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Development of Elementary Mathematics Education Teaching Materials based Living Values Education

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Abstract

Elementary Mathematics Education is a compulsory subject that must be taken by students of the PGSD Study Program. In fact, there are no practical teaching materials available as facilities for learning activities during lectures as needed. The development of teaching materials for elementary mathematics education courses based on living values education (LVE) is deemed necessary because of the decline in individual character. There are various activities in bringing value education to life, ranging from practice, productivity, and meaning. LVE as a solution and answer to the need for values of human life. The purpose of the study was to produce teaching materials for elementary mathematics education based on living values education. The type of research is research and development (R&D) proposed by Borg and Gall. Based on the steps in the research development cycle that were delivered, they were then shortened to four main stages, are 1) exploration stage or preliminary stage, 2) model development stage, 3) model testing stage, and 4) model dissemination and implementation stage. The results showed that the teaching materials developed had met the valid criteria with a percentage of 86.39% in the material aspect, 82.8% in the language aspect, and 88.7% in the presentation aspect with very good criteria. In addition, the teaching materials developed can improve students' abilities with an average pretest achievement of 76 while the average posttest score of 88. On average, the N-Gain value of 0.5 is obtained, which means that the student's ability is included in the medium category.
Keywords: LVE, Mathematics, PGSD, Teaching Material

INTRODUCTION

The Elementary Mathematics Education course is a compulsory subject that must be studied with a total of 3 credits by students of the PGSD Study Program. This course is a basic subject that is important to be mastered by students as prospective elementary school teachers. Based on observations, it is known that in lectures so far students are still experiencing difficulties, this is due to the unavailability of practical teaching materials as facilities for learning activities during lectures. For the last two years, the sources used are books in the library, and even then the number is limited. This results in low student learning outcomes. This can be seen from the decline in student achievement from each generation.

This is also in line with research (Yayuk, 2019) that the problems that occur in the learning process in class seem to be not running optimally as seen from students who do not have book literature even though the lecturer has advised them to look for several references that support lectures, students only rely on handouts from lecturers , students do not understand the material because the activities carried out are listening, seeing, imitating but creativity is

lacking so that learning becomes meaningless. Based on these conditions, one of the efforts to overcome the problems that occur is to provide learning resources that suit the needs of students.

So that students experience ease in recognizing and understanding elementary mathematics education courses, it is necessary to prepare and develop teaching materials that can direct and stimulate the thinking activities of students and lecturers in exploring and maximizing the competencies possessed by students, so that the objectives of a learning process can be achieved. Teaching materials are an important part in the implementation of education, through teaching materials teachers or lecturers will be easier to carry out learning and students will be more helpful and easier in learning (Prastowo, 2013).

There are two important things that must be realized in the process of providing education, namely developing abilities and shaping the character of students. The purpose of learning is to increase insight, behavior, and skills with the end goal being the realization of knowledgeable and characterful people (Barnawi & Arifin, 2012). Thus, in addition to making students master the targeted competencies (materials), the learning process is also designed to make students recognize, realize and internalize character values, and turn them into behaviors in everyday life.

Character education is a process of instilling values in students through education, practice and environmental engineering (Hanafi, 2021). Character education is the development of basic potential so that a good heart is strengthened by multicultural life so that it becomes a nation that is more competitive in world relations. The values contained in Living Values Education are 12 values developed in Living Values Education including: peace, respect, compassion, tolerance, honesty, humility, cooperation, happiness, responsibility, simplicity, freedom, and unity.

Good education means valuable education, because the most important thing in this world is human moral values. Broadly speaking, values are divided into two groups, namely values of being and values of giving. Conscience values are values that exist within humans which then develop into behavior and the way we treat other people, such as the values of honesty, courage, peace-loving, self-reliability, self-potential, discipline, knowing limits, purity and conformity. While the values of giving are values that need to be practiced or given to others who will then be received as much as given. These values are loyal, trustworthy, respectful, love, affection, sensitive, unselfish, kind, friendly, fair and generous (Nufus, 2019).

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There are various activities in bringing value education to life, ranging from practice, productivity, and meaning. Meaning is one way to internalize the values in concepts that need to be built in children (Arnold et al., 2007). However, until now, character education efforts have not been carried out optimally. This condition necessitates the need for an educational approach that not only emphasizes the teaching dimension, but also on the human dimension. The educational approach offered is the Living Values Education (LVE) approach as a solution and answer to the need for human life values. This educational approach is not to teach, but to live values (Diane Tillman & Diana Hsu, 2001).

Based on the problems above, it is necessary to develop teaching materials for elementary mathematics education courses based on living values education (LVE). Living Values Education is an activity of teaching life values through value-based activities. Activities are designed to motivate students and invite them to think about themselves, others, the world, and values in an interconnected way. These activities aim to experience within oneself and to build self-resources. These activities also aim to strengthen and provoke the potential, creativity and talents of each student. Students are invited to reflect, imagine, dialogue, communicate, be creative, write, express themselves through art, and play with the values being taught. In the process, personal, social and emotional skills will develop, along with peaceful social skills and full cooperation with others. These values have been structured in such a way as to provide a set of skills that build upon one another. Existing exercises include building self-respect skills, positive social communication skills, critical thinking skills, and self-expression through art and drama (Hanafi, 2021).

The specific purpose of this research is to produce teaching materials for elementary mathematics education based on living values education (LVE) which are expected to support the learning process of elementary mathematics education courses. The product feasibility study produced in this study was reviewed from the results of expert validation which included material experts, language experts and layout/media experts.

METHOD

This research was conducted on students of the Primary School Teacher Education Study Program (PGSD) at STKIP Muhammadiyah Blora. Researchers used the Research and Development method. Research and Development Methods are research methods used to produce certain products, and test the effectiveness of these products (Sugiyono, 2015). By

using this method, the researcher hopes to produce effective teaching materials. The product developed by the researcher is teaching materials for Elementary Mathematics Education courses, which will be used in the lecture process at PGSD. Borg & Gall (Borg & Gall, 2003)

describes the 10 steps of research and development development methods which are then adapted into four stages, namely the exploration stage, model development, model testing, and model dissemination and implementation (Sukmadinata, 2012) which can be visually described as follows.

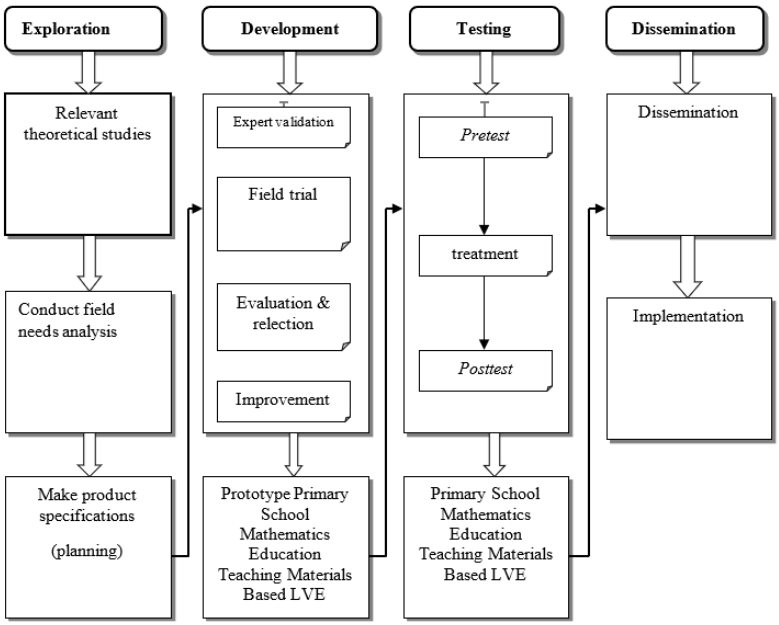

Figure 1. Flow of Product Development Model Produced

The stages of research activities carried out are the result of modifications from the activity stages submitted by (Borg & Gall, 2003), namely: 1) exploration stage, this activity includes analysis conducted by researchers consisting of analysis activities on the curriculum, student needs, lecturer needs and student characteristics. 2) the development stage, which consists of activities on the development of teaching materials, namely the development of LVE-based elementary mathematics education textbooks and the preparation of research instruments. The research instrument consisted of a set of filled-in tests, student attitude scales, and student activity observation sheets in participating in the learning process of Elementary Mathematics Education. In the activity of compiling this instrument, the steps taken were compiling learning observation sheets, validating teaching materials and validating research instruments. 3) the testing phase, the activities carried out include: a) giving a pretest to determine the students' initial abilities; b) researchers carry out learning in Elementary

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Mathematics Education with teaching materials that have been developed; c) observing ongoing learning activities. In this activity, the researcher was assisted by two observers; d) provide questionnaires to students to see their attitudes towards learning activities using teaching materials for Elementary Mathematics Education that have been developed. After four stages of data analysis, this stage is the stage of reviewing data from observations and trials, so that it becomes a description. 4) dissemination.

Both qualitative and quantitative data analysis were used in this study. Data gathering, data reduction, data presentation, and conclusion drawing are the four stages of the Miles and Huberman model's initial data analysis (Sugiyono, 2015). Quantitative data analysis employing the traditional mean test with N-gain is the data analysis technique used to assess the student's proficiency.

RESULTS AND DISCUSSION

Results

The results of the research at each stage of the development of LVE-based elementary mathematics education teaching materials (Living Values Education). The four steps of discovery, development, testing, distribution, and implementation were then modified from the development model (Borg & Gall, 2003) into which the instructional materials were developed (Sukmadinata, 2012).

1. Exploration Stage

The exploration phase of the research consists of reviewing relevant theories, conducting field needs analysis and making product specifications (doing planning). This analysis of the needs of mathematics teaching materials aims to obtain information about the needs of mathematics teaching materials in the field. The data obtained in this stage comes from interviews, observations and document analysis. At this stage an analysis of the curriculum, student needs, lecturer needs, and analysis of learning resources is carried out. Based on observations, it shows that (1) students are still used to passively learning because the learning is teacher-centred (teacher center oriented). Lecturers still dominate in learning, in this case lecturers who continue to provide and explain material to students. Students only pay attention to the explanation of the material from the lecturer and take notes on things that are considered important. (2) learning is not supported by adequate learning resources and teaching

materials. Students do not have books/modules as learning resources. They only rely on the material provided by the lecturer at the time of learning. However, in addition, some students look for materials from the internet before starting learning. (3) student learning outcomes in elementary mathematics education courses are still low when compared to learning outcomes in other subjects.

In the analysis of the needs of the lecturers, it was found that the learning resources used at the time of learning were still limited, the teaching materials used by the lecturers only aimed to develop students' abilities but did not lead to the formation of character/character. While the purpose of learning is to increase insight, behavior, and skills with the ultimate goal being the realization of people who are knowledgeable and have character. In addition, in the analysis of the PGSD study program curriculum at STKIP Muhamamdiyah Blora it is still possible and open to updates to advance learning. Until now, character education efforts have not been carried out optimally. This condition necessitates the need for an educational approach that not only emphasizes the teaching dimension, but also on the human dimension. The educational approach offered is the Living Values Education (LVE) approach as a solution and answer to the need for human life values. This educational approach is not to teach, but to live values.

Based on the analysis results sourced from observations, interviews, and document studies, it can be concluded that the use of teaching materials for elementary mathematics education is still limited, learning activities are still student-centered (student oriented), teaching materials/learning resources used are still taken from several sources and has not been encouraged to develop student character, the teaching materials used will affect student learning outcomes. Based on these results, it is necessary to develop LVE-based elementary mathematics education teaching materials that are able to attract students' attention so that they are able to encourage students to be more active during learning and be able to encourage the growth of student character in addition to developing their abilities.

2. Development Stage

At this stage, LVE-based elementary mathematics education teaching materials were developed. The first stage in product development is the preparation of a prototype. The initial development of LVE-based elementary mathematics education teaching materials consisted of several steps, namely: 1) identifying the material to be developed, 2) searching for material from various sources, 3) compiling the material into a systematic unit of teaching material, 4)

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developing the material according to with the LVE approach steps, and 5) make a layout of teaching materials based on the material that has been prepared. The next step is to make an assessment instrument in the form of a validator assessment sheet. The structure of the teaching materials developed can be seen in the following table:

Table 1. LVE-Based Elementary Mathematics Education Teaching Material Structure

No.	Part	Contents
1.	Cover	Title of teaching material, author, logo, institution
2.	Foreword	The purpose of preparing teaching materials, thanks, hopes and benefits of teaching materials
3.	List of contents	Content and page numbers contained in teaching materials
4.	Introduction	Introduction to LVE-based elementary mathematics education teaching materials
5.	Theory	Elementary mathematics learning strategies, approaches and models, learning theory and mathematics learning, mathematics learning approaches, media and teaching aids in mathematics learning, games in mathematics learning, mathematics learning assessment, basic teaching skills in mathematics learning, elementary mathematics curriculum and materials.

The following is a picture of the developed teaching material product:

Figure 1. Teaching material product

After the process of preparing the initial prototype design is complete, the next stage is carried out, namely validation. Validation is done by involving experts related to the research product being developed. This is done whether the research product is ready to be tested in the field. There are three aspects of expert validation in this study. These aspects aim to examine the suitability of the product prototype with aspects of the substance of the material, use of appropriate language, media or presentation of the displayed design.

a. Material Expert Validation

The material expert validator on the product being developed is Mrs. Ika Nurwulandari, M.Pd. STKIP Muhammadiyah Blora lecturer. The results of the material expert validation assessment are as follows.

Table 2. Material validation results

No	Assessment Component	Score
A.	Elementary Mathematics Education Material Substance	74
B.	LVE-Based Learning	21
	Total score	95
	Percentage	86,3%
	Criteria	Very good

The table shows that the percentage of values given by the validator is 86,3%, which means that the teaching materials developed are suitable for use in terms of material.

b. Linguist Validation

The validator of linguists on the product being developed is Mrs. Bening Sri Palupi, M.Pd. STKIP Muhammadiyah Blora lecturer. The results of the linguist validation assessment are as follows.

Table 3. Language validation results

No	Assessment Component	Score
A.	Simple language	12
B.	Use of communicative language	9
C.	Dialogic and interactive language	8
D.	Suitability of language with the level of development of students	9
E.	Coherence and coherence of the flow of thought	8

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F.	Use of terms, symbols and icons	12
Total score		58
Percentage		82,8%
Criteria		Very good

The table shows that the percentage value given by the validator is 82.8%, which means that the teaching materials developed are suitable for use in terms of language. The validator gives suggestions to complete the incomplete part of the material, but overall the content is good in writing in accordance with the standard grammar of the language.

c. Media/Presentation Expert Validation

The validator of linguists on the product being developed is Mr. Muhammad Aunur Rofiq, M.Pd. STKIP Muhammadiyah Blora lecturer. The results of the media/presentation expert validation assessment are as follows.

Table 4. Hasil validasi penyajian

No	Assessment Component	Score
A.	Book size	10
B.	book cover design	47
C.	Book content design	85
Total score		142
Percentage		88,7%
Criteria		Sangat baik

The table shows that the percentage value given by the validator is 88.7%, which means that the teaching materials developed are suitable for use in terms of media/presentation.

Based on the validation results, the average value of the quality of the teaching materials developed is in the very good category. Based on the validation indicators, the developed teaching materials are said to be valid so that the developed teaching materials can be field tested. Students were asked to evaluate the prototype LVE-based basic mathematics education teaching materials during the field experiment. The evaluation takes the form of a questionnaire with four sections: 1) a description of the educational materials' content, 2) how displays, graphics, tables, and charts are presented, 3) readability, and 4) learning. The following table displays the questionnaire's findings.

Table 5. Questionnaire Assessment Results

No	Assessment Component	Score
1.	Description of the contents of teaching materials	18

No	Assessment Component	Score
2.	Presentation of views, images, tables and charts	27
3.	Legibility	20
4.	Learning	19
	Total score	84
	Percentage	95,45%
	Criteria	Very good

According to the data, the developed prototype of LVE-based worksheets for primary mathematics education has a very good category, but it is still essential to assess and enhance the worksheets in order to improve outcomes. The following can be drawn from the outcomes of the initial field tests:

a) Aspects of the content of teaching materials

From a content perspective, the limited trial's findings demonstrated that students had no trouble comprehending the lessons contained in the LVE-based prototype materials for teaching basic mathematics.

b) Aspects of presentation of views, pictures, tables and charts

Everything about the prototype instructional materials' display presentation, pictures, tables, and charts is excellent. However, some still pictures are unclear and do not come with a description.

c) Aspect of readability

The pictures, tables, and charts used in the prototype instructional materials, as well as the visual layout overall, are all very good. However, some still images lack an explanation and are ambiguous.

d) Learning Aspect

The LVE-based elementary mathematics education teaching resources prototype is quite effective in terms of learning. The instructional resources created have captured students' interest and may motivate them to engage in more active learning.

The validator provided advice and feedback based on the field trials that were conducted. The following table provides a summary of changes made to the prototype LVE-based primary mathematics education teaching materials as a result of a small trial.

Table 6. Field Trial Suggestions and Revisions

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No	Suggestions and Feedback	Improvement
1.	The discussion of the material does not include real examples of mathematical concepts in elementary school	Include real examples of mathematical concepts in teaching materials
2.	There are some sentences that are still ambiguous, giving rise to different interpretations	Replacing sentences that are still ambiguous so as not to cause different perceptions
3.	There are some spellings that are not correct.	Fixed typographical errors.

Furthermore, the results of the revised prototype of LVE-based elementary mathematics education teaching materials were used in the next trial.

3. Testing Stage

Student learning outcomes in this testing phase were measured using a student ability test. The following table describes the results of students' ability tests before and after using LVE-based elementary mathematics education teaching materials.

Table 7. Assess student ability

Student ability	Average score
Pretest	76
Postest	88

Based on the table above as a whole, it can be seen that the ability of student learning outcomes in LVE-based elementary mathematics education learning has increased, but to determine the increase in concept ability, an improvement test is carried out using the Gain (g) test. The results of the Gain (g) ability score of student learning outcomes in general can be seen in the following table.

Table 8. The results of the student's ability score

Criteria	Number of students	Percentage
Low	7	33,33%
Currently	9	42,85%
High	5	23,80%

Based on the table, it can be seen that the results of increasing students' abilities after using LVE-based elementary mathematics education teaching materials obtained 33.33% for the low criteria, 42.85% for the medium category and 23.80% for the high criteria.

The classical average gain normality score can be determined based on the average student ability score measured before and after learning using LVE-based elementary mathematics

education teaching materials. Based on the average score of students' abilities, the data obtained from the pretest and posttest scores. Then the average classical N-Gain score is

$$g = \frac{S_{pos} - S_{pre}}{SMI - S_{pre}} = \frac{88 - 76}{100 - 76} = 0{,}5$$

On the classical average, the N-Gain value is 0.5, which means that students' abilities in elementary mathematics education courses are in the medium category.

Discussion

Based on the research results that have been described, the validation of the developed teaching material products includes in the very good category in all three aspects which include material, language and presentation. The criteria for measuring the results of product validity assessments are based on theory (Sa'dun Akbar & Sriwijana, 2010) which revealed that the product assessment results at the interval of 75.01%-100% were declared valid.

Values Education is very important to be applied to create Character Building (Character Culture) considering the development of today's children who are not concerned with ethical, moral, polite, religious, and so on (Sukitman & Ridwan, 2016). (Apriani & Ariyani, 2017) shows that compared to using the storytelling technique, learning using LVEP has a beneficial impact on instilling nationalism characters, including the sub-characters of cooperation, responsibility, love, peace, respect, tolerance, and unity. Additionally, the study performed by the research revealed that LVEP had a significant impact on all anti-radicalism values observed during the learning process, including tolerance, self-control, citizenship, kindness, courtesy, and fareness..

According to (Danang Sunendar & Wahid, 2008) that teaching materials serve a number of purposes, such as: 1) presenting a clear and cutting-edge point of view on teaching and showing its application; 2) providing a source of content that is rich, simple to read, and varied in accordance with students' interests and needs; 3) offering a well-organized and gradual source; 4) presenting teaching strategies and resources to inspire students; 5) acting as a resource for practical exercises and assignments; 6) Provide suitable evaluation and corrective tools and materials.

Living values, also known as fundamental principles of life, are a variety of behaviors that usually (universally) support positive and harmonious interactions between us and those around us. Because of the individualistic, hedonistic, and materialistic attitudes and behaviors of contemporary humans, we struggle to cultivate these habits both now and in the future. We also tend to forget that people are social beings with virtues and character (Apriani & Ariyani,

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2017). To learn, experience, and put into practice universal values in daily life, students will learn to explore, grow, and have life values through living values.

The application of positive values is very helpful for children face challenges in the future. Hence, aside as a process of awareness that plays a major role in doing social transformation, LVE is also a strategy as well a new approach in character education. In LVE explained that children do not need help, who do help is adults. Therefore, adults (educators or lecturers) first attend LVE training. Through character education and LVE, we continuously build harmonization and respect for one another for a better life.

The findings of this study's product development are also consistent with (Susanti, 2013), who claims that character education in tertiary institutions is applied based on five major pillars:

1. Tri Darma 1 University Studies With character, character education can be incorporated into academic pursuits, study, and volunteer work.
2. Corporate culture in higher education It is necessary for students to be able to adapt to daily living in a higher education setting.
3. Academic Engagement Integrating character education into student activities such as scouting, athletics, writing, art, workshops, and events where students participate in the committee system will help to create it.
4. Everyday Tasks By incorporating habituation into daily living in the family, dorm, and community environments, character education can be improved.
5. Intellectual Environment The entirety of academic culture shapes the value of character education in context..

CONCLUSION

The results of the research that have been described show that:

1. The teaching materials developed have met the valid criteria with a percentage of 86.39% in the material aspect, 82.8% in the language aspect, and 88.7% in the presentation aspect with very good criteria..
2. The teaching materials developed can improve students' abilities with an average pretest achievement of 76 while the average posttest score of 88. On average, the N-Gain value is 0.5, which means that the student's ability is included in the medium category.

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REFERENCES

Apriani, A.-N., & Ariyani, Y. D. (2017). Implementasi Pendidikan Nilai Nasionalisme Dalam Pembelajaran Living Values. *LITERASI (Jurnal Ilmu Pendidikan)*, *8*(1), 59. https://doi.org/10.21927/literasi.2017.8(1).59-73

Arnold, R., Martin, B. N., & Bigby, L. (2007). Is There a Relationship Between Honor Codes and Academic Dishonesty? *Journal of College and Character*, *8*(2). https://doi.org/10.2202/1940-1639.1164

Barnawi & Arifin. (2012). *Strategi & Kebijakan Pembelajaran Pendidikan Karakter*. Ar-Ruzz Media.

Borg & Gall. (2003). *Education Research*. Allyn and Bacon.

Danang Sunendar & Wahid. (2008). *Strategi Pembelajaran*. Remaja Rosdakarya.

Diane Tillman & Diana Hsu. (2001). *Living Values Activities for Children Age 3-7*. Health Communication, Inc.

Hanafi, I. (2021). Pendidikan Karakter Berbasis " Living Values Education" Di Masa Pandemi Covid19 Dengan Sistem Pembelajaran Daring. *Dirosat : Journal of Islamic Studies*, *5*(2). https://doi.org/10.28944/dirosat.v5i2.507

Nufus, H. (2019). pembaharuan pendidikan dalam segala segi dan dimensinya . Mulai dari langsung memanggil pucuk pimpinan dan bertanya : Berapa orang guru yang pendidikan adalah awal dari segalanya . semua jenjang . Dalam waktu yang relatif singkat Jepang berhasil membangun. *Jurnal Al-Iltizam*, *4*(1), 148–163.

Prastowo, A. (2013). *Panduan Kreatif Membuat Bahan Ajar Inovatif*. Diva Press.

Sa'dun Akbar & Sriwijana. (2010). *Pengembangan Kurikulum dan Pembelajaran*. Cipta Media.

Sugiyono. (2015). *Metode Penelitian Pendidikan: Pendekatan Kuantitatif, Kualitatif, dan R&D*. Alfabeta.

Sukitman, T., & Ridwan, M. (2016). Implementasi Pendidikan Nilai (Living Values Education) Dalam Pembelajaran Ips (Studi Terhadap Pembentukan Karakter Anak Di Tingkat Sekolah Dasar). *Profesi Pendidikan Dasar*, *3*(1), 30–41. https://doi.org/10.23917/ppd.v3i1.2717

Sukmadinata, N. S. (2012). *Metode Penelitian Pendidikan*. PT Remaja Rosda Karya.

Susanti, R. (2013). Penerapan Pendidikan Karakter Di Kalangan Mahasiswa. *Al-Ta Lim*

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PRIMARYEDU

Journal, *20*(3), 480–487. https://doi.org/10.15548/jt.v20i3.46

Yayuk, E. (2019). Pengembangan Bahan Ajar Pembelajaran Matematika Untuk Mahasiswa PGSD Semester 6. *Scholaria: Jurnal Pendidikan Dan Kebudayaan*, *9*(2), 172–182. https://doi.org/10.24246/j.js.2019.v9.i2.p172-182