Integration of living values into physics learning based on local potentials

S Sarah¹, Z K Prasetyo² and I Wilujeng³

¹Physics Education, Tarbiyah Faculty, Sains Al Quran University, Indonesia.
²,³Science Education, Pascasarjana Program, Yogyakarta State University, Indonesia.

*Corresponding email: siti.sarah@unsiq.ac.id

Abstract. Living values are the principles and beliefs that influence the way of life and behavior of people in society. These values are defined to determine the individuals’ characteristics in the physical, intellectual, social-emotional, and spiritual dimensions. Such values could be acquired through physics learning. Therefore, the study concerned here was aimed at determining the difference in the living values acquired between students of the grade officially termed Grade X at a state senior high school referred to as SMAN 1 Selomerto, Central Java, Indonesia, who learned physics by using content based on local potentials and those who learned physics without using that content. A quasi-experiment with the control group pre-test post-test design was conducted to collect the data. The data were analyzed by using tests of normality, homogeneity, and different. The results indicate no difference in the living values acquired between students learning physics by using local-potential content and those learning physics without using that content.

1. Introduction

BNN (Badan Narkotika Nasional or the National Narcotics Agency in Indonesia) shows that the number of drug users in the said country until November 2015 had increased to 5.9 million [1]. In addition, cases of corruption are currently in occurrence in almost all lines in Indonesia. The annual report of the Corruption Perceptions Index shows that Indonesia was ranked 90th among the 176 countries reported in it in 2016. Moreover, a research study states that the level of honesty among students is very low [2]. If traced, such a situation could have been found to be caused by learning processes that have not been in accordance with the purposes of education. It shows that living values are not yet adequately embedded in students. It is in spite of the fact that living values are recognized as basic values in life.

Well-implanted living values are the embryos of character formation. The application of living values contributes to 26% of students’ character formation [3]. Character education should become an integral part of school life [4]. Therefore, efforts to cause living values to grow in students are necessary to save the nation's morals.
Living values, as a phrase, is also used as the name of a value education program. The program presents various experience activities and practical methodologies to teachers and facilitators to help children and adolescents explore and develop key personal and social values [5]. By means of the LVE (Living Values Education) model, students become accustomed to activities at school that exert a sufficiently significant impact of developing character up to 42.1% [6]. Living values also constitute the main factors forming the character of the nation because they could reduce conflicts in Indonesian society, which possesses multicultural characteristics [7].

The habit of nurturing living values should be done continuously in all environments whether they are at home, at school, or in society. The implanting of students’ living values at school could be done through various activities like some innovative learning activities and extracurricular activities [8].

Living values in oneself are considerably influenced by the characteristics of the environment or society where one finds oneself. There are 13 living values that could be developed in Indonesia, namely, being religious, honest, tolerant, well-behaved, disciplined, hard-working, creative, independent, democratic, filled with nationalism (love for one’s country), appreciative of achievement, cooperative, and responsible [3].

There are influences of students’ attitudes and behaviors upon themselves and others as impacts of values and programs of emotional literacy [9]. Based on some of the above, the following important points could be made. Living values are the values that should grow, develop, and live in a person. To form these values takes considerable time. It also requires the participation of the people in a system to create them together.

The school is one of the effective systems to foster the values of life in students. This should be done by all stakeholders in the school. The teacher is the spearhead of the embedding of living values in students. Therefore, teachers are needed not only to teach the subject matter but also to instantiate and instill living values by teaching.

A lesson at school would more possibly provide a clear and relevant picture if the theme of the learning is unearthed from local potentials. Considerable research indicates that local potentials could be integrated into learning at school [10, 11, 12, 13].

A local potential is a specific resource potential possessed by a region. Local potentials cover natural resources, human resources, technology, and culture [14]. Culture is anything concerning how the local society views life in relation with its belief, productivity, work, staple food, creativity, values, and norms [15].

The SETS (science, environment, technology, and society) approach is in line with the utilization of local potentials. The SETS approach is a difficult one but it is an approach that could reach HOTS (high-order thinking skills) [16]. HOTS itself refers to the thinking abilities of students who are able to handle the multi-dimensional problems of social, economic, technological, and environmental systems. Through the integration of local potentials into learning physics would be a solution to the matter of growing the living values among students. The objective of the research concerned here was to determine the difference in living values between students learning physics by using content based on local potentials and those learning physics without using that content.

2. Method

The research instruments consisted of some learning equipment, a questionnaire, and an observation sheet. The learning equipment consisted of a syllabus, lesson plan, lesson textbook, students' worksheet, and evaluation sheet. The instruments were validated by experts' judgement. The questionnaire and observation sheet were used to obtain data concerning living values. Interviews with physics teachers were done to dig up information more deeply. Triangulation was done on the data obtained from the observation and questionnaire and from the results of the interviews.
The subject matters of local potentials were, among others, *opak* (a traditional food), the plastic mulch cover of farmland and plant nurseries, and natural resources in the form of mountains, tea from Tambi, and well water. The physics materials were about temperature and heat.

The research subjects were students of Grade X (the official term for the 1st grade of SMA, or *sekolah menengah atas* ‘senior high school’, i.e., Level 2 of the two-level high school system in Indonesia) at an SMAN (SMA Negeri or State SMA), namely, SMAN 1 Selomerto, Central Java, Indonesia, with the said students being divided into two classes. One class was to serve as control class and the other was to serve as experimental class.

The research was quasi-experimental in nature and it used the control-group pre-test post-test design. In the experiment, the experimental class learned physics with local-potential content by means of the guided inquiry method. Meanwhile, the control class learned physics by means of demonstration and lecture methods without local-potential content. The students in the experimental class and the control class were divided into several groups. The data analysis used (1) a test of equality in initial competence, (2) a test of normality, (3) a test of homogeneity, and (4) hypothesis testing.

3. Findings
Prior to the experiment, the two classes were tested for equality in mean scores for living values. By means of a t-test, it was found that the data for the living values under investigation had a value of significance ($p$) > 0.05. It means that the two classes were equal in the mean scores for honesty, cooperation, and responsibility.

After treatment, the data obtained were tested for the normality concerned.

| Class       | Statistic | Df | Sig. | Statistic | df | Sig. |
|-------------|-----------|----|------|-----------|----|------|
| Honesty     |           |    |      |           |    |      |
| Experimental| .165      | 24 | .092 | .934      | 24 | .121 |
| Control     | .157      | 27 | .085 | .959      | 27 | .356 |
| Cooperation |           |    |      |           |    |      |
| Experimental| .137      | 24 | .200*| .956      | 24 | .358 |
| Control     | .189      | 27 | .014 | .935      | 27 | .093 |
| Responsibility |       |    |      |           |    |      |
| Experimental| .188      | 24 | .028 | .929      | 24 | .093 |
| Control     | .191      | 27 | .012 | .934      | 27 | .086 |

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

Table 1 shows that data for cooperation and responsibility as a pair had different respective levels of significance, namely, $p$ < 0.05 (not normally distributed) and $p$ > 0.05 (normally distributed). Therefore, the test of homogeneity was not conducted on the data for cooperation and responsibility. In consequence, the data for cooperation and responsibility were analysed by using nonparametric statistics.

Conversely, the data for honesty of both classes had a value of significance ($p$) > 0.05. It means that the data were normally distributed so that the test of homogeneity was then conducted on the data.
Table 2. Results of the Homogeneity Test on the Data for Honesty

| Honesty                        | Levene Statistic | df1 | df2 | Sig.  |
|-------------------------------|------------------|-----|-----|-------|
| Based on Mean                 | 1.209            | 1   | 49  | .277  |
| Based on Median               | .725             | 1   | 49  | .399  |
| Based on Median and with adjusted df | .725             | 1   | 47.837 | .399  |
| Based on trimmed mean         | 1.131            | 1   | 49  | .293  |

Table 2 shows that the resulting value of significance (p) was 0.277, which was > 0.05. It means that the sample was taken from a homogenous population. Therefore, the data for honesty would be analyzed by using parametric statistics.

The hypothesis testing was done in different ways in accordance with the fulfillment of parametric or nonparametric requirements.

a. Honesty
In the case of the honesty aspect, the hypothesis testing conducted used the t-test because the parametric requirements were fulfilled. The t-test showed that the level of significance (p) was 0.277, which was > 0.05. It means that there was no significant difference in the level of honesty between the students who learned physics by using local-potential content and those who learned physics without using that content.

b. Cooperation and Responsibility
The hypothesis testing related to cooperation and responsibility used the Wilcoxon test.

Table 3. Results of the Test of Difference on Cooperation and Responsibility

| Control Class. Cooperation | Experimental Class. Cooperation | Control Class Responsibility | Experimental Class Responsibility |
|----------------------------|--------------------------------|------------------------------|----------------------------------|
| Z                          | -.677a                         | -.525a                       |                                  |
| Asymp. Sig. (2-tailed)     | .498                           | .600                         |                                  |

Table 3 shows that there was no significant difference in cooperation and responsibility between the students who learned physics with local-potential content and those who learned physics without that content. It could be seen from the values of significance (p) of 0.498 (for cooperation) and 0.600 (for responsibility), both of which were > 0.05.

4. Discussion
The content based on local potentials in learning physics initially motivated the students to learn. It could be seen from the students’ enthusiasm at the beginning of the learning session. In the first meeting, there were almost no sleepy students nor students amusing themselves. The students were a little surprised but happy with the unusual learning method and, moreover, with the use of the content based on local potentials. So the students’ interest in the learning was aroused. However, with the passing of time, the students’ enthusiasm lessened. They had difficulties in several steps of the guided inquiry method. The
difficulties occurred at the time of identifying a problem, collecting data, and analyzing data. The students became very reluctant to comply when asked to read the material in the lesson book. It caused the teacher to spend much time explaining the purpose of the experiment. Such a situation is in opposition with the guided inquiry method, which requires students’ independence in learning. At the time of collecting data, many students still did not understand yet what independent variables, control variables, and dependent variables were. There were also some students who still found it difficult to do correct measuring activities so that they needed to be trained. The following presents the results of the students’ experiments.

Table 4. The Results of Experiment 2 in the Experimental Class

| Group | Initial term (°C) | Final term (°C) | Time          |
|-------|-------------------|-----------------|---------------|
| 1     | 25                | 30              | 00:03:01      |
|       | 25                | 30              | 00:02:42      |
| 2     | 24.5              | 29.5            | 00:02:23:13   |
|       | 25                | 30              | 00:02:30:48   |
| 3     | 22                | 27              | 00:02:28:94   |
|       | 21                | 26              | 00:02:28:68   |
| 4     | 25                | 30              | 00:03:35:86   |
|       | 25                | 30              | 00:03:00:69   |
| 5     | 24                | 29              | 00:02:26:06   |
|       | 24                | 29              | 00:02:08:33   |
| 6     | 24                | 29              | 00:02:01:88   |
|       | 24                | 29              | 00:02:05:50   |

Table 4 shows that Group 2 and Group 6 got data that were not sufficiently accurate. The difficulties experienced by the students since they began the problem identification and the data collection caused them to have difficulties in analyzing the data.

According to the original research design, there were supposed to be seven face-to-face sessions, each of which requiring two lessons’ time (2x45 minutes). During the seven sessions, seven experiments ought to have been accomplished. However, only five experiments came into being. In view of the limited time given to the researcher, the research was put to an end after five experiments were done.

A series of the experiments were purposely designed to implant several living values, namely, honesty, responsibility, and cooperation. Possibly the lack of effectiveness of the learning became a cause of the nonexistence of difference in living values between the students learning physics by using local-potential content and those learning physics without using that content.

If all schools in the Regency of Wonosobo, Central Java, Indonesia, are divided into three groups, namely, those of high, middle, and low categories, SMAN 1 Selomerto would fall into the low category. The categorization is based on students’ initial competence on entry, school accreditation, and school age.

In general, the students who study in SMAN 1 Selomerto are those not accepted at other schools. Even if there are students with high levels of competence, they are very few in number. SMAN 1 Selomerto had been running for only three years at the time the research was made. Automatically, it was still in the process of getting organized in matters of facilities and resources, the number of teachers, the number of students to be recruited, administration, and others. Therefore, it was quite possible that the aspect of implanting living values was not yet one of the matters given priority by the school.

The implantation of living values requires making one get used to new matters. And it is to be done not only at school but also in the family and society. The results of the interviews with the physics teacher and principal of SMAN 1 Selomerto indicate that in general, their students come from families that are not sufficiently well off. A part of the students come from families where one or both parents are away
working in another part of the country or even in another country. So such students live together with their grandparents or other relatives. It indicates that the implantation or growing of living values in the family is very much at a minimum. A survey by Ainis Mufarika and Suhanadji in five poor families in the District of Mojokerto, Indonesia, shows that the poor parents use a combination of democratic and laissez-faire parenting to guide their children. The democratic parenting style is characterized by the encouragement of parents to children, the parents’ attention, their deliberation, and the good communication between parents and children. The laissez-faire parenting style is characterized by parents giving freedom to their children to hang out or play. In addition, however, parents are less knowledgeable about what their boy has done [17].

How to overcome this problem? The way is to intensify the growth of good values in the family, the school, and the community. Research by Sukiyani and Zamroni and also by Anisah indicates that the outlook of the families to character education is influenced by the expectations of parents on their children. Parents teach character through good parenting, model behaviour, and habituation, giving an explanation for the action, the application of high standards and being realistic for the child, and involving children in decision making. Results of character education in the family show that children who grow up in a complete family’s affection feel more fulfilled than children from single-parent families [18, 19].

5. Conclusion

The results show that there is no difference in living values between students who learn physics by using local-potential content and those learning physics without using that content.

6. References

[1] Kompas com 2016 Buwas: Pengguna Narkoba di Indonesia Meningkat hingga 5,9 juta Orang. http://regional.kompas.com/read/2016/01/11/14313191/Buwas.Pengguna.Narkoba.di.Indonesia.Meningkat.hingga.5.9.Juta.Orang

[2] Utomo E, Nurlaeli L and Simangunsong H 2011 Indonesian Students’ Opinion, Knowledge of, and Attitude toward Topics and Values in the Civic Education Subject Journal of Education Research and Policy 3 154-76

[3] Komalasari K 2012 The Living Values-Based Contextual Learning to Develop the Students’ Character Journal of Social Sciences 8(2) 246-51

[4] Romanowski M H 2005 Through the Eyes of Teachers: High School Teachers' Experiences With Character Education ProQuest Education Journal 34 6-23.

[5] Tillman D 2012 Living Green Values Activities for Children and Young Adults: A Special Rio+20 Edition Switzerland: Association for Living Values Education International (ALIVE)

[6] Saripudin D and Komalasari K 2015 Living Values Education in the School Habituation Program and Its Effect on Students’ Character Development The New Educational Review 39(1): 51-62

[7] Wening S 2012 Pembentukan Karakter Bangsa Melalui Pendidikan Nilai Jurnal Pendidikan Karakter Tahun II 1 155-65

[8] Komalasari K Saripudin D and Masyitoh I S 2014 Living Values Education Model in Learning and Extracurricular Activities to Construct Students’ Character Journal of Education and Practice 5(7)

[9] El Hassan Karma and Rula K 2005 The Effect of Living Values: An Educational Program on Behaviors and Attitudes of Elementary Students in a Private School in Lebanon Early Childhood Education Journal 33(2)

[10] Ardan A S et a. 2015 Needs Assessment of the Development of the Biology Textbook for Grade X at High School Based on the Local Wisdom of Timor International Education Studies 8(4)
[11] Kesiman M W A and Ketut A 2012 The Implementation of Hypertext-Based Learning Media for a Local Culture-Based Learning Journal of Information Technology Education: Innovations in Practice 11 377-85
[12] Chusorn P Ariratana W and Chusorn P 2014 Strategy Challenges in the Local Wisdom Application Sustainability in Schools Procedia - Social and Behavioral Sciences 112 626 – 634
[13] Sahlberg P 2007 Educational Policies for Raising Students’ Learning: The Finnish Approach Journal of Educational Policy 22(2) 147–171
[14] Hariyadi P 2010 Penguatan Industri Penghasil Nilai Tambah Berbasis Potensi Lokal Peranan Teknologi Pangan Untuk Kemandirian Pangan Jurnal pangan 19(4)
[15] Arowolo D 2010 The Effects of Western Civilization and Culture on Africa Afro-Asian Journal of Social Sciences 1(1) Quarter IV
[16] Zoller U 2013 Science, Technology, Environment, Society (STES) Literacy for Sustainability: What Should It Take In Chem/Science Education? Educ. quím. 24(2) 207-2 1Ú
[17] Mufarika A and Suhanadji 2013 Pola Pengasuhan Anak Pada Keluarga Miskin (Studi Kasus 5 Keluarga Miskin di Desa Kebontunggul, Kecamatan Gondang, Kabupaten Mojokerto) Jurnal Penelitian
[18] Sukiyani F and Zamroni 2014 Pendidikan Karakter dalam Lingkungan Keluarga SOCIA 11(1) 57-70
[19] Anisah A S 2011 Pola Asuh Orang Tua Dan Implikasinya Terhadap Pembentukan Karakter Anak J.Pendidikan Universitas Garut 05(1) 70-84