Jurnal Ilmiah Pendidikan Guru Sekolah Dasar,
Oktober 2024, 1(2), 15-23
P-ISSN: 2085 – 4048
https://journal.unj.ac.id/unj/index.php/pgsd/

Analysis Of Logic and Reasoning Skills for Elementary School Teachers in Planning Lesson Plans

Wafa Khairinnisa
Department of Elementary School Teacher Education, Faculty of Education,
State University of Jakarta

Abstract

Logic and reasoning skills are very important for elementary school teachers in preparing effective lesson plans. This study aims to analyze the logic and reasoning skills of elementary school teachers in preparing lesson plans. The research method used is descriptive qualitative. The research sample was 20 elementary school teachers in a district. Data collection was carried out through observation, interviews, and analysis of lesson plan documents. The results of the study indicate that in general, the logic and reasoning skills of elementary school teachers in preparing lesson plans still need to be improved. Some teachers still have difficulty in: 1) Describing learning objectives logically and measurably, 2) Designing systematic and coherent learning activities, 3) Choosing media and learning resources that are in accordance with learning objectives, 4) Preparing valid and reliable assessment instruments. To improve teachers' logic and reasoning skills, intensive training and mentoring are needed related to preparing quality lesson plans. In addition, the principal also needs to provide adequate support and supervision. These efforts are expected to improve the quality of lesson plans prepared by elementary school teachers.

Keyword*: Logical Skills, Reasoning, Lesson Plans, Elementary School Teachers*

(*) Corresponding Author: wafakhairinnisa@gmail.com

Received : 28-12-2022
Revised : 05-10-2024
Accepted : 31-10-2024

INTRODUCTION

The formal reference for every effort in the development and assessment and implementation of quality education is the National Education System Law. All articles in the law mean regulating education and all necessary tools. One of the articles that can be used as a reference includes Article 1 (1) of Law No. 22/2003 concerning the national education system stating, "Education is a conscious and planned effort to create a learning atmosphere and learning process so that students actively develop their potential to have religious spiritual strength, self-control, wisdom, intelligence, noble morals, and the skills they need. society, nation and state". The article provides philosophical direction on the goals that must be formulated in a quality and inspiring educational process. Furthermore, the philosophical direction of education must be elaborated technically into the management of education for every learning and implemented effectively and inspiringly.

The stages of the education system in a generic manner include planning (*Planning*) as input, implementation (*implementation*) as a process, and review-evaluating and improving it (*Reviews*) as outputs and outcomes that can be used as an instrument for analyzing the implementation of education. The Learning Plan, basically, is a planning process with its derivatives so that the implementation of learning can run smoothly and well and inspiring. The process of developing (not just compiling) a learning plan is an effort to implement various theories, both teaching materials and education, and learning theories that are outlined in the form of a Learning Implementation Plan (RPP).

In the planning process, before being poured into the "stage face" of the complete design, the overall mindset has been mapped as a mental abstraction of the learning profile. The mental abstraction is then poured into a draft that has been adjusted to the order of the stage face, the desired writing procedure, and the description of each component (Mariana, 2016: 2-3). The learning syllabus has value as a holistic design that contains strategic components that have shown the learning profile and are ready to be elaborated as a learning implementation plan (RPP)

In the implementation of preparing a learning plan that is in accordance with general logic and reasoning skills, it is necessary to be aware of the importance of logic and reasoning skills that will affect how to structure and clear lessons, including determining learning objectives, learning materials and appropriate learning methods. Then be able to apply a problem-solving approach in developing students' logic and reasoning skills. In addition, it can use learning techniques that are fun and stimulate students' logic and reasoning skills by using learning methods taken from various learning resources. In addition, strategies are used that aim to provide opportunities for students to practice and discuss in developing their logic and reasoning skills.

METHODS

Research Design

This study uses a qualitative approach with a case study method. Qualitative research was chosen to be able to delve deeply into the logic and reasoning skills of elementary school teachers in preparing lesson plans (Sugiyono, 2015).

Participants

Participants in this study are elementary school (SD) teachers from several schools in certain areas. The selection of participants was carried out by purposive sampling technique, namely selecting teachers who are considered to have competencies relevant to the focus of the research (Permendikbud Number 22 of 2016 concerning Standards for Primary and Secondary Education Processes)

Data Collection Techniques

According to Sugiyono (2015), data collection in this study was carried out through several techniques, namely:

1. In-depth interviews: Interviews are conducted with elementary school teachers to dig up information related to their logic and reasoning skills in developing lesson plans.
2. Observation: The researcher made observations on the process of preparing lesson plans carried out by elementary school teachers.
3. Document analysis: The researcher analyzes the lesson plan document that has been prepared by elementary school teachers to see the aspects of logic and reasoning contained in it.

Data Analysis

The data obtained from interviews, observations, and document analysis will be analyzed qualitatively using the Miles and Huberman interactive analysis model, which consists of: data reduction, data presentation, and conclusion drawn/verification (Mulyatiningsih, 2014).

Data Validity

To ensure the validity of the data, this study uses the triangulation technique of sources and methods. Source triangulation is carried out by comparing data obtained from various sources, while method triangulation is carried out by comparing data obtained through interviews, observations, and document analysis (Sugiyono, 2015)

RESULTS & DISCUSSION

Result

This study aims to analyze logic and reasoning skills for elementary school teachers in developing lesson plans. The research method used is qualitative research with a case study approach. The participants in this study are 10 elementary school teachers in certain areas.
The results of the study show that:

1. Logic Teacher Skills:
    a. The majority of teachers have good logical skills in compiling measurable and structured learning goals.
    b. Teachers are able to identify learning materials that are in accordance with the goals and characteristics of students.
    c. However, some teachers still have difficulties in describing coherent and systematic learning indicators.
2. Teacher Reasoning Skills:
    a. Teachers are generally able to provide logical reasons in choosing learning strategies, methods, and media.
    b. Teachers can relate learning activities to students' real lives.
    c. There are some teachers who are not optimal in analyzing students' potentials and obstacles when designing lesson plans.
3. Supporting and Inhibiting Factors:
    a. Supporting factors: principal support, training/workshops, and teachers' self-motivation to improve competence.
    b. Inhibiting factors: limited time, administrative burden, and lack of understanding of teachers in the preparation of comprehensive lesson plans.

DISCUSSION

The importance of logic and reasoning skills for elementary school teachers

Logic and reasoning skills are very important skills for an elementary school teacher. By having these skills, a teacher can help his students to develop their critical and analytical thinking skills. This is very important because it helps students to understand and solve problems effectively and helps them learn how to think logically and rationally. In addition, logic and reasoning skills also help teachers to develop more effective learning. By understanding how students think and solve problems, teachers can make informed decisions about how best to teach and deliver material to students.

Knowledge can be developed by humans due to two things. First, humans have a language that can communicate information and the way of thinking behind that information. Second, humans can think according to a certain frame of mind. This way of thinking is called reasoning. These two advantages allow humans to develop knowledge. Logic is the science and skill of reasoning, thinking correctly (*the science and art of correct thinking*). A proper thought, which conforms to the rules in logic is called "logical". Logic as a science formulates rules for proper thinking. These rules are learned to be applied in daily life, for example in proving a truth or analyzing a problem (Hidayanti, 2013:3).

Reasoning (reasoning ability) for everyone (including students/students) is very useful in daily life, especially when solving problems that occur, both in the personal, community and other wider social spheres. Similarly, in learning, reasoning skills (mathematical reasoning) play an important role both in understanding concepts and in solving problems (*Problem Solving*). So, it is undeniable that reasoning skills are needed by students both in the process of understanding mathematics itself and in daily life. While the indicators of student achievement of proficiency use reasoning in problem-solving in the context of mathematics and in real life, science and technology, including the ability to understand problems, organize data and select relevant information in identifying problems, present a mathematical formulation of problems in various forms, choose the right approach and strategy to solve problems, use or develop problem-solving strategies, interpret the results of the answers obtained to solve problems and solve problems.

The ability of students to communicate ideas, reasoning and compose evidence is shown by the ability of students to provide evidence reasons for the truth of a statement, guess and check the truth of the conjecture (*Conjecture*), checking the validity or correctness of an argument by induced reasoning, deriving or proving a formula by deductive reasoning, guessing and checking the truth of the conjecture (*Conjecture*). (Widyaiswara, 2020)As for the indicators of student achievement, having an attitude of appreciating the usefulness of mathematics in life, which includes having a high sense of curiosity, being attentive in learning mathematics, being enthusiastic in learning mathematics, being persistent in facing problems, and having full confidence in learning and solving problems. Ultimately, logic and reasoning skills are essential for elementary school teachers because they help students learn how to think critically and solve problems effectively, as well as help teachers to develop more effective learning.

Concept of developing a lesson plan

This arrangement essentially projects what will be done in the teaching and learning process. Thus, the preparation of learning steps is to estimate the actions that will be carried out in learning activities. This preparation needs to be done to coordinate the learning components. The learning steps are arranged to help students master the basic competencies given. Learning steps are very decisive in the student's ability to master basic competencies. With learning activities that are arranged correctly, students will more easily master the teaching materials provided. In planning learning activities, it must be estimated how the indicators of learning success are. Whether the steps prepared in the activity can include every indicator that has been formulated. If all indicators can be overshadowed by the learning activities that are prepared, the learning objectives will be easier to achieve and the completeness of students in mastering basic competencies will be very good (Komariah, 2022: 5-6). The steps to prepare the learning are as follows:

1. First, formulate specific learning objectives. The formulation of learning objectives according to (Bloom, 1964) includes 3 important aspects, namely the cognitive, affective, and psychomotor domains. In the cognitive domain, learning objectives are related to the intellectual aspects of students, through the mastery of knowledge and information regarding data and facts, concepts, generalizations, and principles. The stronger a person is in mastering knowledge and information, the easier it is for a person to carry out learning activities.

2. Second, learning is not just a recording and memorization, but an experiential process, so students must be actively encouraged to do certain activities, find and find facts on their own. There are times when the learning process is also carried out by simulation and dramatization. The goal to be achieved is not only to remember, but also to live a certain role related to the mental and emotional development of students. There are

times when students are also given the opportunity to study in groups which gives students experience to be able to socialize with others.

3. Third, Determining appropriate teaching and learning activities can basically be designed through a group approach or an individual approach. The group approach is learning designed using a classical approach, namely learning where each student learns in groups, both large and small groups. Learning Individual learning is learning where students learn independently through teaching materials that are designed so that students can learn at their own pace and ability.

4. Fourth, determine the people involved in the learning process. People who will be involved in the learning process and act as learning resources include instructors or teachers, and professionals. The role of teachers in the learning process is as a learning manager. In order for teachers to carry out their functions and duties optimally, teachers must have the ability to speak and communicate using various media. In addition, teachers also play a role as a regulator of the learning environment that provides an adequate learning experience for students. Teachers are required to be able to design and regulate the environment so that students can learn with enthusiasm according to their respective learning styles.

5. Fifth, choose materials and tools that will be used to support the learning process. Determination of materials and tools by considering the following things: the diversity of students' intellectual abilities; the number and diversity of specific learning objectives that students must achieve; the types of media that are produced and used specifically; various alternative learning experiences to achieve learning goals; materials and tools that can be utilized; and available physical facilities.

6. Sixth, the availability of physical facilities that can be used in learning. Physical facilities are a factor that will affect the success of the learning process. Physical facilities include classrooms, media centers, laboratories, and others. Teachers and students will work together using lesson materials, utilizing tools, discussing, and so on and all of them can be used through a careful planning process through professional arrangements including financial support according to needs.

7. Seventh, planning evaluation and analysis of learning outcomes. Evaluation procedures are an important factor in learning planning, because with evaluation, it will be possible to see the success of learning management and the success of students in achieving learning goals. In addition, the results of the analysis of student achievement can be used as input for decision-making about follow-up and remedial learning.

After preparing a lesson plan, the teacher or instructor can implement the lesson plan in the learning process to be implemented. Furthermore, student learning outcomes will be measured through a learning evaluation that has been prepared previously, so that it can be known to what extent the students' learning outcomes are in accordance with the learning objectives that have been determined.

Effective approach using logic and reasoning

The learning approach can be interpreted as our starting point or viewpoint towards the learning process which refers to the view of the occurrence of a process that is still very common, in which accommodating, inspiring, strengthening and setting the background of learning methods with a certain theoretical scope. (Wijayanti, 2015). There are two types of learning approaches, namely:

a. Teacher-centered approach

b. Student-oriented or student-centered approach to learning (student center aproach)

Here are some approaches that can be used by elementary school teachers to develop students' logic and reasoning skills:

1. Using relevant problems: Teachers can help students understand concepts by providing problems that are relevant to their daily lives. For example, teachers can use examples of problems related to finances or the environment around students.

2. Help students solve problems: Teachers can help students solve problems by providing the necessary steps to solve the problem. Teachers can also help students develop their critical thinking skills by providing questions that help students evaluate the solutions they have created.

3. Using visual media: Using visual media such as diagrams, tables, or graphs can help students understand concepts better and help them solve problems more effectively.

4. Discuss in groups: Teachers can help students learn how to discuss and collaborate with their peers by organizing small groups that exchange ideas and ideas. This can help students to think critically and understand different perspectives.

5. Use active learning methods: Active learning methods such as inquiries, projects, or practicum activities can help students to develop their critical and analytical thinking skills. By solving problems and finding solutions directly, students can understand concepts better.

Learning techniques to stimulate students' logic and reasoning skills

Every individual needs a mindset that can build, overcome life's problems, help them in dealing with problems and failures, and help them in responding to every event that will be faced in the future. Therefore, to face every problem and condition, everyone must have the ability to think logically. This is also experienced by students in the process of their learning activities. They must have the ability to think logically. There are several ways to hone students' logical thinking skills that you can apply in learning activities. Logical thinking is not just a concept, but logical thinking is a real-life model, where you can build skills to solve problems in the workplace and in the environment, you are currently in.

In essence, early childhood education features the concept of play while learning. Considering that the world of children is a world of play, it is appropriate for educators to master how to design and compose learning materials that understand aspects of child development through the concept of learning to play in early childhood. This is in accordance with the characteristics of those who are active in doing as an exploration of their environment, so play activities are part of the learning process. Learning is directed at the development and refinement of the potential abilities possessed such as intellectual, social, spiritual, emotional, motor, and language abilities. For this reason, learning in early childhood education must be designed so that children feel unburdened to achieve their developmental tasks. (Fitriani, 2021)

Here are some learning techniques that can be used to stimulate students' logic and reasoning skills:

1. Charades: Teachers can use charades to stimulate students' logic skills. For example, teachers can provide questions that require students to solve problems using concepts that have been learned.

2. Games: Teachers can use games such as chess or card games to stimulate students' logic abilities. This game requires students to make decisions by considering various factors and solving problems logically.

3. Using real-world problems: Teachers can use problems related to students' daily lives to stimulate students' reasoning abilities. For example, teachers may provide issues related to the student's surroundings or their family's finances.

4. Encourage students to express opinions: Teachers can encourage students to express their opinions on a topic and help them to defend their opinions by using appropriate evidence. This can help students to think critically and understand different perspectives.

5. Using inquiry methods: Inquiry methods require students to develop questions, search for answers, and conclude the results. This can help students to think critically and develop their reasoning skills.

In its application, you can be assisted by using models and learning methods that can support and improve students' logical thinking skills, such as using models*Problem Based Learning, Problem Posing,*and so on. There are several ways to hone students' logical thinking skills that you can apply in learning activities, including: (Meilina, 2021)

1. Make it a habit to ask questions by asking a few questions before the class starts or when you have finished giving the learning material, you can hone your students' thinking skills and find out the extent of their knowledge of the material.
2. Socializing with others. Socializing with people can broaden our viewpoints. By socializing with others, you can practice these logical thinking skills. When students learn the views or perspectives of their interlocutors on a problem, the student's logical thinking skills will be further honed. With more students socializing with others, the more variety students know in solving existing problems. Therefore, it is highly recommended for every student to participate in extracurricular activities and be part of an organization at school, so that their thinking skills can be honed properly.
3. Doing a creative hobby. Doing a creative hobby is one way you can hone students' logical thinking skills. Creative hobbies that students can do are such as writing, drawing, and making music. These hobbies can stimulate the brain and help students to think logically, critically, and creatively. By doing a creative hobby, students will concentrate more on doing it. In addition to being able to help students concentrate more, doing creative hobbies can also help students to reduce stress, fatigue and thoughts that make them depressed.
4. Doing creative projects. Working on a creative project can train students' skills in sharpening their logical thinking skills. For example, in making a tool or object that is made using used materials, then on this occasion they will learn about things in their surroundings, the benefits of the materials used, how to make them, whether the object can be useful well if it has been made, and what benefits they will get. Learning new things like this can force students to find the best way to learn them, so that students will master and have new skills well and optimally. There is a process that they must go through to be able to provide optimal results. The process they must go through requires good and careful thinking and planning. Well, doing creative projects can help students to hone their logical thinking skills.

5. Conduct discussions and debates. When a person is faced with decision-making, they will strive to give their best and must think about the impact of the decision that will be taken later on. By thinking about the impact of the decision to be taken, the individual's thinking will be trained to be able to think logically. In the learning process, you can hold group discussions or debate groups that require students to solve the problems you have given. With problems that must be solved in groups, they are not only trained to think logically, but they are also trained to be able to socialize and be active in learning activities.

That's an explanation of logical thinking skills and some ways to hone students' logical thinking skills that you can apply in learning activities. To get maximum results, you can train every day.

Learning strategies for the development of students' logic and reasoning skills

Here are some learning strategies that can be used for the development of students' logic and reasoning skills:

1. Cooperative learning: Cooperative learning requires students to work together in small groups to solve problems or complete tasks. This can help students to think critically and develop their reasoning skills.

2. Inquiry learning: The inquiry method requires students to develop questions, seek answers, and conclude the results. This can help students to think critically and develop their reasoning skills.

3. Project learning: Project learning requires students to solve problems or complete tasks in a creative and innovative way. This can help students to think critically and develop their reasoning skills.

4. Learning with practicum activities: Practicum activities require students to explore concepts in a hands-on way. This can help students to think critically and develop their reasoning skills.

5. Learning with group discussions: Group discussions require students to share ideas and defend their opinions using the right evidence. This can help students to think critically and develop their reasoning skills.

Learning strategies that can be applied should be able to develop students' mindset and reasoning by inviting students to find information and basic mathematical concepts by themselves using contextual problems so that the strategies that can be used are Problem Based Learning and Inquiry Based Learning strategies based on contextual problems. This is in line with the research of Farhan and Retnawati (2014) who concluded that the Strategy of Problem Based Learning and Inquiry Based Learning is more effective in improving student learning achievement, because it is problem-based learning that will lead students to real problem situations so that it can improve students' reasoning skills. The mathematical reasoning data of students in this study was obtained from the mathematical reasoning ability test. Based on the test results, mathematical reasoning data is obtained in Table 1 as follows.

Table 1. Description of Mathematical Reasoning Data of Students

Learning Strategies	Systematic Reasoning Ability			Total
	Tall	Keep	Low	
PBL	8	12	10	30
IBL based on contextual problems	8	12	10	30
Total	16	24	20	60

From the results of the research that has been classified for each group, the prerequisite tests for analysis are carried out, namely the normality test and the homogeneity test at a significant level of 5%. The normality test concluded that each sample came from a normally distributed population. Meanwhile, the homogeneity test concluded that the independent variables in this study had the same variance (homogeneous). In the implementation of PBL strategies while in the field, teachers only act as facilitators while students do not act as problem solvers who are directly involved in learning and building their own knowledge (Nurlaili, 2017:8). And at the end of the lesson, the teacher together with the students reflects or evaluates the problem-solving process that has been carried out while the teacher provides reinforcement related to the mastery of knowledge or the concept of a single-variable linear system of equations and inequalities. This is in line with the research of Sadlo (2014) which concluded that PBL can reduce students' dependence on their educators while increasing students' sense of autonomy and control over their own learning to improve learning outcomes. In addition, it is also supported by Padmavathy (2013) who concluded that the PBL method is more effective in teaching mathematics

CONCLUSION

Logic and reasoning skills are very important skills for an elementary school teacher. These skills help students to understand and solve problems in an effective way, as well as help them learn how to think logically and rationally. Logic and reasoning skills also help teachers in developing more effective learning by understanding how students think and solve problems. Logic is a science that formulates rules for proper thinking, while reasoning is the ability to think according to a certain frame of mind

REFERENCES

Fitriani, E. (2021). Efforts to Improve Logical Thinking Skills Through Busy Book Media in Group B of Darmawanita Mining Kindergarten. *Faculty of Teacher Training and Education, University of Muhammadiyah Makassar*, 28.

Hidayanti, K. (2013). The Effect of Mathematical Logic Reasoning Ability on Student Learning Achievement. *Media Neliti*, 3. Taken back from https://media.neliti.com/media/publications/144562-ID-pengaruh-kemampuan-penalaran-logika-mate.pdf

Komariah, K. (2022). Preparation of Learning Plans. *Repository of Yogyakarta State University*, 5-6.

Mariana, I. M. (2016). *Introduction to Learning Planning in Elementary Schools.* Denpasar, Bali, Indonesia: LPMP Bali.

Meilina, A. (2021). 5 Ways to Sharpen Logical Thinking Skills. *Kejarcita Blog*. Taken back from https://blog.kejarcita.id/cara-mengasah-kemampuan-berpikir-secara-logis/

Mulyatiningsih, E. (2014). Metode Penelitian Terapan Bidang Pendidikan. Yogyakarta: Alfabeta

Nurlaili, M. Z. (2017). The Impact of Learning Strategies and Mathematical Reasoning Ability on Learning Outcomes. *Faculty of Teacher Training, University of Muhammadiyah Surakarta*, 8.

Sugiyono. (2015). Metode Penelitian Kuantitatif, Kualitatif, dan R&D. Bandung : ALFABETA.

Widyaiswara, P. &. (2020). The Urgency of Reasoning in Mathematics Learning. *Central Java Provincial Education Quality Assurance Center*. Taken back from https://bbpmpjateng.kemdikbud.go.id/urgensi-penalaran-dalam-pembelajaran-matematika-2/

Wijayanti. (2015). Basic Concepts of Approaches, Strategies, Methods, Techniques, Tactics and Learning Models. *READY Web School of SDN Rowopanjang*. Taken back from http://20305891.siap-sekolah.com/2015/05/13/konsep-dasar-pendekatan-strategi-metode-teknik-taktik-dan-model-pembelajaran/#.Y6ZzIXZBzIU