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Modification of a Learning Cycle Model Based on Positive Learning Environment to Improve Primary School StudentsScientific Literacy

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ABSTRACT

This study aimed to develop an alternative science learning in primary schoolsto improve students'scientific literacy through a learning cycle model based on a Positive Learning Environment. This research used a model development approach that adopted Borg & Gall and ASSURE (A-Analyze Learners, S-State Objectives, S-Select Media and Materials, U-Utilize Media and Materials, R-Require Learner Participation, and E-Evaluate and Revise) model. This research analyzed student needs, set goals, selected techniques, media, and teaching materials, andencouraged student engagement. The study started withneeds analysis onGrade 5Primary School students and Natural Science teachers as homeroom teachers. The research sample was Grade 5 Primary School students at two (2) schools in Cirebon City. The total research sample was 57 respondents. The last stage of the research was implementing the Natural Science learning model,using *Siklus Belajar Berbasis Positive Learning Environment* (SIBELPOLEN), to improve students'scientific literacy.The study focused on: (1) developinga SIBELPOLEN forNatural Science learning for primary schools; and (2)optimizingSIBELPOLEN for Natural Sciencelearning to improve the scientific literacy of primary schoolstudents. Findings confirmed that the SIBELPOLEN model increased students' scientific literacyin two (2) *Madrasah Ibditaiyah*(MI) through the (a) eight (8) syntax stages and (b) free writing activities related to the learning experience.Learning outcomes (pre-test and post-test results) showed a 19-point increase in scientific literacy. Then, 31 students obtained medium category N-Gain, and 17 students received high category N-Gain. The N-Gain indicated that SIBELPOLEN increased students' scientific literacy. The N-Gain average (56.36) showed that the SIBELPOLEN model moderately improved Grade 5 students' scientific literacyattwo (2)MIin Cirebon City.

***Keyword**: Scientific Literacy, Learning Cycle, Positive Learning Environment.*

Introduction

One of the student learning outcomes on an international scale is scientific literacy. Scientific literacy is defined as a person's ability and competence in interpreting scientific knowledge, identifying and sorting problems, and drawing conclusions based on facts. The skills mentioned above improve self-control and decision-making process in daily activities. In line withthe Organisation for Economic Co-operation and Development (OECD) definition,scientific literacy explains the key to a successful learning process starting at the age range of 15 years(OECD, 2019). The age limitisadjusted to students' psychological development(Park, 2017)

This preliminary research produced researchers' observational data on Grade 5students in two (2)*Madrasah Ibditaiyah*(MI), namely MI An-Nur and MI PGM. The observational data showed that Grade 5 students were capable of memorization. However, the Grade 5 students had difficulty incontextualizing knowledge. The students tend to memorize as opposed to improvingthinking skills(Higher-Order Thinking Skills).Furthermore, science teachers emphasize abstract conceptualization instead of developing active experiments. Abstract conceptualization and functional experiments should be proportionally balanced(Pearson et al., 2010)

Following government regulations (Kemdikbud, 2016), science education's main objectiveis to encourage students' interest in science and instill scientific habits. The attitudes or values in the scientific process influence students' decision making to improve scientific knowledge.For instance, students may use scientific concepts and methods in daily activities and pursue a career related to science. An individual's scientific abilities contain attitudes such as trust, motivation, and self-understanding. Furthermore, an individual's scientific abilities possess positive values such as religiousness, social care, and discipline value.

The improvement of students' understanding of science, especially on science characteristics as scientific inquiry, and the awareness that science and technology may shape the environment, intelligence, and culture indicated an ideal science learning. Students may learn to observe and analyze their environment and enjoy the beauty and diversity of the environment. Furthermore, the students may become aware of the effect of one's action. Based on the ideas mentioned above, the researcher began developing a learning environment and positive learning experience.

This research's main objective was to innovate Primary School Natural Science learning to improve students' scientific literacy using *Siklus Belajar Berbasis Positive Learning Environment* (SIBELPOLEN). This research aimed to develop alternative Natural Science learning in response to Natural Science teachers' ongoing problems in Cirebon City primary schools. The Natural Science teachers could not create a positive and conducive learning environment to ensure students' comfort and happiness in science learning. Therefore, this research sought to innovate contextualization of knowledge relevant to students' environment. In line withKiener et al.(2014),this research aimed to optimize positive education and students' scientific literacy.

The research problems were as follows: (a) How to modify the development of Primary SchoolNatural Science Learning through SIBELPOLEN? (b) How may the application of Primary School Natural Science Learning through SIBELPOLEN improve students' scientific literacy?

Learning activities based on a positive environment may encourage students to improvescientific literacy through various activities,such as formulating questions, seeking an answer, and observing using the five senses. The students will receive information regarding the world around them. Furthermore, students will learn to describe, compare, classify and sort information, observation, and measurement results.Also, students learn to form concepts, draw conclusions, and find causal explanations. The students learn to use a critical approach to obtain information through experimentation, vision, or hearing(Gardner, 2011).

The researchers developed Natural Science learning to encourage teachers' innovation in improving student learning quality, providing appropriate scientific skills, and supporting student activity to create a suitable learning environment(Keown et al., 2020; Madden et al., 2014). Scientific literacy improvement is in line with science learning outcomes (Karatas & Baki, 2013)based on students score' in Natural Science (Levy et al., 2016). Furthermore, assessing student learning outcomes adheres to the minimum requirement of the 2013 Curriculum reference in Indonesia.

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Review of Related Literature

Scientific literacy-related literature stated the urgency of students' needs. Instead of focusing on science content, scientific literacy should focus on the learners' future(Arikan et al., 2016; Selmer et al., 2014). Previous research concluded that Natural Science learning at the Primary School level focuses on fundamental problems in science and its application to students' daily activities(Bahng & Lee, 2017; Weih, 2014).

In addition to understanding the concept of Natural Science, it is necessary to improve scientific process competence in primary schools(Schwartz & Lederman, 2000). (Schwartz & Lederman, 2000) stated thatLearning Cycle is one of inquiry-based learning. The learning cycle model has several activities to improve students' competency by encouraging active learning (Wilder, Melinda; Shuttleworth, 2004). The previous research finding is in line with the research development as described in this paper.

Several relevant studies(Adeniran & Smith-Glasgow, 2010; Calp, 2020; Kaarby & Lindboe, 2016; Liao & Wang, 2015)explainedthe nature of a positive learning environment suggested program development that requires primary school students active participation. Active and direct participation increases students' sensitivity to the importance of environmental preservation. According to Maryville University's researchers, several positive learning environment conditioning goals are closely related to Comfortability in Learning-Scale to improve a positive classroom learning environment(Kiener et al., 2014; Mikerova et al., 2018).

Australian Association of University Professorsestablished the Positive Learning Framework (PLF).PLF encourages teachers to create a positive learning environment for students with good classroom management. Furthermore, PLF influences and improves the quality of the education system.(Mcdonald, 2010)

The learning cycle's initial theory indicated that the learning cycle uses five (5) stages of the learning cycle(Bybee et al., 2006). There has been no modification related to the cycle stages. Previous research focused on the effect of the learning cycle on the learning process(Daşdemir, 2016; Krantz, 1996; Wilder, Melinda; Shuttleworth, 2004).

Researchers developed different learning cycle model compared to the previous research. Researchers modified the learning cycle based on a positive learning environment framework. The model development went through the following stages: Elicit (goal setting), Encourage (stimulate), Engage (student participation), Explore, Explain, Elaborate, Evaluate and Enjoy Reflection. Furthermore, the model used six (6) components of a positive learning environment frameworko0ii: security, shelter, social contact, symbolic identification, task mediation, and fun.

The researchers conducted the study adhering to the researcher's expertise. Furthermore, the researcher found that MI An-Nur and MI PGM often receive opportunities from the Science Olympiad program. However, inadequate facilities and incompetent teacher staff deter students from receiving the benefit of the program. Furthermore, there is a lack of enthusiasm in learning science.

The researchers developed a modification of primary school / MI Natural Science Learning through SIBELPOLEN to improve scientific literacy. The research sample was 57 Grade 5 students of MI An-Nur and MI PGM in Cirebon City.

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Research Method

This study used the research and development (R&D) method. The researchers modified the Borg & Gall model(Gall & Borg, 1989),namely preliminary study, planning, design development, limited product testing, revision, field test, revision of field test results, feasibility test, final revision, dissemination, and implementation. Furthermore, researchers modified the ASSURE development model(Smaldino et al., 2011)consisting of (a) learner analysis, (b) goal setting,(c) choosing the method, media/material, (d) using media and material,(e) enable student engagement,(f) evaluation,and(g)revision. The researchers conducted needs analysis on Grade 5 Primary School students and Natural Science teachers as a homeroom teacher. The researchers set goals referring to the three (3) domains in Bloom's taxonomy(Bloom & Krathwohl, 1956),namely cognitive, psychomotor, and affective, which reflect the positive attitude of students. The researchers adopted the Active Learning method and Critical Incident strategy to develop SIBELPOLEN. The objective of the Critical Incident strategy was in line with the Scientific Literacy Strengthening program. Furthermore, the researchers used the collaborative method adhering to the context in class. The researchers used simple tools and media to test the developed model.

The following figure describes the flow of the research:

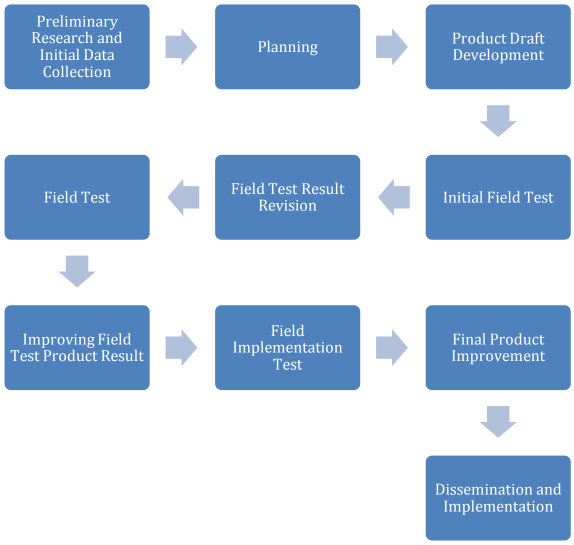

Figure 1. The Flow of Design Development

Participants

The research sample was 57 Grade 5 students and homeroom teachers intwo (2)primary schools, namely MI PGM and MI An-Nur in Cirebon City. The data collection used population, indicating that every event related to researchwas used as the purpose of the study(Suharsimi, 2013). Despite the large population in this research, the researcher did not take the entire population. The researcher chose a few classes as an experimental group out of the two schools' whole population.The researcher employed purposive sampling to obtain detailed data(Moleong, 2006).

Procedure and Instrument

Data collection used several methods. The first was observation where the researchers systematically recorded emerging symptoms on the research object at the research location. The observer was in the same placewith the research object. This method is widely known as participant observation or direct observation. The researchers observed teaching and learning activities at MI PGM and MI An-Nur Cirebon. The teachers employed the 2013 curriculum for teaching and learning activities. Furthermore, the researchers observed student responses to learning methods. The second data collection method was interviews, where theresearchers employed semi-structured interviews using guidelines. The third data collection method wasquestionnaire. The esearchers prepared a questionnaire for the teachers and Grade 5 students to obtain detailed information on classroom learning strategies. Furthermore, the questionnaire allowed researchers to receive response data on students' opinions and responses to teachers' teaching methods.

Data Analysis

Analysis involved expert assessment as well as small and large group experiments using qualitative descriptive analysis and quantitative descriptive analysis. The qualitative analysis processed data from education experts, material experts, small group, and large group experiments. The qualitative analysis technique employed responses, criticism, and suggestion in the form of a narrative. The quantitative descriptive analyses processed data from small and large group experiments. The quantitative analysis technique employed a description of values and data processing in values or numbers. The researchers analyzed pre-test and post-test of a small and large group experiment to determine the extent of students' scientific literacy improvement.

Findings

Based on observation result and needs analysis, the researchers found the following.

First, the teachers thought that they were not proficient and incapableof innovatingscience teaching. The teachers could not applyscientific theories, laws,and procedures in daily activities. Based on the researcher's observations, the teachers tend to be monotonous. The teachers used the available books. Furthermore, the teachers tended to use worksheets over the 2013 Curriculum student book and teacher manual. Therefore, teaching and learning activities merely concerned on cognitive perspective, forgoing psychomotor perspective, which potentially provides students with real experience. The teachers explained teaching content by relying on the worksheet.

Second, science learning activities focused heavily on theory and worksheets. For instance, the teacher merely used the lecturing method upon explaining the water cycle. Therefore, the students tended to grow bored quickly and failed to understand the relationship between science and the environment. According to previous researches, the relationship between science and the environment is crucial in increasing student understanding in a simple and concrete manner. Furthermore, students may apply theory and contextualize science laws in a relevant way for daily activities. The ability to apply theories and contextualize laws of science is crucial in the context of literacy studies.

Initial systematic observation data is described in the following table.

Table 1. Needs Assessment Observation

No	Aspect	Findings
1	Student	▪ Nearly 90% of students liked experiment related Natural Sciences material ▪ Students lacked the enthusiasm to do Natural Sciences worksheets.
2	Teachers	▪ Teachers relied on books during the teaching process. ▪ Teachers did not make daily learning design. Teachers tended to make weekly learning plan after the teaching and learning activities. ▪ Teachers lacked teaching strategy innovation.
3	Curriculum	▪ Teachers thought that the 2013 Curriculum was not comprehensive as the teaching material tended to be thematic. ▪ Despite often joining Science Olympiad, the school hads not incorporated science programs into school activity.
4	Support	▪ Lacked of parental support. ▪ Low facility and teachers competency in using surrounding environment as alternative learning media.

Results

Source: Observation data at MI PGM and MI An-nur

Researchers distributed questionnaires to teachers in the two (2) schools, namely MI An-Nur and MI PGM Cirebon City. About 90% of teachers did not know how to develop and apply learning strategies for teaching Natural Scienceusing concepts relevant to the 2013 Thematic Curriculum.

Based on observation data, Grade 5 students in MI An-Nur and MI PGM easily memorized Natural Science material. However, the students found it difficult in contextualizing their knowledge. Students were accustomed to using rote learning to quickly master science instead of improving thinking skills through Higher-Order Thinking Skills. The researchers considered that the Higher-Order Thinking skills should be pursued at primary school-age.

The students' and teachers'needs analysis is described in the following table.

Table 2. Student Product Needs Analysis Result

No	Description	Response Positive (%)	Response Negative (%)
1	Students understood the objective of learning activities	86	14
2	The teacher explained learning material through daily life context	57	43
3	Students actively did the worksheet or participated in group discussion	29	71
4	Teachers tended to use the lecturing method	91	9
5	Teachers taught science in a fun manner	33	67
6	Students had a better understanding of science through stories	71	29
7	Students preferred exercises using relatable and understandable examples	71	29
8	Students were interested in pursuing further knowledge on Natural Science material	95	5
9	Students preferred new learning method to accelerate Natural Sciences understanding	100	0
10	Students wanted their opinion heard by other students and teachers	100	0

Source: Student needs analysis at MI PGM and MI An-nur

Based on Table 2, 21 students stated that Natural Science teachers tended to focus on memorizing concepts or procedures (abstract conceptualization) and used lecturing methods. Furthermore, student-oriented learning techniques, such as experiments, projects, investigation, and observation were rarely used. Both lecture method and active experimentation ought to be balanced (Hewitt, 1999). Besides, Natural Science teachers did not explain and apply learning material appropriately. Furthermore, the Natural Science teachers did not accommodate systematic thinking to explain concepts or knowledge, nor provide appropriate examples based on the surrounding environment.

The researchers distributed questionnaires to students to determine an overview of the

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teachers' teaching process or style before and after model treatment. The result of the questionnaire is presented in the following table.

Table 3. Student Responses to Teacher Teaching Style

Time	Aspect	Σ student	Positive	Percentage	Negative	Percentage
Before Treatment	**Students' response to the teachers' teaching style**			**always-often**		**seldom-never**
	Explanation of the objective of learning	56	18	32.14	38	67.86
	Explanation using daily activities application	56	44	78.57	12	21.43
	Using active teaching style	56	6	10.71	50	89.29
	Using media/props	56	19	33.93	37	66.07
	Suitability between learning material and exercises	56	54	96.43	2	3.57
	Exercises use easy to understand example	56	15	26.79	41	73.21
	Average			**46.43**		**53.57**
After Treatment	**Students' response to the teachers' teaching style**			**always-often**		**seldom-never**
	Explanation of the objective of learning	56	48	85.71	8	14.29
	Explanation using daily activities application	56	50	89.29	6	10.71
	Using active teaching style	56	54	96.43	2	3.57
	Using media/props	56	53	94.64	3	5.36
	Suitability between learning material and exercises	56	50	89.29	6	10.71
	Exercises use easy understand example	56	43	76.79	13	23.21
	Average	56		**88.69**		**11.31**

Source: Questionnaire data at MI PGM and MI An-nur

Based on Table 3, 53.57% of students negatively responded to the teacher's teaching style as they tended to use student books and worksheets. On the other hand, 88.69% of students responded positively to the SIBELPOLEN Natural Science learning model. The students had a better understanding of literacy questions in narrative form. Furthermore, the students could remember and explain learning materials easier.

After conducting questionnaire analysis, the researchers analyzed the student characteristics through short interviews with the students and homeroom teachers. The researchers determined students' backgrounds using semi-structured interview guidelines.

Based on interviews with the principal, teachers, and Grade 5 homeroom teachers and direct observation of students during science learning activities, the researchers found: a) Teachers rarely innovated during Natural Science class due to time and space constraints. A classroom can accommodate up to 35 students.

> "Our class is always crowded. Since a class has 35 students, we use worksheets. The students will focus on the question and remain quiet without disturbing the other classes."

b) Teachers rarely asked questions related to literacy understanding as they tended to use worksheets without modification. c) Students tended to be passive and were less enthusiastic. They managed to provide a similar answer,indicating dull learning

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activity. d) The Natural The science curriculum used the revised 2013 Curriculum. However, teachers complained about the difficulty of its implementation. The teachers found the content of the curriculum was not comprehensive. e) Learning resources were mostly worksheets. The learning activity rarely used the teacher manual and student book provided by the government. f) There was a lack of variety and applicable learning media. Therefore, the students lacked the motivation to inquire and participate in Natural Science learning.

The result of the interview was in line with the result of literacy pre-rest and post-test. The result of literacy pre-rest and post-test is presented in the following figure.

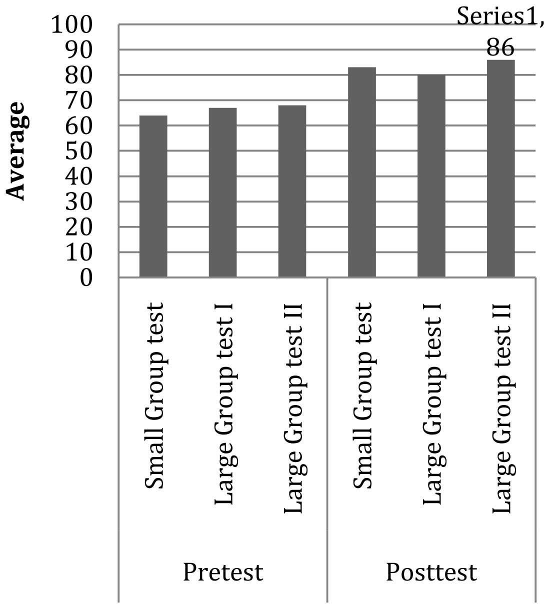

Figure1.Students' pre-test and post-test score recapitulations

Based on Figure 1, the pre-test and post-test scores in the Limited Test Implementation increased to 19 points. The pre-test and post-test scores of Group Test 1 increased by 13 points. The pre-test and post-test scores of Extended Group Test II increased by 18 points. Based on N-Gain recapitulation in Figure 1, 8 students obtained a low N-Gain category indicating no significant influence on the SIBELPOLEN treatment model. Furthermore, 31 students obtained moderate N-Gain category, and 17 students got high N-Gain category. The N-Gain showed that the SIBELPOLEN model increased the students' literacy understanding. The average N-Gain (56.36) indicated that the SIBELPOLEN model was moderately effective in improving the scientific literacy of Grade 5 Students at MI An-Nur and MI PGM in Cirebon City. The SIBELPOLEN model had fun strengthening activities and allowed the student to actualize themselves freely

According to Maslow's hierarchy of self-actualization concepts, children at a young age are easily impressed(Crain, 2015) and need to self actualize. An individual may self-actualize and find their hidden potential. Writing activities help students better understand and remember learning material (Slavin, 2005). SIBELPOLEN model demonstrated the fact through the Large Group Test. The researchers added literacy competence in the Large Group Test's lesson syntax.The SIBELPOLEN syntax is described in the following figure:

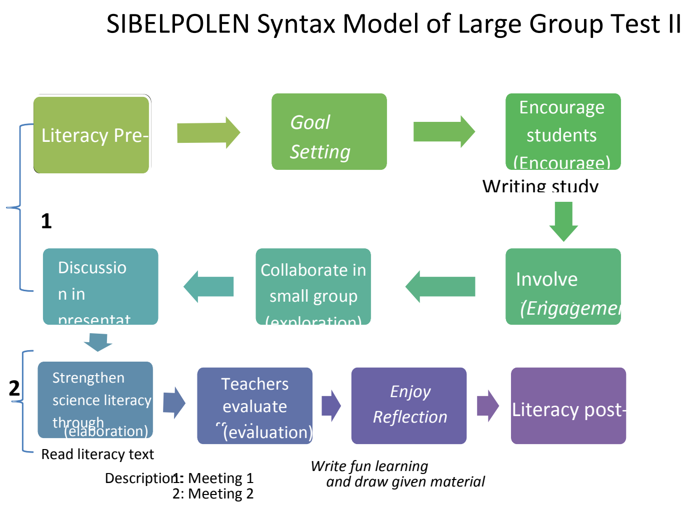

Figure 2. SIBELPOLEN Syntax Model of Large Group Test II

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Limitation

This research was limited to developing a Natural Science learning model. Furthermore, the model was not tested on other subjects within the scope of primary education. Therefore, it is necessary to carry out further studies. The research object was limited to two (2) schools. Consequently, it is possible to conduct future research in other locations and on the SIBELPOLEN model.

Discussion

The SIBELPOLEN model innovation consists of several elements: syntax, social systems, teacher roles, support systems, Instructional Impacts, and Nurturing Impacts. Students and teachers performed the SIBELPOLEN model through preparation, implementation, and final stages. The SIBELPOLEN Natural Science learning model has several stages and different characteristics depending on each element. The researcher adopted the Bruce Joyce and Marsha Weil learning model elements (Joyce et al., 2017), which are described as follows:

Syntax Model. The syntax is an important teaching structure in the process of teaching and learning. There are three(3) stages: Initial Activities (2 phases of Elicit & Encourage), Core Activities (4 phases of Engagement, Exploration, Explanation, andElaboration), and Final Activities (2 phases of Evaluation and EnjoyReflection).

Social System is interpreted as a learning atmosphere anda cooperative relationship between teachers and students.

The Teacher's Role in the early stage is to determine the problem and encouragestudents' enthusiasm. Teachers encourage students to be more creative and think critically through writing positive experiences.In the second stage, the teacher invites students to perform experiments and investigationsby providing new information. In the final stage, teachers control and monitor the learning process.

The Supporting Systemrequires optimal support from students, facilities, media, and a conducive environment. The supporting system in the SIBELPOLEN model is a set of adapted materials, teachers who understand the intellectual processes and learning strategies, alternative material to support the main material, learning designs or plans for implementing SIBELPOLEN, SIBELPOLEN guide books, SIBELPOLENScience Project Worksheets, and media/learning tools.

The Instructional Effectis an effect that will immediately appear on the learning process related to the SIBELPOLEN model. The instructional effect wasrelated to increasing knowledge of scientific concepts and their application in the student environment, contextualizing the theory with students' daily activities, students' positive response toSIBELPOLEN, active and critical student involvement, and a fun learning process.

The Nurturant Effectis a continuation of the Instructional Effect in students and learning objectives. The NurturantEffect relates tostudents actively participating in the inquiry process at the beginning of learning activities, concern for the surrounding environment, fun learning process, and enjoyment of

SIBELPOLEN Implementation in Class

The implementation stage is the stage of applying the SIBELPOLEN model in the classroom. The SIBELPOLEN implementation is described as follows.

The Preparation Phase

Several prerequisites were necessary to apply for SIBELPOLEN. The prerequisites were as follows. (1) Teachers encourage students to involve and arouse student curiosity by providing critical exercises(Ibrahim & Mahmud, 2020)relevant to daily life. (2) Teachers create a fun learning environment and a learning atmosphere free from bullying and ridicule. Encourage the student to appreciate class differences, forgoing

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labeling, and initial justification. Teachers respond to students' thoughts and words,conduct reflection and corrections, and summarize material/activities (shelter/nurturing). (3) Teachers can develop students' social skills using planned activities. For instance, group work involving interpersonal skills, teamwork, leadership, and responsibility. The group work emphasizes that teachers always invite discussion or exchange ideas with students (social contact). (4) Teachers build a class community to create an atmosphere of belonging to the class (symbolic identification).(5) Teachers create positive learning full of humor, enthusiasm, positive support, regular breaks, and enthusiasm.(6) Teachers encourage students to focus on working independently and obtain achievements involving the five senses in learning through discussions, group work, practicum, experiments, and projects (task instrumentality).(7) Teachers create a conducive environment for learning by arranging teaching materials around students' concentration periods(Syahrial et al., 2020). It is suggested that teachers provide a short break with humor/song/applause because the human brain can only concentrate for a short time or about 20 minutes(Gordon & Ledoux, 2008; Paulitsch et al., 2011; Raichle & Mintun, 2006).Teachers must provide an overview at the beginning, a summary at the end of the lesson, and review the material before the next lesson.(8) Teachers develop freedom of expression, self-confidence, respect for opinions (security/protection).

Learning Model Implementation Phase

The SIBELPOLEN preparation phase contains eight(8) contents of positive learning, and the implementation stage contains eight(8) learning steps. The SIBELPOLEN model ends with the final stage.

The researchers conducted experiments during the SIBELPOLEN implementation stage. A literacy pre-test and SIBELPOLEN learning model was done in the first meeting. At the second meeting, the researchers conducted learning by strengthening scientific literacy. Furthermore, the researchers conducted a literacy post-test. Based on the syntax flow model, the Small Group Test took two meetings. The first meeting started with a pre-test aimed at determining students' initial abilities related to literacy problems. The next meeting started with the implementation of the SIBELPOLEN model. The researchers conducted literacy strengthening during the Enjoy Reflection stage. The researchers asked students to write down pleasant and memorable experiences during Natural Science learning using the SIBELPOLEN model. Then, the researchers conducted a literacy post-test at the end of the second meeting.

The following step in the SIBELPOLEN implementation stage was conducted at the Large Group Test at two (2) MI schools, namely MI PGM and MI An-Nur in Cirebon city. Based on considerations during the Small Group Test, the researchers improved the model and the product. For instance, the module or teacher manual adhered to the instructions of the expert validator. The researchers conducted the Large Group Test I twice at MI PGM and MI An-Nur. The research sample was 57 students. In one class, researchers conducted pre-rest before implementing the SIBELPOLEN model. Theresearchers conducted a post-test after model implementation. The researchers aimed to determine the success of the model implementation in each experimental class.

Based on the Extended Test I (first), the researchers concludedit is necessary to add literacy exercise to one of the syntax stages in the SIBELPOLEN model to obtain significant improvement. The Large Group Test involved scientific literacy competency exercises from student worksheetsin the Natural Science teacher manual of the SIBELPOLEN model.

Based on Large Group Test II, there was a difference between the syntax flow of Small Group Test, Large Group Test I, and Large Group Test II in the literacy strengthening (in the Encourage stage, Elaboration stage, and Enjoy Reflection stage). The difference was related to literacy strengthening, namely reading literacy texts at the Elaboration stage and writing activities at the Enjoy Reflection stage. The addition of literacy content was to encourage students' familiarity with literacy exercises—for instance, writing learning experience in a descriptive narrative, reading literacy texts, and describing learning material.

Final Phase

The teachers conducted an assessment of the learning process to measure the achievement level of students' competencies. The assessment result was used to compile reports on the progress of learning outcomes and improve the learning process. The teachersmight carry out assessments according to their needs—for instance, observation of attitudes, knowledge test, and work/projects presentation.

Conclusions

The development of a Primary SchoolNatural Science learning model, through the implementation of the SIBELPOLEN model, improved students' understanding of scientific literacy in primary education. The development was conductedthrough the following stages.*First*, the SIBELPOLEN learning model was designed. *Second*, the teachers created a positive learning environment and prioritized a happy and memorable learning process. For instance,the teachers encouraged sharing pleasant experiences in writing activities before and after teaching and learning activities. Third, the Limited Test Implementation pre-test and the post-test score increased by 19 points.Test Group Ipre-test and the post-test score increased by 13 points.The ExtendedTest Group II pre-test and the post-test score increased by18 points. The N-Gain recapitulation obtained an average of 56.36%, indicating that SIBELPOLEN was moderately effective in improving the scientific literacy of Grade 5 students at MI An-Nur and MI PGM in Cirebon City.

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AVAILABILITY OF DATA AND MATERIALS

Information used and / or analyzed at multiple points of observation and data analysis can be requested from researchers in relation to affordable demand.

ABBREVIATIONS

SIBELPOLEN : Learning Cycle based on Positive Learning Environment

ASSURE :Analyze learners, State Objectives, Select method, media and material; Utilize media and materials Require Learner Participation; Evaluation and Revise

MI : Madrasah Ibtidaiyah

AUTHORS' CONTRIBUTIONS

The first author contributes to the process of collecting field data, studying the obtained data, developing models in the field, developing model syntax, interpreting data, and compiling research results. The second author contributed to the preparation of the research plan and checking the data validity. The third author contributed in evaluating the process of data analysis and review of research results.

ETHICS APPROVAL AND CONSENT TO PARTICIPATE

This research has been approved by the Universitas Negeri Jakarta Doctoral Program in Basic Education. Respondents volunteered to provide information (students and teachers).Data published by researchers were anonymous and researchers maintained confidentiality for all personal matters. The researcher obtained written permission from the respondent during the research.

CONSENT FOR PUBLICATION

Researchers look forward to fast track publication

COMPETING INTERESTS

The authors declare that they have no competing interests.

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