, 2015), arouse interest (Jiang et al., 2016; Zairul, 2019), attitudes, and creativity in delivering their arguments (Haase & Lautenschläger, 2011; Kennedy & Miceli, 2010; Komarudin et al., 2014) so that students' mathematical concepts understanding could be improved (Damayanti et al., 2019; Gumanti et al., 2018; Suherman et al., 2019). Concepts understanding is one of the mathematical skills that must be mastered in learning mathematics (Malmia et al., 2019; Purwanti et al., 2016; Septiyana & Pujiastuti, 2018; Tamrin et al., 2018).

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Thefactsinthefieldshowthatstudents'mathematicalabilitiesneedtobeimproved(Maarif, 2016; Rany et al., 2020; Shodikin, 2015; Suherman et al., 2020).Thestudentsalsofeelboredinclass(Daschmann et al., 2014; Kristin, 2016; Yasin et al., 2020).Thisproblemcanbeminimizedbyapplyingalearningmodelthatisfunyetplacesmoreemphasisontheconceptofunderstanding(Anggoro, Agustina, et al., 2019; Diez-Olivan et al., 2019; Ismanto et al., 2019).ThelearningmodelappliedwasBambooDancelearningmodelcombinedwithCourseReviewHoray.TheBambooDancelearningmodelisalearningmodelthatcanmakestudentsmoreactive(Isnaini et al., 2019; Novitasari, 2017a).TheBambooDancelearningmodelaimstoencouragestudentstoshareinformationinpairswithinashortamountoftimeregularly.Thismodelwasselectedsinceitcanmakestudentsmoreactiveandincreasetheirconceptofunderstanding.

SomepreviousstudiesshowthattheBambooDancelearningmodelcanevenlydistributeinformationtoallstudentsthroughtheirrespectivepairsinashortandconcurrenttime(Fiyany, 2018; Harianto & Dalle, 2018; Novitasari, 2017b),TheCourseReviewHoraylearningmodel(CRH)canimprovelearningincludingteacher'sskills,students'activities,andstudents'learningoutcomes(Kasna et al., 2015; Muhandaz et al., 2018; Suryani et al., 2016),Studentsaremoreactiveandteachersareonlyasfacilitators,dynamists,andmentorsinlearningactivities(Prameswari et al., 2017).Also,CRHcanincreaseinteractionamongstudentsinthelearningprocess(Hermawan et al., 2018; Lapatta et al., 2015; Wahyudi & Tripuspitaningrum, 2018; Wardani et al., 2019).sothatstudents'mathematicalconceptsunderstandingcouldbeincreased(Nuari et al., 2019; Triyana et al., 2019).Thiscooperativelearningmodelisexpectedtosignificantlyincreaselearningactivitiesandoutcomes(Anggraeny, 2018; Faradita, 2018; Marhadi et al., 2018; Mustika, 2016; Putri et al., 2018).

BasedonpreviousresearchthenoveltyofthisstudyliesintheintegrationoftheBambooDancelearningmodelandCourseReviewHoraylearningmodeltomeasurecognitiveabilitiesinmathematicalconceptsunderstanding.Thepurposeofthisstudywastodeterminetheeffectof theCourseReviewHoray-basedBambooDancelearningmodelonthestudents' mathematicalconceptsunderstanding.

METHOD

Themethodemployedwasaquantitativemethodofquasiexperimentaldesign.Thepopulationofthisstudywas160studentsofSMPNegeri(StateJuniorHighSchool)1PancaJaya,Indonesia.Thesamplingtechniqueusedwassimplerandomsamplingwithrandomizedclasstechniques.Theexperimentalclass1wastreatedwiththeCourseReviewHoray-basedBambooDancelearningmodelwhiletheexperimentclass2wastreatedwithBambooDancelearningmodel.Thecontrolclasswastreatedwiththelearningmodelcommonlyusedatschool.

Thedataofthestudywascollectedthroughtestsofmathematicalconceptunderstandingability.Theindicatorsusedasguidelinesareasfollows(Ningsih et al., 2017):

Table1.TestsGuidelinesofMathematicalConceptsUnderstandingAbility

No	Indicators	Description	Score
1.	Re-stateaconcept	Doesnotprovideananswer	0
		Provideanswerswithnoreason	1
		Providecorrectanswersandreasonsbutnotquiteright.	2
		Provideanswersandreasonsbutareincomplete.	3
		Provideanswersandreasonscorrectly.	4
2.	Theabilitytoclassifyobjectsaccordingtocertaincharacteristicsandconcepts	Doesnotprovideananswer	0
		Provideanswerswithnoreason	1
		Providecorrectanswersandreasonsbutnotquiteright.	2
		Provideanswersandreasonsbutareincomplete.	3
		Provideanswersandreasonscorrectly.	4
3.	Abilitytogiveexamplesandnotexamples	Doesnotprovideananswer	0
		Provideanswerswithnoreason	1
		Providecorrectanswersandreasonsbutnotquiteright.	2
		Provideanswersandreasonsbutareincomplete.	3
		Provideanswersandreasonscorrectly.	4
4.	Abilitytopresentconceptsinvariousformsofm	Doesnotprovideananswer	0
		Provideanswerswithnoreason	1

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No	Indicators	Description	Score
	athematicalrepresentation	Providecorrectanswersandreasonsbutnotquiteright.	2
		Provideanswersandreasonsbutareincomplete.	3
		Provideanswersandreasonscorrectly.	4
5.	Abilitytodevelopprequirementsorinsufficient conditionsofaconcept	Doesnotprovideananswer	0
		Provideanswerswithnoreason	1
		Providecorrectanswersandreasonsbutnotquiteright.	2
		Provideanswersandreasonsbutareincomplete.	3
		Provideanswersandreasonscorrectly.	4
6.	Abilitytouse,utilize,andchoosecertainprocedures	Doesnotprovideananswer	0
		Provideanswerswithnoreason	1
		Providecorrectanswersandreasonsbutnotquiteright.	2
		Provideanswersandreasonsbutareincomplete.	3
		Provideanswersandreasonscorrectly.	4
7.	Abilitytoclassifyconceptsoralgorithmsintoproblem-solving	Doesnotprovideananswer	0
		Provideanswerswithnoreason	1
		Providecorrectanswersandreasonsbutnotquiteright.	2
		Provideanswersandreasonsbutareincomplete.	3
		Provideanswersandreasonscorrectly.	4

TheBambooDanceintegretedCourseReviewHoraylearningstepswerecarriedoutusingthefollowingsteps:

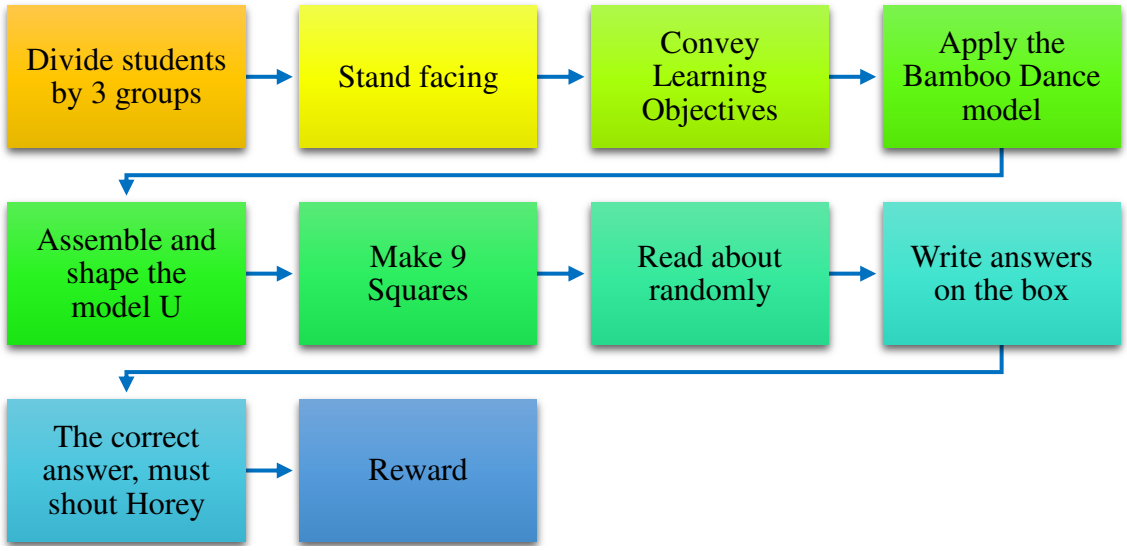

Fig.1. ThestepsoftheBambooDanceintegretedCourseReviewHorayLearningModel

Theprerequisitetestsperformedwerethenormalityandhomogeneitytestswhilethehypotheticaltestperformedwasone-wayANOVA.

RESULTS

TheresultsofthestudyrevealedtheinfluenceoftheBambooDanceLearningmodelintegratedwithCourseReviewHoray onthemathematicalconceptsunderstanding.Thedatacollectedwereintheformofpretestandposttestresults,bothfromtheeexperimentalclassandthecontrolclass.Thehighestvalue(X_{max})andthelowestvalue(X_{min})inallthreeclasseswereseoughtaswellasthecentraltendencyincludingthemean($\bar{x}$),median(Me),andmode(Mo).Hereisthesummaryofpretestandposttestdata:

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Table2.DescriptionoftheResultsofMathematicalConceptsUnderstanding

Class	pretest				posttest			
	x_{max}	x_{min}	$\bar{x}$	S	x_{max}	x_{min}	$\bar{x}$	S
Experiment1	85.50	50.30	75.73	10.57	90.00	66.00	83.44	4.77
Experiment2	78.00	40.50	65.48	7.748	85.00	64.00	82.53	4.92
Control	60.50	40.00	54.54	10.12	78.00	54.00	76.41	5.23

AccordingtoTable2,itisknownthattheresultsofPretestandPosttestaredifferentclasses.Basedonthedata,inpretest,thehighestscoreisobtainedwithaClass1experimentimplementingBambooDanceintegretedCourseReviewHorayandthelowestvaluegainedbythecontrolclassregularlyusingschoollearning.Basedonthedata,thehighestposttestingstatementwasobtainedthroughtheexperimentalClass1andthelowestscorewasobtainedbythecontrolclass.Thefollowingisthegraphicofthepretestandposttestscoreonmathematicalconceptsunderstanding.

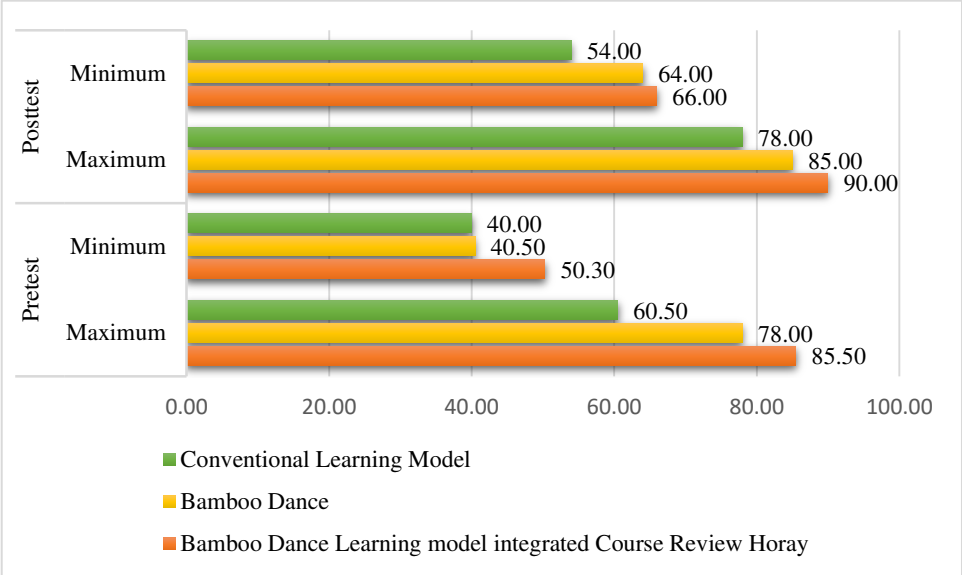

Fig.2. GraphicofPretestandPosttestScoresonMathematicalConceptsUnderstanding

Figure2illustratestheresultsofthehighestandlowestscoresofthepretestandposttestofthethreeclasses.Thesedataindicatethatthereisasignificantincreaseinstudents'mathematicalconceptsunderstandingaftertheimplementationofBambooDanceIntegratedCourseReviewhorayintheexperimentalclass1,BambooDancemodelintheexperimentalclass2,andschool'smodelinthecontrolclass.Thefollowingarethedataofmathematicalconceptsunderstandingthatisnormallydistributedandhomogeneous.

Table3.TheDataofNormalityTestonMathematicalConceptUnderstanding

Class	$\bar{X}$	$L_{observed}$	$L_{critical}$	Conclusions
BambooDanceLearningmodelintegratedCourseReviewHoray	83.44	0.152	0.159	H_0 isaccepted
BambooDance	82.53	0.155		H_0 isaccepted
ConventionalLearningModel	76.41	0.129		H_0 isaccepted

Table3showsthatthedatawasnormallydistributed.Thenormalitytestswereperformedin3classes.Also,ahomogeneitytestwascarriedoutasdisplayedinTable4.

Table4.TheDataofHomogeneityTestonMathematicalConceptUnderstanding

Class	Dk	si^2	Dk.si^2	Logsi^2	Dk.Logsi^2
BambooDanceLearningModelIntegrated CourseReviewHoray	31	20.791	644.530	1.318	40.858

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BambooDance	31	28.153	872.728	1.450	44.950
ConventionalLearningModel	31	15.216	471.696	1.182	36.642

Table4showsthatthedatahavethesamevariance.Furthermore,theresearchhypothesiswastestedusingaone-wayANOVAtest.ThedatacanbeseeninTable5.

Table5.TheResultsofANOVATest

JKG	KTG	KTK	$F_{observed}$	$F_{critical}$	P
5656.156	60.819	492.792	8.103	2.703	H_0isrejected

BasedonTable5, $F_{observed} \geq F_{critical}$.ItmeansthattheaveragescoreofstudentstreatedwiththeBambooDancelearningmodelintegratedwithReviewCoursesHorayisdifferentcomparedtotheotherlearningapplications.TheBambooDancelearningmodelintegratedwithReviewCoursesHoray,BambooDancelearningmodel,andtheconventionalmodelhaveinfluencethestudents'mathematicalconceptunderstanding.Toseewhichmodelaffects,adoublecompatibilitytestwasperformedusingtheScheffe'smethod.

Table6.TheResultsoftheFurtherTest

Treatment	Paired\Treatment	$F_{observed}$	$F_{critical}$	α	Conclusion
1	$(\bar{X}_1 - \bar{X}_2)^2$	0.352	2.703	0.05	H_0isaccepted
2	$(\bar{X}_1 - \bar{X}_3)^2$	13.997	2.703		H_0isrejected
3	$(\bar{X}_2 - \bar{X}_3)^2$	9.870	2,703		H_0isrejected

BasedonTable6,intreatment1,thereisnodifferencebetweentheBambooDancelearningmodelintegratedwithReviewCoursesHoraycomparedtotheBambooDancemodel.Intreatment2,thereisasignificantdifferencebetweentheBambooDancelearningmodelintegratedwithReviewCoursesHorayandconventionallearning.Intreatment3,thereisasignificantinfluencebetweentheBambooDancelearningmodelandconventionaldancemodels.

Theseresultsareduetothenatureofthe BambooDancelearningmodelsothatthestudentsunderstandconceptswithaclearlearningstructure,thusallowingstudentstoexchangeinformationbrieflyandregularly(Sutarna & Kusdiana, 2018).Itprovidesopportunitiesforstudentstoprocessinformationandimprovestheirconceptofunderstanding(Dewi, 2016).

TheBambooDancelearningmodelmakesstudentsmoreactive(Fauzi et al., 2017)becauseofitcapableofevenlydistributingmaterial.Thismaterialcanbeconveyedwellbecauseoftherepeateddeliveryofmaterialbyfellowfriendsinturn.Furthermore,theCourseReviewHoraylearningmodelmakesstudentsenjoybecausetheycanpracticequestionsaboutthematerialthathasbeenconveyedintheBambooDancelearningmodelbyplayinggames(Fauzi et al., 2017; Rohman & Susiolo, 2017).Thismakesstudentsbecomemoreinterestedandunderstandthematerial.Thisisinlinewiththeresultsofresearchconductedby DessyAanggrainithattheCourseReviewHoraylearningmodelcanincreasestudents'activities,learningoutcomes,andteachers'skills(Marhadi et al., 2018; Triyana et al., 2019).

Basedontheresultsoftheanalysis,thereisaninfluenceoftheBambooDancelearningmodelintegratedwithCourseReviewHoray,BambooDancemodel,andconventionallearningonstudents'mathematicalconceptunderstandingabilities.Themarginalmeanobtainedfromtheapplicationof theBambooDancelearningmodelintegratedwithCourseReviewHoraywas83,719whilethemarginalmeanfortheapplicationoftheBambooDancelearningmodelwas82,531.Theseresultsshowthattheresultsofthemarginalmeanof theBambooDancelearningmodelintegratedwithCourseReviewHorayaregreaterthantheBambooDancemodel.

TheBambooDancelearningmodelissaidtobebetterbecausestudentscanexchangeexperienceswitheachotherinthelearningprocess(Sutarna & Kusdiana, 2018),increasecollaborationamongstudents(Chao et al., 2019),andincreasetoleranceamongfellowstudents(Rohartati, 2019).ItcanbeseenthattheBambooDancelearningmodelintegratedwithCourseReviewHorayisbetter.

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CONCLUSION

Basedontheresultsofthestudy,itcanbeconcludedthatthereisaninfluenceoftheBambooDancelearningmodelintegrated withCourseReviewHorayonthemathematicalconceptsunderstandingability.TheBambooDancelearningmodelintegr atedwithCourseReviewHorayisbetterthantheBambooDancelearningmodelonthemathematicalconceptsunderstandi ngability.

Inconclusion,thismodelcanbeasolutiontolearningandmakestudentsmoreactiveduringthelearningprocess.

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