21ST CENTURY LEARNING: FOSTERING MATHEMATICAL CONCEPTS UNDERSTANDING STUDENTS' THROUGH BAMBOODANCE 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 e-learning model and Course Review Horay on students' mathematical concepts understanding. The population of this study consisted of 160 students. The design of this study was quasi-experimental. Data collection instruments were in the form of mathematical concepts understanding test questions. The data analysis techniques used were normality test and the homogeneity test. The hypothetical testing was performed using one-way ANOVA and Scheffe’s method ANOVA. The result 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 e-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 each 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-Lakomy & Rozkwiłska, 2013; Pantić & Wubbels, 2010). Education in a country can have an impact on the quality of competent human beings (Komarudin et al., 2017; Ibrahim, 2015). Students' mathematical concepts understanding, as the result of the application of the Bamboo Dance e-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 learning. Thus, this learning could be used as an alternative in improving students' mathematical concept understanding.

One effort to educate the nation's life is to improve the existing components of schools (Andriani et al., 2019; Hartinah 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; Koizuma, 2008; Ruihong, 2007; Sudarsana, 2016). Educators who have the motivation to develop learning methods will create new learning models (Fauzi et al., 2017; Komarudin et al., 2020; Suherman et al., 2018). 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). 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; Koizuma, 2008; Ruihong, 2007; Sudarsana, 2016). Educators who have the motivation to develop learning methods will create new learning models (Fauzi et al., 2017; Komarudin et al., 2020; Suherman et al., 2018). 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).

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The facts in the field show that students' mathematical abilities need to be improved (Maarif, 2016; Rany et al., 2020; Shodikin, 2015; Suherman et al., 2020). The students also feel bored in class (Daschmann et al., 2014; Kristin, 2016; Yasin et al., 2020). This problem can be minimized by applying a learning model that is fun yet places more emphasis on the concept of understanding (Anggoro, Agustina, et al., 2019; Diez-Olivan et al., 2019; Ismanto et al., 2019). The learning model applied was Bamboo Dance learning model combined with Course Review Horay. The Bamboo Dance learning model is a learning model that can make students more active (Isnaini et al., 2019; Novitasari, 2017a). The Bamboo Dance learning model aims to encourage students to share information in pairs within a short amount of time regularly. This model was selected since it can make students more active and increase their conceptual understanding.

Some previous studies show that the Bamboo Dance learning model can evenly distribute information to all students through their respective pairs in a short and concurrent time (Fiyany, 2018; Harianto & Dalle, 2018; Novitasari, 2017b). The Course Review Horay learning model (CRH) can improve learning including teacher’s skills, students’ activities, and students’ learning outcomes (Kasna et al., 2015; Muhandaz et al., 2018; Suryani et al., 2016). Students are more active and teachers are only as facilitators, dynamists, and mentors in learning activities (Prameswari et al., 2017). Also, CRH can increase interaction among students in the learning process (Hermawan et al., 2018; Lapatta et al., 2015; Wahyudi & Tripuspitaringrum, 2018; Wardani et al., 2019). So, that students' mathematical conceptual understanding could be increased (Nuari et al., 2019; Triyana et al., 2019). This cooperative learning model is expected to significantly increase learning activities and outcomes (Anggraeny, 2018; Faradita, 2018; Marhadi et al., 2018; Mustika, 2016; Putri et al., 2018).

Based on previous research, the novelty of this study lies in the integration of the Bamboo Dance learning model and Course Review Horay learning model to measure cognitive abilities in mathematical concept understanding. The purpose of this study was to determine the effect of the Course Review Horay-based Bamboo Dance learning model on the students’ mathematical conceptual understanding.

**METHOD**

The method employed was a quantitative method of quasi experimental design. The population of this study was 160 students of SMPNegeri (State Junior High School) 1 Panca Jaya, Indonesia. The sampling technique used was simple random sampling with randomized class techniques. The experimental class 1 was treated with the Course Review Horay-based Bamboo Dance learning model while the experimental class 2 was treated with Bamboo Dance learning model. The control class was treated with the learning model commonly used at the school.

The data of the study was collected through tests of mathematical concept understanding ability. The indicators used as guidelines (Ningsih et al., 2017):

**Table 1. Tests Guidelines of Mathematical Concepts Understanding Ability**

<table>
<thead>
<tr>
<th>No</th>
<th>Indicators</th>
<th>Description</th>
<th>Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Re-state a concept</td>
<td>Does not provide an answer</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Provides answers with no reason</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Provides correct answers but not quite right.</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Provides answers and reasons but incomplete.</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Provides answers and reasons correctly.</td>
<td>4</td>
</tr>
<tr>
<td>2.</td>
<td>The ability to classify objects according to certain characteristics of concepts</td>
<td>Does not provide an answer</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Provides answers with no reason</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Provides correct answers but not quite right.</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Provides answers and reasons but incomplete.</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Provides answers and reasons correctly.</td>
<td>4</td>
</tr>
<tr>
<td>3.</td>
<td>Ability to give examples and not examples</td>
<td>Does not provide an answer</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Provides answers with no reason</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Provides correct answers but not quite right.</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Provides answers and reasons but incomplete.</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Provides answers and reasons correctly.</td>
<td>4</td>
</tr>
<tr>
<td>4.</td>
<td>Ability to present concepts in various forms of them</td>
<td>Does not provide an answer</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Provides answers with no reason</td>
<td>1</td>
</tr>
</tbody>
</table>
5. **Ability to develop requirements or insufficient conditions of a concept**

- **Does not provide an answer**: 0
- **Provide answers with no reason**: 1
- **Provide correct answers and reasons but not quite right**: 2
- **Provide answers and reasons but are incomplete**: 3
- **Provide answers and reasons correctly**: 4

6. **Ability to use, utilize, and choose certain procedures**

- **Does not provide an answer**: 0
- **Provide answers with no reason**: 1
- **Provide correct answers and reasons but not quite right**: 2
- **Provide answers and reasons but are incomplete**: 3
- **Provide answers and reasons correctly**: 4

7. **Ability to classify concepts or algorithms into problem-solving**

- **Does not provide an answer**: 0
- **Provide answers with no reason**: 1
- **Provide correct answers and reasons but not quite right**: 2
- **Provide answers and reasons but are incomplete**: 3
- **Provide answers and reasons correctly**: 4

The Bamboo Dance integrated Course Review Horay learning steps were carried out using the following steps:

- **Divide students by 3 groups**
- **Stand facing**
- **Convey Learning Objectives**
- **Apply the Bamboo Dance model**
- **Assemble and shape the model U**
- **Make 9 Squares**
- **Read about randomly**
- **Write answers on the box**
- **The correct answer, must shout Horey**
- **Reward**

**Fig.1. The steps of the Bamboo Dance integrated Course Review Horay Learning Model**

The prerequisite tests performed were the normality and homogeneity tests while the hypothetical test performed was one-way ANOVA.

**RESULTS**

The result of the study revealed the influence of the Bamboo Dance Learning model integrated with Course Review Horay on the mathematical concept understanding. The data collected were in the form of pretest and posttest results, both from the experimental class and the control class. The highest value ($X_{max}$) and the lowest value ($X_{min}$) in all three classes were roughly the same. The central tendency included the mean ($\bar{x}$), median (Me), and mode (Mo). Here is the summary of pretest and posttest data:
Table 2. Description of the Results of Mathematical Concepts Understanding

<table>
<thead>
<tr>
<th>Class</th>
<th>pretest</th>
<th>posttest</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>$x_{\text{max}}$</td>
<td>$x_{\text{min}}$</td>
</tr>
<tr>
<td>Experiment 1</td>
<td>85.50</td>
<td>50.30</td>
</tr>
<tr>
<td>Experiment 2</td>
<td>78.00</td>
<td>40.50</td>
</tr>
<tr>
<td>Control</td>
<td>60.50</td>
<td>40.00</td>
</tr>
</tbody>
</table>

According to Table 2, it is known that the result of Pretest and Posttest are different classes. Based on the data, the highest score is obtained with the Class 1 experiment implementing Bamboo Dance Integrated Course Review Horay and the lowest value gained by the control class regularly using school learning. Based on the data, the highest posttesting statement was obtained through the experimental Class 1 and the lowest score was obtained by the control class. The following is the graphic of the pretest and posttest score on mathematical concepts understanding.

![Graphic of Pretest and Posttest Scores on Mathematical Concepts Understanding](image)

Figure 2 illustrates the result of the highest and lowest scores of the pretest and posttest of the three classes. These data indicate that there is a significant increase in students' mathematical concepts understanding after the implementation of Bamboo Dance Integrated Course Review Horay in the experimental class 1, Bamboo Dance model in the experimental class 2, and school model in the control class. The following are the data of mathematical concepts understanding that is normally distributed and homogeneous.

Table 3. The Data of Normality Test on Mathematical Concept Understanding

<table>
<thead>
<tr>
<th>Class</th>
<th>$X$</th>
<th>$I_{\text{observed}}$</th>
<th>$I_{\text{critical}}$</th>
<th>Conclusions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bamboo Dance Learning model integrated Course Review Horay</td>
<td>83.44</td>
<td>0.152</td>
<td>0.159</td>
<td>$H_0$ is accepted</td>
</tr>
<tr>
<td>Bamboo Dance</td>
<td>82.53</td>
<td>0.155</td>
<td></td>
<td>$H_0$ is accepted</td>
</tr>
<tr>
<td>Conventional Learning Model</td>
<td>76.41</td>
<td>0.129</td>
<td></td>
<td>$H_0$ is accepted</td>
</tr>
</tbody>
</table>

Table 3 shows that the data was normally distributed. The normality tests were performed in 3 classes. Also, a homogeneity test was carried out as displayed in Table 4.

Table 4. The Data of Homogeneity Test on Mathematical Concept Understanding

<table>
<thead>
<tr>
<th>Class</th>
<th>$D_k$</th>
<th>$s_i^2$</th>
<th>$D_k.s_i^2$</th>
<th>$\log s_i^2$</th>
<th>$D_k.\log s_i^2$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bamboo Dance Learning model integrated Course Review Horay</td>
<td>31</td>
<td>20.791</td>
<td>644.530</td>
<td>1.318</td>
<td>40.858</td>
</tr>
</tbody>
</table>
Table 4 shows that the data have the same variance. Furthermore, the research hypothesis was tested using a one-way ANOVA test. The data can be seen in Table 5.

Table 5. The Results of ANOVA Test

<table>
<thead>
<tr>
<th>JK</th>
<th>KT</th>
<th>F&lt;sub&gt;observed&lt;/sub&gt;</th>
<th>F&lt;sub&gt;critical&lt;/sub&gt;</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td>5656.156</td>
<td>60.819</td>
<td>492.792</td>
<td>8.103</td>
<td>2.703</td>
</tr>
</tbody>
</table>

Based on Table 5, F<sub>observed</sub> ≥ F<sub>critical</sub>. It means that the average score of students treated with the Bamboo Dance learning model integrated with Review Courses Horay is different compared to the other learning applications. The Bamboo Dance learning model integrated with Review Courses Horay, Bamboo Dance learning model, and the conventional model have influenced the students' mathematical concept understanding. These influence models affect, adouble compatibility test was performed using the Scheffe’s method.

Table 6. The Results of the Further Test

<table>
<thead>
<tr>
<th>Treatment</th>
<th>Paired Treatment</th>
<th>F&lt;sub&gt;observed&lt;/sub&gt;</th>
<th>F&lt;sub&gt;critical&lt;/sub&gt;</th>
<th>α</th>
<th>Conclusion</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>((\bar{X}_1 - \bar{X}_2))^2</td>
<td>0.352</td>
<td>2.703</td>
<td>0.05</td>
<td>H&lt;sub&gt;0&lt;/sub&gt; is accepted</td>
</tr>
<tr>
<td>2</td>
<td>((\bar{X}_1 - \bar{X}_3))^2</td>
<td>13.997</td>
<td>2.703</td>
<td></td>
<td>H&lt;sub&gt;0&lt;/sub&gt; is rejected</td>
</tr>
<tr>
<td>3</td>
<td>((\bar{X}_2 - \bar{X}_3))^2</td>
<td>9.870</td>
<td>2.703</td>
<td></td>
<td>H&lt;sub&gt;0&lt;/sub&gt; is rejected</td>
</tr>
</tbody>
</table>

Based on Table 6, in treatment 1, there is no difference between the Bamboo Dance learning model integrated with Review Courses Horay compared to the Bamboo Dance model. In treatment 2, there is a significant difference between the Bamboo Dance learning model integrated with Review Courses Horay and conventional learning. In treatment 3, there is a significant influence between the Bamboo Dance learning model and conventional dance models.

These results are due to the nature of the Bamboo Dance learning model so that the students understand concepts with a clear learning structure, thus allowing students to exchange information briefly and regularly (Sutarna & Kusdiana, 2018). It provides opportunities for students to process information and improve their concept of understanding (Dewi, 2016).

The Bamboo Dance learning model makes students more active (Fauzi et al., 2017) because of its capable of evenly distributing material. This material can be conveyed well because of the repeated delivery of material by fellow friends in turn. Furthermore, the Course Review Horay Learning model makes students enjoy the practice of questions about the material that has been conveyed in the Bamboo Dance learning model by playing games (Fauzi et al., 2017; Rohman & Susiolo, 2017). This makes students more interested in understanding the material. This is in line with the results of research conducted by Desya Aanggrainithathe Course Review Horay Learning model can increase students' activities, learning outcomes, and teachers' skills (Marhadi et al., 2018; Triyana et al., 2019).

Based on the results of the analysis, there is an influence of the Bamboo Dance learning model integrated with Course Review Horay, Bamboo Dance model, and conventional learning on students' mathematical concept understanding abilities. The marginal mean obtained from the application of the Bamboo Dance learning model integrated with Course Review Horay was 83.719 while the marginal mean for the application of the Bamboo Dance learning model was 82.531. The results show that the marginal mean of the Bamboo Dance learning model integrated with Course Review Horay are greater than the Bamboo Dance model.

The Bamboo Dance learning model is said to be better because students can exchange experiences with each other in the learning process (Sutarna & Kusdiana, 2018), increase collaboration among students (Chao et al., 2019), and increase tolerance among fellow students (Rohartati, 2019). It can be seen that the Bamboo Dance learning model integrated with Course Review Horay is better.
CONCLUSION
Based on the results of the study, it can be concluded that there is an influence of the Bamboo Dance learning model integrated with Course Review Horay on the mathematical concepts understanding ability. The Bamboo Dance learning model integrated with Course Review Horay is better than the Bamboo Dance learning model on the mathematical concepts understanding ability.

In conclusion, this model can be a solution to learning and makes students more active during the learning process.

References


