The Importance of Integrating Local Culture Values in Science Learning by Supply Chain Strategy

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Abstract— This study aims to examine the effectiveness of the model of integrating local cultural values in science learning in elementary school based on the supply chain strategy. The design of this study includes four stages, namely: (1) preliminary study; (2) design of learning models; (3) developing of learning models; and (4) validating the models in the science learning process in supply chain. In this study, step (3) and step (4) are carried out, while steps (1) and steps (2) have been implemented in the previous year. This research was carried out in several elementary schools: (1) in Dendang Belitung Timur District, Bangka Belitung; and (2) in Kediri Tabanan District, Bali. A total of 21 elementary school teachers and more than 300 elementary school students were included in this study. The results of this study, it can be seen that there is an increase in the ability of elementary school teachers to design and implement science learning by integrating local cultural values in science learning in the classroom. From the results of statistical tests, it is seen that there is an increase in student learning outcomes before and after the learning process takes place. In addition, most students appear to be actively participating and look happy during the learning process because the science content they learn is associated with local cultural values in their surroundings. The learning process like this makes it fun not only for elementary school teachers who teach but also makes students are happy in learning science.

Keywords— Science, Supply chain strategy, Local Culture, Transmission of Culture, Character.

1. Introduction

This research is a continuation of the 2016 study entitled "Development of a Model for Integrating Local Cultural Values in Learning Natural Sciences in Primary Schools". From the results of a study in 2016 obtained information, among others, there are several factors that support the readiness of teachers to integrate local cultural values in science learning in elementary schools, among others: teachers say that they have sufficient ability to integrate local cultural values in learning Science in elementary school; peers according to them play an important role in integrating local cultural values in natural science learning; the work environment in elementary school plays an important role so that they can integrate local cultural values in natural science learning; During this time the teachers working group or professional learning community (PLC) forum was perceived as having an important role in supporting their abilities, even though the activities in the PLC forum were not carried out regularly.

Local cultural values that are usually integrated with natural science learning in elementary schools (ES) are cultural values that surround students. However, some of the elementary school teachers said that there were several factors that have hindered the readiness of teachers to be able to integrate local cultural values in natural science learning in elementary schools, including: (1) lack of understanding of primary school teachers about the importance of the ability to integrate local cultural values in science learning at elementary school; (2) the amount of material or science concept that students must master in one semester or in one year so that the time to integrate local cultural values in science learning in elementary school cannot be implemented properly; (3) limited teaching aids or supporting facilities and infrastructure for the science learning process are perceived as an obstacle to be able to carry out the learning process based on inquiry in elementary schools; (4) there is no adequate training for ES teachers to integrate local cultural values in natural science learning; and (5) there is a sense of laziness or "reluctance" to integrate local cultural values in natural science learning. Besides that, it takes time, energy, and more adequate facilities and infrastructure support if the teachers wish to be able to integrate local cultural values in natural science learning. In addition, some of the efforts they say support the ability of ES teachers to be able to integrate local cultural values in natural science learning in the classroom. From the results of statistical tests, it is seen that there is an increase in student learning outcomes before and after the learning process takes place. In addition, most students appear to be actively participating and look happy during the learning process because the science content they learn is associated with local cultural values in their surroundings. The learning process like this makes it fun not only for elementary school teachers who teach but also makes students are happy in learning science.
cultural values in the science learning process in the classroom, including: (1) using a lesson plan that integrates local cultural values in science learning in elementary school; (2) adopting or adjusting lesson plan which integrates local cultural values in science learning in elementary schools that are available on the internet; (3) developing their own lesson plans that integrate local cultural values in natural science learning; and (4) training with peers to integrate local cultural values in learning in schools even though such activities are rarely carried out or are not routine.

As an educator who engages in the science field, we must understand what is meant by the Natural Science itself, so that understanding the field of science becomes more profound and fundamental. Besides understanding science, what is equally important is how to teach science to students. Seeing the complexity of educational problems, especially in natural science learning, researchers through this study try to uncover local cultural values in science learning in elementary schools. In order to have good coordination between the parties involved, namely teachers, peers, school principals and supervisors, and the head of the Technical Implementation Unit at the sub-district level. All related elements should be able to work together and support each other so that training activities for elementary school teachers to be able to integrate local cultural values in science learning in elementary schools in the PLC forum can be carried out routinely and sustainably.

Indonesia is known as a multi-ethnic country with different traditions, socio-cultural, economic and education between regions in the Indonesian archipelago. Indonesian people are basically difficult to separate from tradition, socio-culture, customs and habits of their respective ethnicities. Education is a conscious and systematic effort in developing the potential of students. Education is also an effort of the community and the nation in preparing its young generation for a better life in the future. Sustainability is marked by cultural inheritance and character that has been owned by the people and nation. Therefore, education is a process of cultural inheritance of the nation's character for the younger generation and also the process of developing the nation's culture and character, actively developing students' potential, carrying out the process of internalization and appreciation of values into their personalities in socializing, developing community life who are more prosperous and develop a dignified life of the nation. To fulfill these human resources, education has a very important role.

This study aims to examine the effectiveness of the model of integrating local cultural values in science learning in supply chain strategy. More specifically this study aims as follows: (1) to analyze the opinions of community leaders on local cultural values that can be integrated in natural science learning; (2) to analyze the extent to which elementary teachers have integrated local cultural values in science learning in elementary school; (3) to analyze the effectiveness of the model of integrating local cultural values in natural science learning; and (4) to analyze whether the model of integrating local cultural values in science learning can realize the concept of "science is fun" in elementary school.

2. Literature Review

2.1 The Meaning of Local Wisdom

Supply chain management can be defined as the design, control, and operation of a system to maximise value creation over the life-cycle of an education or culture, with dynamic recovery of value from different types and volumes of returns over time. Local wisdom is a source of planting the values of the prevailing norms, such as identity, character, tolerance, and a more comprehensive concept of diversity. Local wisdom is human intelligence possessed by certain ethnic groups obtained through community experience. In other words, local wisdom is the result of certain communities through their experience and not necessarily experienced by other communities. This value will be very tight and strong in certain communities and that value has been through a long time journey, as long as the community exists.

In the process of strengthening local wisdom, the teacher's role is certainly very strategic given their position at the forefront of the process of education and coaching of the younger generation. Therefore, the role of the teacher also needs to be strengthened in the framework of facing and utilizing the globalization of education today. At the practical level, the process of value education has taken place in the lives of people in various forms of tradition. In this case, this tradition can be seen
2.2 Inquiry in Science Learning

Teaching science with inquiry conducted in various forms of teaching approaches in this study which includes learning cycle approaches, science process skills approaches, integrated/thematic approaches, and STM approaches by involving laboratory activities (hands-on activities) makes science learning fun and not boring for elementary students, this is in accordance with what is desired in the NSES which states that in learning science is emphasized on understanding scientific concepts and developing the ability to conduct inquiry, can be realized in this study [7],[20]. Learning with inquiry usually cannot be separated from the presence of learning media. Sardjijo said, by involving students in the use of learning media, students' attention would increase and the learning process would not be complicated to perceive [10],[23].

2.3 The Role of Teachers in Science Learning in Elementary Schools

Harlen (1985), states that concepts taught in basic education must meet the criteria, namely: (1) these concepts must be able to help children to understand the events in their daily lives; (2) these concepts must be able to be digested by elementary school age children by taking into account the limited experience they have and their mental development; (3) must be carried out and tested using the science process skills that are appropriate to the development of elementary school children; and (4) must be able to provide knowledge of science basics for students to be able to learn science at a more advanced level.

2.4 Character Building through Science Education

Character education is a system of cultivating character values to school citizens which includes components of knowledge, awareness or willingness, and actions to implement these values, both towards God Almighty, self, fellow, environment, and nationality so that it becomes a human being of the human body. In character education in schools, all components (stakeholders) must be involved, including the components of education itself, namely curriculum content, learning process and assessment, relationship quality, handling or management of subjects, school management, implementation of co-curricular activities or activities, empowerment of infrastructure, financing, and work ethics of all citizens and the school environment.

3. Methodology and Data

3.1 Supply Chain Strategy in Education

By placing organizational culture within the competing value framework, this study establishes a conceptual model for the relationships between organizational culture and Supply Chain Strategy. The research design used in this study refers to the design of R & D, Borg & Gall that have been modified. The design includes four stages, namely: (1) preliminary study; (2) Designing learning models that are packaged in the learning implementation of lesson plan; (3) development of learning models that are packaged in lesson plan by integrating the content of local cultural values in science learning in elementary school; and (4) validating the learning model in the learning process in elementary school. Phase (1) and (2) have been implemented in the first year. In the Second Year, the activities of Phase (3) and Phase (4) are carried out [3],[4],[21].

Model design activities of integrating local cultural values in science learning in elementary school are based on the results of preliminary studies. The target of designing learning models is elementary school teachers. The program components developed are as follows.
Table 1. Components of the Science Learning Program

<table>
<thead>
<tr>
<th>No</th>
<th>Program components</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>List of local cultural values that will be integrated with natural science learning</td>
</tr>
<tr>
<td>2</td>
<td>Learning Improvement Plans (lesson plan) by integrating local cultural values in science learning in elementary school</td>
</tr>
<tr>
<td>3</td>
<td>Tools for assessing the ability of teachers to design lesson plan (TPAI - 1), and Tool for assessing the teacher's ability to carry out learning based on the lesson plan that has been developed (TPAI-2)</td>
</tr>
<tr>
<td>4</td>
<td>Tests of learning outcomes and answer guidelines developed by the teacher</td>
</tr>
<tr>
<td>5</td>
<td>Guidelines for Integrating Local Cultural Values in Science Learning in Elementary Schools</td>
</tr>
</tbody>
</table>

3.2 Research Location

The population of this study, elementary school teachers: (1) in Dendang Belitung Timur District, Bangka Belitung; and (2) in Kediri Tabanan District, Bali. The sample was selected by purposive sampling with the following design: (1) for the purpose of testing, the research subjects were selected as much as one PLC forum (as many as 8-10 elementary school teachers for each research location). This elementary school teacher group was given treatment (intervention) in the form of the application of learning models by integrating local cultural values in science learning in elementary schools in the PLC forum; (2) in addition, as many as 8-10 elementary school teachers, in each study location were tracked their teaching abilities in elementary school. The selection criteria are that they are willing to be observed and have obtained permission from the school principal where they teach; and (3) to see the effectiveness of the learning model implemented by the teacher, students are given a pretest before the learning process takes place. After the learning process is carried out, the student is given a post-test using the same questions in the pretest. Time research starts from planning, proposal preparation, data collection, data analysis up to reporting from March to December 2017.

3.3 Data Collection

Instruments used in the data collection process to measure the effectiveness of learning models by integrating the content of local cultural values in science learning in elementary schools in the form of questionnaires, interview guidelines, observation sheets, and student learning outcomes tests. Besides comparing quantitative aspects, in this study qualitative aspects of the learning model were tested. Qualitative aspects are captured by conducting observations and interviews with teachers and students conducted throughout the learning process by researchers. Questions in interviews cover aspects of the attitude of teachers and students whether they feel "science is fun" with the learning model that has been implemented. For teachers who teach also asked whether they are interested in using the learning model further. Besides that, information is also collected about the strengths and weaknesses of the learning model that has been implemented.

3.4 Data analysis and conclusion

The analysis technique for each data of the research results is carried out as follows: (1) Data on the opinions of principals, education service opinions at the sub-district level, opinions of community leaders about local cultural values that are usually integrated in natural science learning are analyzed by using content analysis techniques by tabulating ideas, issues, and similar concepts [8],[22], or first arranged into certain codes [1]; and (2) Analysis of improving teaching abilities. The ability to teach elementary school teachers is determined by the gain (g) test achieved from the use of learning models that integrate local cultural values in science learning in elementary school. The gain test was determined from the posttest and pretest scores normalized by the Meltzer formula [5]: \( g = \frac{(\text{post-test score} - \text{pretest score})}{(\text{maximum score} - \text{pretest score})} \).

4. Empirical Results and Discussion

There are two things discussed in this article, namely: (1) analyzing the effectiveness of the supply chain model of integrating local cultural values in natural science learning; and (2) analyzing whether the model of integrating local cultural values in science learning can realize the concept of "science is fun" in elementary school.
There are seven components assessed in implementing learning using a lesson plan that has been compiled or assessed using the TPAI-2 format, which includes components: (1) Managing learning spaces and facilities; (2) Carry out learning improvement activities; (3) Manage class interactions; (4) Be open and flexible and help develop students' positive attitudes towards learning; (5) Demonstrate special abilities in improving science subjects; (6) Carry out an assessment of learning processes and results; and (7) general impression of the implementation of the learning process. The average change in the score of the teacher's ability to create a lesson plan can be seen in Table 2.

Table 2. Average ability of teachers to implement a lesson plan

<table>
<thead>
<tr>
<th>No</th>
<th>Aspect</th>
<th>Phase-1</th>
<th>Phase-2</th>
<th>Difference</th>
<th>t-test</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Manage learning spaces and facilities</td>
<td>4.61</td>
<td>4.84</td>
<td>0.23</td>
<td>2.455</td>
<td>Significant</td>
</tr>
<tr>
<td>2</td>
<td>Carry out learning improvement activities</td>
<td>4.32</td>
<td>4.69</td>
<td>0.37</td>
<td>4.513</td>
<td>Significant</td>
</tr>
<tr>
<td>3</td>
<td>Manage class interactions</td>
<td>4.32</td>
<td>4.62</td>
<td>0.30</td>
<td>3.683</td>
<td>Significant</td>
</tr>
<tr>
<td>4</td>
<td>Be open and flexible and help develop students' positive attitudes towards learning</td>
<td>4.45</td>
<td>4.68</td>
<td>0.23</td>
<td>4.726</td>
<td>Significant</td>
</tr>
<tr>
<td>5</td>
<td>Demonstrate special abilities in improving science subjects</td>
<td>4.46</td>
<td>4.69</td>
<td>0.23</td>
<td>4.907</td>
<td>Significant</td>
</tr>
<tr>
<td>6</td>
<td>Carry out the assessment of process and learning outcomes</td>
<td>4.42</td>
<td>4.71</td>
<td>0.29</td>
<td>4.158</td>
<td>Significant</td>
</tr>
<tr>
<td>7</td>
<td>The general impression of the implementation of the learning process</td>
<td>4.54</td>
<td>4.70</td>
<td>0.16</td>
<td>3.076</td>
<td>Significant</td>
</tr>
</tbody>
</table>

From the results of the analysis of changes in the ability of teachers (n = 21) to carry out the learning process based on the lesson plan that has been prepared before and after treatment.

4.1 Students' ability in answering questions before and after treatment

Table 3. Achievement of ES Student Before and After Treatment

<table>
<thead>
<tr>
<th>No</th>
<th>ES's Code</th>
<th>Grade</th>
<th>Number of ES Student</th>
<th>Average of Score Pretest</th>
<th>Average of Score Posttest</th>
<th>t-test</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>ESBP-1</td>
<td>4</td>
<td>27</td>
<td>17.41</td>
<td>85.19</td>
<td>16.918</td>
<td>Significant</td>
</tr>
<tr>
<td>2</td>
<td>ESBP-2</td>
<td>5</td>
<td>29</td>
<td>11.03</td>
<td>80.00</td>
<td>25.874</td>
<td>Significant</td>
</tr>
<tr>
<td>3</td>
<td>ESBP-3</td>
<td>5</td>
<td>12</td>
<td>26.67</td>
<td>100.00</td>
<td>33.928</td>
<td>Significant</td>
</tr>
<tr>
<td>4</td>
<td>ESBP-4</td>
<td>5</td>
<td>18</td>
<td>16.11</td>
<td>76.11</td>
<td>30.950</td>
<td>Significant</td>
</tr>
<tr>
<td>5</td>
<td>ESBP-5</td>
<td>6</td>
<td>15</td>
<td>46.87</td>
<td>92.60</td>
<td>8.230</td>
<td>Significant</td>
</tr>
<tr>
<td>6</td>
<td>ESBP-6</td>
<td>4</td>
<td>26</td>
<td>63.08</td>
<td>92.35</td>
<td>8.020</td>
<td>Significant</td>
</tr>
<tr>
<td>7</td>
<td>ESBP-7</td>
<td>5</td>
<td>20</td>
<td>35.00</td>
<td>89.00</td>
<td>25.682</td>
<td>Significant</td>
</tr>
<tr>
<td>8</td>
<td>ESBP-8</td>
<td>6</td>
<td>27</td>
<td>60.74</td>
<td>84.07</td>
<td>7.728</td>
<td>Significant</td>
</tr>
<tr>
<td>9</td>
<td>ESTD-1</td>
<td>5</td>
<td>14</td>
<td>38.57</td>
<td>75.71</td>
<td>6.925</td>
<td>Significant</td>
</tr>
<tr>
<td>10</td>
<td>ESTD-2</td>
<td>6</td>
<td>18</td>
<td>30.00</td>
<td>70.00</td>
<td>8.845</td>
<td>Significant</td>
</tr>
<tr>
<td>11</td>
<td>ESTD-3</td>
<td>4</td>
<td>19</td>
<td>37.65</td>
<td>57.09</td>
<td>10.680</td>
<td>Significant</td>
</tr>
<tr>
<td>12</td>
<td>ESTD-4</td>
<td>5</td>
<td>18</td>
<td>49.44</td>
<td>71.11</td>
<td>14.866</td>
<td>Significant</td>
</tr>
<tr>
<td>13</td>
<td>ESTD-5</td>
<td>6</td>
<td>18</td>
<td>50.56</td>
<td>72.78</td>
<td>17.195</td>
<td>Significant</td>
</tr>
<tr>
<td>14</td>
<td>ESTD-6</td>
<td>4</td>
<td>27</td>
<td>37.41</td>
<td>76.67</td>
<td>12.628</td>
<td>Significant</td>
</tr>
<tr>
<td>15</td>
<td>ESTD-7</td>
<td>5</td>
<td>30</td>
<td>40.00</td>
<td>89.00</td>
<td>17.437</td>
<td>Significant</td>
</tr>
</tbody>
</table>

(Explanation: n=14-30, df 0.05 = 1.7613-1.6973)
From Table 3, it can be seen that there is a significant increase in student learning outcomes for all classes used as research samples, although the level of significance varies. This indicates that the learning model by integrating local cultural values in science learning in elementary school, not only can make students enjoy learning science, but also can improve students’ learning outcomes in elementary school.

4.2 Discussion

4.2.1 The effectiveness of integrating local cultural values in science learning in elementary school

Specifically, we argue that development culture enhances SCI for two reasons. First, when firms emphasize development culture, long-term development will be one of their major objectives. To achieve that objective, the firm pays more attention to new information and technology that may enhance its dynamic abilities for adapting to new opportunities. In this situation, a firm is motivated to acquire information about current situations, future demand and technologies or capabilities that may guide their R&D-related programs. In general, from the results of the assessment of the implementation lesson plan and from the observations made in the classroom that there is an increase in the ability of teachers to design and implement learning by integrating local cultural content in the classroom. Likewise, from the results of data analysis, there is an increase in the ability of teachers to design and implement learning in Phase-1 and Phase-2.

There is an increase in the ability of teachers in the six aspects used to measure the ability of teachers in preparing Lesson Plan which includes the ability to: (1) plan learning, especially for aspects of determining learning improvement; (2) develop and organize materials, determine themes, media; (3) plan a learning improvement scenario; (4) design management of learning improvement classes; and (5) Plan procedures, types and preparing learning improvement assessment tools.

Suastra, said that the implications of the results of his research for science education in schools, namely: (1) native science (local culture) can be accommodated as an illustration in learning science in schools, considering this original science is part of their lives, and (2) learning science in schools can be seen as the transmission of local culture. In this case, teaching science with inquiry carried out in various forms of teaching approaches, as exemplified by the teacher in the learning process by integrating local cultural values that are relevant to natural science subject matter taught by involving simple activities (hands-on activities) making Science learning is fun and not boring for elementary school students [11].

4.2.2 Realizing the concept of "science is fun" in elementary school

Based on the results of the analysis of the data, students’ ability to answer the pretest and posttest questions that there is a significant increase in student learning outcomes for all classes that are used as research samples, although the level of significance varies. From the observations in the classroom, it appears that most students look happy during the learning process. Most students appear to be actively participating in the learning process. Their attention was focused on the teacher's explanation when the teacher explained the local cultural content in science learning. Students look very interested in the teacher's explanation can be seen from their eyes to want to know what the teacher is explaining. They are active in answering questions asked by the teacher. Some students appear to have asked the teacher questions about the topics discussed. Likewise, teachers also feel happy when they see most students are very interested in the material taught by the teacher. This was revealed when the researcher asked the teacher and questions posed to students. Interaction in the learning process like this can make happy not only teachers who teach or also make students happy.

4.2.3 The extent to which elementary teachers have integrated local cultural values in science learning in elementary school

When compared with teachers who have taught for more than 30 years, or currently 50 years old there is a tendency for elementary school teachers in the past to enjoy teaching even though their income or teacher's salary is insufficient, but they remain creative and innovative. They continue to teach with great devotion because they are teachers. This is different from elementary school teachers today. They have a tendency to pursue curriculum achievement by teaching all the material and not
paying attention to the completeness of the science material they teach. However, efforts to maintain local wisdom, develop positive local wisdom needs to be pursued so that the Indonesian nation becomes a great nation, victorious, respected by all nations in the world but still maintaining local wisdom as said Alvin Toffler, "Think globally, act locally" (think and view globally without releasing local culture and wisdom [12],[17].

This research discussed Local Culture supported by previous research, namely; Amirudin, Mulyana and Purba [2],[6],[9],[15],[15].

5. Conclusion and Suggestion

5.1 Conclusion

Supply chain strategy and its cultural effects on the learning of elementary affects are considered in this research. Based on the results of data analysis and discussion of research results, it can be concluded that the assessment of lesson plan documents, from the observations made in the classroom it can be seen that there is an increase in the ability of teachers to design and implement learning by integrating local cultural content in science learning in elementary school. Likewise, from the results of data analysis, there is an increase in the ability of teachers to design and implement learning in Phase-1 and Phase-2. In addition, based on the results of the analysis of research data, the ability of students to answer pretest and posttest questions, it can be seen that there is a significant increase in student learning outcomes for all classes used as research samples, although the level of significance varies between classes and between teachers who teach science at elementary school.

Exciting things, from the observation in the class, it appears that most students look happy during the learning process. They appear to be actively participating in the science learning process that is associated with the content or local cultural values in learning science in elementary school. Students look very interested in the teacher's explanation can be seen from their eyes to want to know what the teacher is explaining. They are active in answering questions posed by the teacher, as well as asking questions to the teacher regarding the topic of the science being discussed. Likewise, teachers also feel happy when they see most students are very interested in the material taught by the teacher.

This was revealed when the researcher asked the teacher questions and questions posed to students. Interaction in the learning process like this can make happy not only teachers who teach or also make students happy, which means "science is fun" can be realized in this study.

5.2 Suggestion

Based on the results of the data analysis, discussion and conclusions above, it can be suggested that referring to previous research, most elementary school teachers have understood that local cultural values are values that are agreed upon and embedded in a society in the form of habits, beliefs, symbols with certain characteristics that can be used as a reference for behavior and responses to What happened. However, most of the elementary school teachers do not have enough knowledge and skills to integrate local cultural values in science learning in elementary school. For this reason, they need to be given knowledge and skills on how to integrate local cultural values in the learning process of science in the classroom.

From the observations conducted in the classroom, it can be seen that there is an increase in the ability of teachers in designing and implementing learning by integrating local cultural content in the classroom. Likewise, from the results of data analysis, there is an increase in the ability of teachers to design and implement learning in Phase-1 and Phase-2. For this reason, this learning model needs to be tested for other elementary teachers on a wider scale and involves more teachers in the PLC group. In the learning process, it was seen that elementary school teachers were happy when they saw that most students were very interested in the material taught by the teacher. This was revealed when the researcher asked the teacher questions and questions posed to students. Interaction in the learning process like this can make happy not only teachers who teach or also make students happy. For that reason, the learning model by revealing and integrating local cultural values in the science learning process needs to be tested for other science materials in elementary school.
References