Analysis of teacher's ability in planning and implementing learning on vibration, wave and sound submaterials

N A Azizah1*, S Sukarmin2, and M Masykuri3

1Science Education Study Program, Faculty of Teacher Training and Education, Universitas Sebelas Maret, Indonesia
2Physics Education Study Program, Faculty of Teacher Training and Education, Universitas Sebelas Maret, Indonesia
3Chemistry Education Study Program, Faculty of Teacher Training and Education, Universitas Sebelas Maret, Indonesia

*nurulvianiazizah@studen.uns.ac.id

Abstract. Submaterial vibration, waves and sound in junior high school science learning has high complexity. Teachers must not only master the material, but also they must be able to plan and implement the learning process. This study aims to analyze the ability of teachers to plan and implement learning on vibration, wave and sound material. This research is descriptive with a qualitative approach. The data collection techniques involved assessment of the lesson plans and observation of learning implementation to obtain the primary data. The secondary data are sourced from lesson plans, teacher and student interviews. Data were qualitative analyzed. Based on the analysis of the learning process shows that (1) the ability of teachers to make lesson plans in terms of format in accordance with aspects of the assessment of IPKG-1 with a score of 79.97% in the category is quite good. Lesser lesson planning indicators include learning objectives, methods, and procedures. learning plan (RPP) is not in accordance with the syllabus (2) the ability of teachers to apply is in accordance with aspects of the assessment of IPKG-2 with a score of learning implementation of 79.5% in the good enough category. Indicators of poor learning implementation are directing students to 21st century skills and lack of application of basic competencies

1. Introduction

In this 21st century era there were many paradigm changes globally both in terms of way of life, information, knowledge and technology [1]–[3]. These changes will lead to many new demands in the world of education [3], [4]. The demand in education today is able to produce individuals to compete in the 21st century era [3], [5]. This demand is focused on the ability of students to use their knowledge and skills to meet real life challenges [2], [6], [7]. In education 21 century skills can be developed such as thinking skills, collaboration, communication and creativity [8]–[11]. These various skills are a process and behavior of students that are integrated to learn and understand the content of learning materials. In ignition the teacher has an important role to direct the 21st century skills [7], [12].

Teachers as agents of change in the world of education need to develop their abilities with knowledge, skills and expertise. Teachers are required to be able to produce students who have high competence and
are ready to face life's challenges with high confidence and self-confidence through meaningful learning processes that they themselves experience so as to be able to apply their knowledge in daily life [4], [6], [12], [13]. Meaningful learning is a process of linking new information to relevant concepts contained in a person's cognitive structure [14].

Teachers have a very important role in realizing national education goals that are tailored to schools, students and the environment. Therefore, the teacher as the organizer of the activity must organize and direct good learning activities [13][15]. Teachers must be able to design their own learning plans based on the curriculum that has been created by the government [6] [13].

According to the Republic of Indonesia Minister of Education's Regulation No. 41/2007 About Process Standards for Elementary and Secondary Education Units, the first step in learning according to process standards is the learning planning that is realized by preparing the lesson plans. In general, in developing lesson plans must be guided by the principles of developing lesson plans, which are as follows: 1) Competencies planned in the lesson plans must be clear, concrete, and easy to understand. 2) Lesson plans must be simple and flexible. 3) Lesson plans developed is comprehensive, complete, and clear in its achievements. 4) Must coordinate with the implementing components of the school program, so as not to interfere with other school hours [16].

Lesson plans have benefits in the teaching-learning process, namely: (1) as a direction for activities in achieving goals; (2) as an archetype in regulating the duties and authorities for each element involved in the activity; (3) as a work guideline for each element, both teacher and student elements; (4) as a measure of whether or not a work is effective, so that at all times the accuracy and delays in the work are known; (5) as material for data preparation so that there is a work balance; (6) as a saver of time, energy, tools and costs. Therefore learning is carried out in accordance with teaching programs that have been made previously in the form of learning implementation design [17]. Learning planning will determine the quality of learning carried out. If planning is good then learning will be good too [18].

A good learning process is a process where learning is fun, students have active control on learning, creative, and be able to solve problems given to learning, and can also be supported by learning models delivered by the teacher [18], [19]

2. Methods
This research is descriptive with a qualitative approach. The data collection techniques involve of assessment of lesson plans and observations of the learning implementation to obtain the primary data. The secondary data are sourced from the lesson plans, teacher and student interviews. Data collection techniques related to lesson plans made by teachers and learning implementation the use of the teacher performance assessment 1 ((IPKG-1) and implement learning using the teacher performance assessment (IPKG-2). The population and sample in this study were 3 science teachers and 3 class VIII lesson plans in 3 junior high schools in the city of Surakarta.

3. Result and Discussion
Based on the results of research conducted in three junior high schools in Surakarta city the obtained of three lesson plans on the sub-material vibration, waves and sound. The results show that the teacher's ability to lesson plans using the teacher performance assessment 1 (IPKG-1) and implement learning using the teacher performance assessment (IPKG-2). The results show that the teacher's ability has referred to the aspects of assessment in the IPKG to make lesson plans scores 77.97 % in the quite good category and the ability to implement learning scores 79.5 % in the quite good category. The obtain lesson plans scores and learning implementation are described in Figures 1 and 2. While the average percentages for each lesson plans indicator are explained in table 1.
Figure 1. Score Acquisition of Lesson Plans

![Score Acquisition of Lesson Plans](image)

Table 1. Indicator of Lesson Plans Score

| Indicator of Lesson Plans Assessment | Ideal Percentage | Lesson Plans Percentage | GAP |
|-------------------------------------|------------------|-------------------------|-----|
| Learning Objectives                 | 7,14             | 3,87                    | 3,27|
| Learning Submaterials               | 10,71            | 10,12                   | 0,59|
| Learning Methods                    | 7,14             | 4,76                    | 2,38|
| Procedures                          | 39,3             | 30,35                   | 8,95|
| Tools / Materials / Learning Resources | 14,29           | 11,6                    | 2,69|
| Assessment                          | 10,71            | 8,34                    | 2,37|
| General Impression of Learning      | 10,71            | 8,93                    | 1,78|
| Total                               | 100%             | 77,97%                  |     |
Based on Table 1, it shows that the lesson plans indicators that have the highest GAP are the objectives, methods, and procedure. With learning objectives 3.27, learning methods 2.38, and procedures 8.95.

In the basic competencies, learning objectives indicators and learning indicators that are made are still not referring to basic competencies 3.11 Analyzing the concepts of vibration, waves, and sounds in daily life include the human hearing systems and sonar systems in animals and 4.11 Presenting the results of experiments on vibrations, waves, and sounds [20]. This is shown in lesson plan 1 namely 3.10 Understand the concepts of vibration, waves, sound and hearing, and their application in the sonar system in animals and in daily life's and 4.10 conduct observations or experiments on vibration, waves and sounds. Conformity between basic competence, indicators and learning objectives in lesson plans 1 has not yet reached the realm of analysis (C4) and inclusion of learning objectives.

Learning method indicators in lesson plans 1 not include the models and methods used, while in lesson plans 3 there are 2 learning models used namely direct instruction and cooperative learning, while learning methods that are used vary such as lectures, discussions, questions and answers, experiments, and demonstrations. The variety of learning models and methods used can increase student interest, motivation, and involvement, and students are better prepared for activities in the classroom [21].

While the indicators of teacher learning steps use scientific 5 M, namely observing, asking, collecting data, associating and communicating. In the lesson plans 1 initial activity section there is no direction about learning activities. In the learning step in lesson plans 1,2,3 less emphasis on 21st century skills namely creativity, critical thinking, communication, and collaboration. The best learning is takes place emphasis on 21st century abilities so that at the same time as learning they will be trained in how to think and solve problems [11], [22].

Analysis of the suitability of the lesson plan with the learning process is based on the suitability of the lesson plan made by the teacher with learning in the classroom. Analysis of the suitability of the implementation of this learning is 3 teachers with each 1 school 1 teacher. The average acquisition of teachers in the implementation of learning is 79.5%. As for the percentage of each teacher in the implementation of learning is explained in figure 2, while the percentage of learning implementation indicators is explained in table 2.

| Table 2. Indicators of the teacher performance assessment 2 (IPKG-2) Learning Implementation |
|------------------------------------------------------------------------------------------------|
| **Indicators of the Teacher Assessment Learning Implementation** | **Ideal Percentage** | **Learning Implementation Percentage** | **GAP** |
| Initial Activity | 20 | 16.25 | 3.75 |
| Core Activity | 70 | 53.3 | 16.7 |
| End Activities | 10 | 10 | 0 |
| Total | 100% | 79.55% | |

In the initial activity indicator there is a gap of 3.75, and 16.7 core activities. when the beginning of learning the teacher does not explain the learning objectives at the meeting, so students do not know what they need to learn on that day. The teacher gives questions before starting the lesson related to the material so students can explore their ability to think and know the subject matter that will be explained by the teacher [23][24].

At the core activity in explaining the subject matter the teacher mastered the material well. The teacher gives examples in the environment and daily life's so students quickly understand and apply them [6][13][11]. However, in presenting material in class the learning steps are not in accordance with the
planning steps that have been prepared in the lesson plans, so that the material presented is only in basic competencies. 3.11 while 4.11 is not done.

The learning materials used are science books published by the Ministry of Education and Culture and student worksheets lent by schools. This teaching material helps students in understanding the material in addition to getting an explanation from the teacher in learning activities [25]. Information obtained from various sources can increase student knowledge and can develop students' reasoning power. So, if students have difficulty in learning students can ask for an explanation from the teacher who functions as a mediator. The teacher gives questions to students and some students respond and some don't respond. The teacher holds a discussion but the discussion is not conducive. Through discussion in learning can prove to make students critical, have a positive influence on a variety of student outcomes, including academic and cognitive development, clarity of educational goals, interpersonal skills, and openness and tolerance for diversity [26]–[28].

The teacher's ability to open and close learning already includes aspects of assessment in the teacher performance assessment 2 (IPKG-2). After explaining the learning material the teacher gives the opportunity to ask students and answer the question. Then the teacher also concludes learning activities with students so students can recall important material concepts. The teacher provides information about learning materials for the next meeting and gives assignments to students. From the description above it can be concluded that the teacher's performance in implementing learning in the quite good category.

Based on teacher and student interviews when learning is rarely carried out practicum activities due to limitations of tools and laboratories, because laboratories are used for classrooms. In these learning activities learning is still dependent on teachers while tend student to be passive in learning so that 21st century students' skills are not optimal. Student-centered learning, the teacher usually acts as a facilitator to help students. If students are active then in learning they can recognize, design, and develop new activities for themselves and each other with the aim of meeting the learning needs of students identified individually especially the needs of the 21st century and so as otherwise if students are passive then the tendency that appear is usually difficult for students in understanding and developing its activities [29]–[32].

4. Conclusion
The conclusion in this study is the percentage of Teacher's Ability in planning learning is 77.97% is quite good. With an average indicator that is lacking is learning objectives 3.27, learning methods 2.38 and learning steps 8.95. While the implementing learning 79.5% in the category is quite good. Learning is not in accordance with the implementation plan of learning (RPP), learning is still a teacher center and 21st century skills are still lacking.

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