The development of a problem-based learning design model to improve students' communication skills

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ABSTRACT
The purpose of this study was to develop a problem-based learning model for fourth grade elementary school students in order to improve their communication skills. This is a research and development (R&D) project using a combined approach (mixed methods), specifically Borg and Gall research combined with ADDIE design development. The type of research that was conducted was True Experimental research with a post-test only control group design. Data collection techniques included tests and non-tests. The effectiveness of the problem-based learning model was determined through data analysis using the t-test. The results indicated that t arithmetic > t table (9.84 > 2.012) was rejected at a 5% significance level, while Ha was accepted and supported by observations of student communication skills in six lessons, which revealed an average of 80.07 percent of 24 students in the very good category. As a result, it can be concluded that the design model for problem-based learning is effective at improving communication skills.

KEYWORDS
Learning design; communication skills; problem-based learning

Introduction
Learning must always experience innovation according to its era. Several years ago, schools used conventional methods, namely educators as the center. However, over time, the method slowly changed. This is the background for the change in the curriculum since 1947 until now, namely the 2013 curriculum. The 2013 curriculum adheres to the basic view that knowledge cannot be simply transferred from educators to students, because students are subjects who have the ability to actively seek, process, and learn, constructing, and using knowledge. The implementation of the 2013 curriculum aims to produce graduates who are competitive, innovative, creative, collaborative, and have character. So that education is not only carried out to develop knowledge based on the main core of learning but also must be oriented so that students have creative, critical, communicative and character abilities.

Permendikbud Number 65 of 2013 concerning Standards for Primary and Secondary Education, states that the learning process in the 2013 curriculum for all levels is implemented by applying a scientific/scientific approach combined with integrated thematic learning. The 2013 curriculum provides flexibility for schools and educators to design, develop, and implement curricula according to situations, conditions, and potential local advantages that can be raised by schools, educators are free to carry out the learning process according to situations and conditions. school situation and student situation.

The 21st century requires educators to be more active in innovating learning. Every year the era always experiences developments, including in the fields of technology and communication. This has an impact on the need for skills that must be possessed by human resources in the 21st century. Skills or competencies that must be possessed include the ability to collaborate, think critically, be creative and communicate.

Based on the PISA report released on Tuesday, December 3, 2019, Indonesia’s reading score was ranked 72 out of 77 countries, then mathematics was ranked 72 out of 78 countries, and science scores was ranked 70 out of 77 countries.
78 countries. From the PISA results, it can be seen that Indonesia is ranked 72 in the reading score. Meanwhile, reading is one of the communication skills which is one of the skills needed by students in the 21st century.

Communication skills that are important to pay attention to in education are generally related to research activities, especially in an academic environment. The communication includes, among others: contributing his opinion on a data from a graph/table, being able to follow his friend’s invitation to solve problems, carrying out and completing the structured tasks he gives, comparing observations, combining group data, describing the characteristics of an object carefully and objectively, as well as conveying information from the observed problems. Therefore, communication skills are something that students must master to answer and survive the challenges of their times. Students can be trained to improve communication, both oral and written. This must also be considered by educators in designing learning designs in order to achieve educational goals.

Furthermore, the researchers made initial observations on May 10, 2021 to SD Alam Al Karim to see the communication skills of grade 4 students. The researchers distributed observation sheets along with an assessment rubric to each grade 4 teacher to observe students’ communication skills on theme 9 sub-theme 1. The results showed that grade 4 said bin zaid with a total of 24 students obtained an average of 50.63%. Zubair bin Awwam’s class with 24 students obtained an average of 50.83%. Meanwhile, Ustman bin Afan’s class with 24 students obtained an average of 50.21%. The table above shows that the communication skills of grade 4 students at SD Alam Al Karim are still low.

Based on the results of observations of these communication skills, the researchers then analyzed the needs of teachers and students through a questionnaire. The results of the observations show that the teacher has developed a learning design but has never developed a learning design that leads to the process of developing students’ communication skills. Learning applies more teacher centered approach, ie educators become information centers for students. 80% of learning designed by educators has not been oriented to student activity. This learning pattern is more about the activeness of educators than students. The learning carried out is also very minimal in providing opportunities for students to discuss and conclude learning independently. Educators have not implemented a problem-based learning model. Educators have never designed a learning design that refers to improving students’ communication skills. So that when the teacher gives the opportunity to ask questions, students look silent without anyone asking. Students feel embarrassed and afraid when asked to express opinions or questions. Therefore, a learning design that focuses on improving students’ communication skills is needed.

Learning design plays an important role in improving the quality of learning, this is possible because by designing learning designs, an educator has a vital role in formulating the learning objectives to be achieved. By having an awareness of the importance of learning objectives, teachers will try to carry out various activities in order to realize learning objectives, such as formulating materials, choosing strategies, choosing learning media and tools, designing evaluation tools, and so on.

Problem-based learning model is one of the appropriate learning models to use. The syntax in problem-based learning models guides students to be active in solving problems, especially those related to learning materials. In addition to making students active, this model also trains students to think critically and trains students in communicating.

Finkle and Torp (1995) in (Shoimin, 2014) state that problem-based learning is the development of a curriculum and teaching system that develops stimulant problem solving strategies and the basics of knowledge and skills by placing students in an active role as problem solvers in everyday life. day. -days that are not well structured.

Based on the above definition, the learning atmosphere using this learning model leads to the process of solving everyday problems. In the problem solving process, students will actively carry out communication activities such as discussing, speaking, listening, and writing. The advantage of the problem-based learning model in helping to improve students’ communication skills is the occurrence of scientific communication activities in problem solving processes such as discussions and presentations. Students are also active in digging for information on the internet, reading books in the library, and conducting interviews with resource persons. In addition, students will also get used to communicating with their group mates in the form of peer teaching.

Based on the background of the problems that have been stated, the researchers feel it is necessary to conduct research on the development of problem-based learning model learning designs to improve the communication skills of fourth grade students at SD Alam Al Karim Lampung.
Literature review

Understanding learning design

Well-designed learning will take place conducive and meaningful for students. Therefore, a teacher as the main actor in the learning process must have good creativity in designing a lesson. According to (Horax et al., 2017) interpreting learning design as a systematic process to solve learning problems through planning learning materials and activities to be carried out, planning learning resources that can be used and planning success evaluations.

The purpose of making learning designs is to create optimal means to achieve the desired learning objectives. Hasni et al. (2011) defines that instructional design relates to understanding, improving, and applying appropriate learning methods to produce the desired changes in students related to knowledge and skills in accordance with the learning content. Likewise, Supriyadi et al. (2017) which states that learning design is essentially a linear process that begins with determining needs, developing designs to respond to needs, then testing the design and finally determining the evaluation process to determine results related to the effectiveness of the designs that have been prepared.

Based on some of the theories above that have been put forward, it can be concluded that learning design is concerned with the development of the learning process which includes the formulation of objectives to the evaluation of learning. In this study, researchers will develop learning design as a system.

Problem-based learning (PBL)

Learning outcomes are also determined by how educators design learning with models that are adapted to learning needs so that the goals and targets in the learning can be achieved. One of the learning models that can be used is the problem based learning (PBL) model. Problem-based learning model is a learning approach that uses real-world problems as a context for students to learn about critical thinking and problem-solving skills, as well as to acquire knowledge and concepts. According to Ward in Mudlofir (2017) defines problem-based learning as a learning strategy that involves students to solve problems through the stages of the scientific method so that students can learn knowledge related to the problem and at the same time have the skills to solve problems. In line with this opinion, Panen said that problem-based learning is a learning strategy that brings students involved in the learning process that requires identifying problems, collecting data, and using the data to solve problems.

Case studies of problem-based learning include (1) presenting problems, (2) driving inquiry, (3) steps for problem-based learning, namely initial analysis, raising learning issues, independent interaction and problem solving collaboration, integration of new knowledge, presenting solutions, and evaluation. Mudlofir (2017) mentions the main characteristics of problem-based learning strategies, namely: Learning begins with a problem and the problems given relate to the real world; Organizing lessons around problems, not around disciplines; Giving great responsibility to students in shaping and directly carrying out their own learning process, within the framework of scientific thinking; Requires students to demonstrate what they have learned in the form of a product or performance. The syntax of the PBL model according to Arends in Mudlofir (2017) is as follows: Orientation of students to problems; Organizing students to learn; Guiding individual and group investigations; Develop and present the work; Analyze and evaluate the work.

Communication ability

Communication is an integral part of all human activities. As social beings who cannot live alone without other people, communication is very important. According to Naim & Gosling (2011) communication is the process of delivering messages by the communicator to the communicant. Communication can be interpreted as an interconnected event or dialogue that occurs in a classroom environment and results in the transfer of messages from one person to another. According to Cangara (1998), communication skills are a person’s ability to convey messages to audiences (recipients of messages).

Communication can be delivered in various forms and forms. According to (Chatab, 2007), communication skills are the ability to establish relationships through human communication channels or media, so that messages or information can be understood properly. Communication is not only about the process of conveying, but also involves aspects of listening effectively to decipher meaning, including knowledge, values, attitudes and concerns. According to Hall et al. (2003), communication skills are not abilities that are innate and do not appear suddenly, skills need to be learned and trained.

Communication purpose

The purpose of communication is to create a common understanding or change perceptions, even behavior. So that communication has a very important role in determining how effectively people work together and coordinate efforts to achieve these goals. According to Stanton (2007), there are four purposes of human
communication, namely: Influencing others; Build or manage interpersonal relationships; Finding different types of knowledge; Help others.

Communication is the exchange of information and conveying the meaning of a social system or organization. Communication skills are needed to achieve success in learning. Communication skills, students will easily communicate various things related to learning material, both orally and in writing. According to Jennerjahn et al. (2004) the purpose of communication is to create a common understanding or change perceptions, even behavior. Communication has a very important role in determining how effectively people work together and coordinate efforts to achieve goals. According to Porter et al. (2005) the purposes of communication include, namely: So that what we convey can be understood, as communicators we must explain to the communicant (receiver) as well as possible and thoroughly so that they can understand and acknowledge what we mean; Understanding other people; So that ideas can be accepted by others; Motivating other people to do something, moving something can vary, maybe in the form of activities.

Methods
This research model refers to the Borg & Gall research model which is adapted to the research context. The research steps according to Borg & Gall (1989) are (1) research and initial information collection (research and information collection), (2) planning (planning), (3) initial product development (preliminary development), (4) preliminary field test, (5) main product revision, (6) main field test, (7) operational product revision, (8) operational product test (operational field test), (9) final product revision (final and product revision), and (10) dissemination (dissemination and distribution), in this development process the researcher will only do 7 steps. The reason the researcher only did 7 steps, this is due to limited time, cost and research personnel. Learning design development will use the ADDIE model (Analyze, design, develop, implement, evaluate) so that when integrated, the stages of the ADDIE model enter the steps of the Borg and Gall research and development procedure.

Participant
The population in this study were fourth grade students at SD Alam Alkarim Lampung. Sampling was done using multistage random sampling technique. So the researchers took a random sample by choosing 2 classes from the existing population and obtained a sample, namely class IV Said bin Zaid, totaling 24 people as the experimental class and class IV Zubair bin Awwam, totaling 24 people as the control class.

Instrument
The instruments used to collect data in this study were (1) needs questionnaire (2) expert validation sheet (3) communication ability observation sheet, (4) student communication ability questionnaire sheet (5) educator response questionnaire sheet.

Data analysis
Feasibility test of problem-based learning design development
The feasibility test for developing the PBL model design was carried out using validation sheets from material experts, design experts and teachers as users. The data obtained were measured using a Likert scale. The score obtained is calculated using the equation:

\[ V = \frac{A}{B} \times 100\% \]

Information:

- \( V \) = Percentage value
- \( A \) = Score obtained
- \( B \) = Maximum score

The scores obtained are converted into the following assessment criteria:

<table>
<thead>
<tr>
<th>Criteria</th>
<th>Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>Very well</td>
<td>81-100</td>
</tr>
<tr>
<td>Good</td>
<td>61-80</td>
</tr>
</tbody>
</table>

Table 1. Criteria for assessing the feasibility of research products
**Validity of questionnaire questions**

This study uses a validity test with product moment correlation with rough numbers. The formula used is:

\[ r = \frac{\frac{1}{N} \sum_{i=1}^{N} X_i Y_i - (\sum_{i=1}^{N} X_i)(\sum_{i=1}^{N} Y_i)}{\sqrt{\left(\frac{1}{N} \sum_{i=1}^{N} X_i^2 - (\sum_{i=1}^{N} X_i)^2\right)\left(\frac{1}{N} \sum_{i=1}^{N} Y_i^2 - (\sum_{i=1}^{N} Y_i)^2\right)}} \]

Information:

- \( r \) = validity value
- \( N \) = number of test takers
- \( X \) = total test scores
- \( Y \) = total score criteria (comparison)

Classification of validity in the table as follows:

<table>
<thead>
<tr>
<th>Correlation number</th>
<th>Means</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.800-1000</td>
<td>Very high</td>
</tr>
<tr>
<td>0.600-0.800</td>
<td>Tall</td>
</tr>
<tr>
<td>0.400-0.600</td>
<td>At the moment</td>
</tr>
<tr>
<td>0.200-0.400</td>
<td>Low</td>
</tr>
<tr>
<td>0.000-0.200</td>
<td>Very low</td>
</tr>
</tbody>
</table>

*Source: Arikunto (2008)*

**Questionnaire reliability test**

Testing the reliability of this research is testing the reliability of communication skills instruments. The purpose of this test is to determine the accuracy of the measuring instrument used to measure. According to Arikunto (2019), it is stated that to measure the level of persistence of the questions, the Alpha Cronbach formula is used. Cronbach’s Alpha formula is as follows:

\[ r_{11} = \frac{n}{n-1} \left[1 - \frac{\sum s_t^2}{\sum s_t^2} \right] \]

Information:

- \( r_{11} \) = reliability coefficient
- \( n \) = number of questions
- \( l \) = fixed number
- \( s_t^2 \) = number of variants of goods
- \( St^2 \) = Total variance score

The reliability coefficient values obtained are interpreted with the reliability index in the following table:

<table>
<thead>
<tr>
<th>Reliability of test questions</th>
<th>Classification</th>
<th>Interpretation</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.00 - 0.40</td>
<td>Low</td>
<td>Revision</td>
</tr>
<tr>
<td>0.41 - 0.70</td>
<td>At the moment</td>
<td>Minor revision</td>
</tr>
<tr>
<td>0.71 - 1.00</td>
<td>Tall</td>
<td>Worn</td>
</tr>
</tbody>
</table>

*Source: (Arikunto, 2010)*
Effectiveness test

Effectiveness is the suitability of the person carrying out the task with the intended target, it can be said that effectiveness is related to the implementation of all main tasks of achieving goals, timeliness, and active participation of members. The following is the t-test formula according to Sugiyono (2015) which is used to test the effectiveness of communication skills as follows:

\[ t = \frac{X_1 - X_2}{\sqrt{\frac{(n_2 - 1)S_1^2 + (n_2 - 1)S_2^2}{n_1 + n_2 - 2} \left( \frac{1}{n_1} + \frac{1}{n_2} \right)}} \]

Results

Material expert validation

Material expert validation was carried out by two experts, who works as a teacher at SDN is also an alumni of postgraduate students at the University of Lampung. Based on the results of the analysis and the results of the validation of the material, there were several suggestions given by the material expert, so the researchers made several product revisions. The product revision results from the suggestions given by media experts are as follows:

<table>
<thead>
<tr>
<th>Not</th>
<th>Validator</th>
<th>Mark</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Material Expert 1</td>
<td>83.33</td>
</tr>
<tr>
<td>2</td>
<td>Material Expert 2</td>
<td>85.41</td>
</tr>
<tr>
<td>Average</td>
<td></td>
<td>84.37</td>
</tr>
<tr>
<td>Category</td>
<td></td>
<td>Very valid</td>
</tr>
</tbody>
</table>

Learning design expert validation

Validation of the learning design experts was carried out by two experts, namely the director and teacher at the Alkarim Natural School, and Mr. Roni Agus Saputra, M.Pd. who are teachers, lecturers and alumni from the University of Lampung.

<table>
<thead>
<tr>
<th>Not</th>
<th>Validator</th>
<th>Mark</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Design Expert 1</td>
<td>81.48</td>
</tr>
<tr>
<td>2</td>
<td>Design Expert 2</td>
<td>82.40</td>
</tr>
<tr>
<td>Average</td>
<td></td>
<td>81.94</td>
</tr>
<tr>
<td>Category</td>
<td></td>
<td>Very valid</td>
</tr>
</tbody>
</table>

Communication skill effectiveness test

The results of the effectiveness of communication skills in the questionnaire distributed to students using t-test data analysis, namely to analyze the effectiveness of students’ communication skills with the treated and untreated classes can be seen in the following table.

<table>
<thead>
<tr>
<th>Aspect</th>
<th>Control class</th>
<th>Experimental class</th>
<th>t-count</th>
<th>t-table</th>
</tr>
</thead>
<tbody>
<tr>
<td>Average</td>
<td>62.22</td>
<td>85.55</td>
<td>9.84</td>
<td>2.012</td>
</tr>
</tbody>
</table>

Based on Table 6 it is analyzed that t count = 9.84 Meanwhile, with a significance level of 5% and dk = (n1+n2)-2 = (24+24) - 2 = 46, so the t table is 2.012. Because the value of t count > t table (9.84 > 2.012) and a significance level of 5%, it is rejected and Ha is accepted. The achievement of student communication skills in grade IV SD Alam Alkarim can also be seen by using the student communication skill observation sheet. The student communication skill observation sheet was used to determine the level of achievement of students’ communication skills in the experimental class with 24 students and the control class with 24 students. This student communication ability observation sheet uses an assessment score, with 4 (four) alternative answers, namely: (1)
very good given a score of 4, (2) good given a score of 3, (3) enough to be given a score of 2 (4) less given a score 1
and using the rubric on the observation sheet. Students obtained the value of the communication skill criteria of
80.7%. The picture below is a histogram of the average value of the observation of students’ communication skills in
lessons 1 to 6.

![Histogram of average value of communication ability observations](image)

Figure 1 Average value of communication ability observations

Table 6 and Figure 1 show that the results of the observation of students’ communication skills in 6 lessons
obtained an average value of 24 students with a percentage of 80.07% in the "very good" category. The results of the
complete recapitulation can be seen in Appendix 6 on page 94. So it can be concluded that "The realization of an
effective problem-based learning model learning design to improve communication skills”.

Discussion

Validation sheets from material expert validators, learning design experts and practitioner experts show that
the problem-based learning model learning design developed theoretically is feasible to be used as an instrument in
learning and revision, so revisions must be made according to suggestions and comments from each validator. first.
before moving on to the next stage. The validity of the portfolio assessment instrument can be seen from each
validator with an assessment percentage of 83.16%. The percentage results show that each validator gives a value
with the "very feasible" criteria. The score from material experts is 84.38%, learning design experts are 81.94% and
practitioners are 100%.

Although the learning design of this problem based learning model only takes one of the themes and sub
themes in grade IV SD, it still does not reduce the value that the learning design of this problem based learning
learning model is one of the good alternative innovations, and can be used in learning. The learning design of this
problem based learning model is suitable to be used as a reference and companion for the development of subject
matter contained in the 2013 curriculum student book, because this learning design was designed and developed
referring to the 2013 curriculum.

Based on the effectiveness test using the t-test, communication skills using the problem based learning model
in the experimental class are higher than the control class which does not use the problem based learning model.
According to Sugiyono (2015) the t-test is a formula used to test the effectiveness of students’ communication skills.
The results of the calculation of the hypothesis test with the calculation of df = 46 and a significance level of
0.05 (5%) obtained the results of t-count = 9.84, while the t-table (0.05) = 2.012. Because t-count (9.84) t-table (2.012)
then Ha is accepted and Ho is rejected, so it can be concluded that there is a difference in the effectiveness of
communication skills using problem based learning models and those not using design development learning for
students. Class IV SD Alam Alkarim Lampung.

In line with Jaya et al. (2019), the results showed that the average results of evaluating students' mathematical communication skills in cycle I and cycle II after using the problem-based learning model were 80.21
and 85.17, respectively. cycles of 75% and 88.57%. By looking at the learning outcomes from cycle I to cycle II, there
was an increase in students' mathematical communication skills.

Based on the results of communication skills carried out using a questionnaire contained in the
communication skills indicators, there were differences in the improvement in the control class and the
experimental class. Based on the data obtained, the average communication ability on the questionnaire sheet
distributed at the end of the learning 6 control class was 62.22 and the experimental class was 85.55 and the
average communication skill on the observation sheet in each lesson obtained an average of 80 0 0.07% with very
good criteria, this shows that the development of learning design learning model problem based learning is effective
for improving students’ communication skills.
Conclusion
The learning design of the problem based learning model is effectively used in the learning process of the fourth grade students of SD Alam Alkarim Lampung to improve communication skills. It can be seen that based on the effectiveness test using the t-test, communication skills using the problem based learning model in the experimental class are higher than the control class which does not use the problem based learning model.

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Reference