# Monitoring the Characteristics of High School Physics Learning Devices Refers to the 2013 Curriculum Content and Process Standards

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**Abstract:** This research is a qualitative research method with the type of document analysis and supported by interview studies. The purpose of this study is to describe characteristics of high school physics learning tools that reach the content standards and process standards of Curriculum 2013. The documents analyzed are in the form of high school physics learning tools soft files from four teachers as respondents from different schools. The selection of the teachers was carried out by purposive sampling and the learning device data were analyzed descriptively. Research step begins by asking each teacher for the same type of learning tools, consisting of lesson plans, student's worksheet, and instrument test for daily exams. Supporting step is an interview study with a semi-open model. The results of the data analysis of learning devices there are still 2 teachers who do not meet these types of learning tools, and only 1 teacher in the aspect of learning time allocation does not reach the standard process, which is only 30 minutes. Then generally each teacher is still not able to achieve aspects of the standard content, namely the achievement of basic competencies.

**Keywords:** High school physics learning device; Content and process standards; Curriculum 2013

## Introduction

National education is one of the national development sectors in the context of educating the nation's life, has a vision of realizing the education system as a strong and authoritative social institution to empower all Indonesian citizens to develop into quality human beings, so that they are able and proactively respond to the challenges of changing times (Kemendikbud, 2012). Referring to this attachment, implementation of education should pay attention to the achievements that have been determined. The achievement is intended in the vision of national education by the Ministry of Education and Culture, in 2025 which will come, namely to produce intelligent and competitive Indonesian people. Intelligent people are spiritually intelligent, emotionally intelligent, socially intelligent, intellectually intelligent and kinesthetically intelligent. As for being competitive, namely being able to be comprehensive and compete at a higher and wider level in the development and application of science (Mulyasa, 2013).

Educators and education staff become a unified aspect that supports each other in the implementation of national education which is of course required to be able to achieve the goals of national education. The quality of education is a direct consequence of a change and development of learning at this time (Sutjipto, 2014). Of course, in carrying out their duties, teachers need a learning device as a learning aid. So that the learning reference is apart from the implementation of the curriculum, it is also based on the learning tools that are arranged.

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This study will monitor the form of high school physics learning tools by several teachers in different schools. It will also directly describe the character of each teacher's learning device. The intended learning tools are lesson plan, worksheet and students' daily practice test instruments. Some of these types of devices will be monitored for their achievement of the content standards and process standards of the 2013 curriculum currently in effect.

The plan of face-to-face learning activities for one or more meetings in achieving basic competencies in the syllabus is the definition of the lesson plan. This explanation is in line with Rusman (2013), that the learning implementation plan is a matter that describes the procedures and organization of learning to achieve a basic competency set out in the content standards and described in the syllabus to direct student learning activities in an effort to achieve basic competencies. While student worksheet is a way to realize the creativity of students and package learning materials that can be done by teachers (Rohman, 2017). Finally, the test instrument is a form of assessment instrument in the learning process, which focuses on the cognitive domain. A good assessment instrument is an instrument that follows certain rules, can provide accurate data about the ability of students to achieve learning goals or understand the subject matter (Arifin, 2013).

The curriculum according to Law Number 20 of 2003 Article 1 Section (19) is a set of plans and arrangements regarding the objectives, content, and learning materials as well as the methods used as guidelines for the implementation of learning activities to achieve certain educational goals (Kemendikbud, 2013). Entering the middle of 2013, the world of education in Indonesia is faced with a very important national policy, namely the implementation of the 2013 Curriculum. The new curriculum policy becomes interesting to continue to study, especially academically. This happens because the curriculum is one of the important instruments in the educational process, and is always undergoing a process of renewal along with developments that occur in society (Deitje, 2014).

Success in implementing the curriculum according to Anwar (2014) is determined by all stakeholders in the field of education, especially at the operational level with an open attitude and preparing themselves with a new operational model. The positive impact of implementing the 2013 curriculum was conveyed by Subkhan and Susilowati (2015), that the implementation of the 2013 curriculum had a positive impact on learning management, especially in science subjects.

In this study, form of a learning approach carried out by the teacher through learning tools will be reviewed through the content standards and process standards in the applicable 2013 curriculum. The content standard is a scope of material and the level of competence as outlined in the criteria for graduate competencies, study material competencies and subject competencies as well as learning syllabus. This must then be fulfilled by students at their respective levels and types of education (Government Regulation No. 19 of 2005). Content standards are determined by the regulation of the national education minister no. 22 of 2006 which has been amended several times until now is regulated in Permendikbud No. 21 of 2016.

While the Process Standards are criteria regarding the implementation of learning in educational units to achieve Graduate Competency Standards. Process standards are developed referring to Graduate Competency Standards and Content Standards that have been set in accordance with the provisions in Government Regulation Number 19 of 2005 concerning National Education Standards as amended by Regulation Number 32 of 2013 concerning Amendments to Government Regulation Number 19 of 2005 concerning National Education Standards.

## Method

This research is a qualitative research type of document analysis. The selection of qualitative methods certainly refers to the focus of the research problem, namely the monitoring of physics learning devices senior high school with reference to the content standards and process standards of the 2013 curriculum. So, that researchers can explain or find concepts, patterns, hypotheses and theories in that context. The research steps are presented through the following research chart in Figure 1.
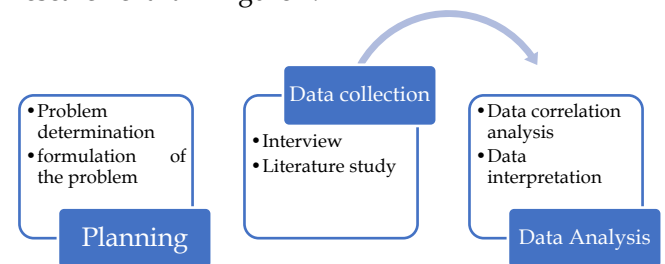


**Figure 1.** Research Steps

This research was conducted remotely at the researcher's house (Bima, NTB). However, the research data were taken from several high school physics teachers in Indonesia, namely Yogyakarta, Aceh, and NTB. So, in general, this research was conducted remotely due to the adjustment of research time during the Covid-19 pandemic situation. In addition, to find out whether there are differences or not in the character of each teacher's learning device.

The research instrument is the researcher himself as the main instrument. The supporting instruments are teachers who will provide physics learning tools from

the results of their preparation or for learning in the form of softfile documents. The document in question is the softfile of learning tools from 5 high school physics teachers at different schools. In line with Sugiyono (2013), that in qualitative research the main instrument is the researcher himself or a member of the research team. Based on the view above, in this study the researcher is the main instrument. Then the teachers as a research team or supporting instruments. Meanwhile, the learning devices made by the teachers are the instruments used in the research.

The sample and data sources in this study were selected by purposive sampling. The sample data in question are learning tools in the form of lesson plans, student's worksheet, and homework instruments. The selection of these teachers is that researchers have special reasons or considerations and of course they are believed to be right. This is in accordance with Ahyar et al., (2020), that the main characteristic of this sampling is when the sample members are selected specifically based on the research objectives. In total there are 4 teachers as data sources, namely one teacher each from NTB and aceh, and two teachers from Yogyakarta.

The main data collection techniques in this research are still in general, namely direct observation, semi-open interviews and documentation studies. Research using direct observation techniques, researchers in conducting data collection stated frankly to the data source, namely in this case the physics teacher, that they were conducting research. So those who are being studied know from the beginning to the end about the activities of the researchers with the data they provide. While the study of documentation is a technique of collecting data in the form of writing, pictures or monumental works of someone. So that in this study the document in question is the work of learning tools by the teacher (Sugiyono, 2013).

Qualitative research will obtain data from various sources, using various data collection techniques (triangulation) in this study, namely observation, interviews and documentation studies, and is carried out continuously until the data is saturated. The data obtained in general is qualitative data (does not reject quantitative data), so the data analysis technique is used before there is a clear pattern (Hardani et al., 2020).

In this study using data analysis techniques according to Miles and Huberman which is carried out interactively through the process of data reduction, data display and verification. The data obtained from the field is quite large, for that it needs to be reduced, namely to summarize the main things or focus on important things. After the data is reduced, the next step is to display the data. Presentation can be done in the form of tables, graphs, phie chard, pictograms and the like. Through the presentation of the data, the data is

organized, arranged in a pattern of relationships, so that it will be easier to understand.

The last is drawing conclusions and verification, with the aim of answering the research problem formulation if it is supported by valid and consistent evidence (data). As depicted in the Figure 2.
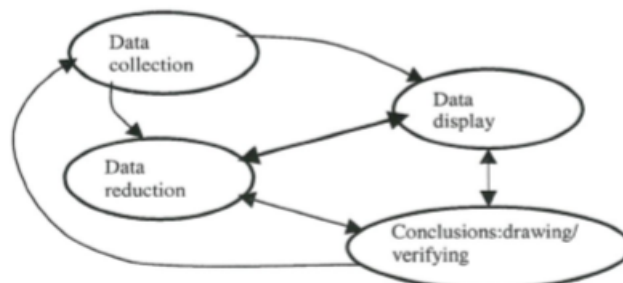


**Figure 2.** Schematic of Data Analysis Components

The data validity test in this study includes the data credibility test (internal validity), data dependability (reliability) test, transferability test (external validit) and confirmability test (objectivity). Testing the credibility of the data or the trustworthiness of the data from qualitative research results, among others, is carried out by extending observations, increasing diligence in research, triangulation, discussions with colleagues, negative case analysis, and member checks. Meanwhile, transferability is an external validity in quantitative research that shows the degree of accuracy or applicability of the research results to the population where the sample is taken. Furthermore, depenability called reliability is reliable research is if other people can replicate the research process.

In qualitative research, the depenability test is carried out by conducting an audit of the entire research process. Finally, confirmability testing in quantitative research is called the research objectivity test. Research is said to be objective if the results of the research have been agreed upon by many people. In qualitative research, the confirmability test is similar to the dependability test, so the test can be carried out simultaneously (Sugiyono, et al, 2013).

## Result and Discussion

This research is a type of research that analyzes documents in the form of learning tools (lesson plan, students' worksheet, and test instruments). So that the general discussion will describe the learning device. Another thing is the linkage of learning devices with the current 2013 curriculum.

*Teacher Profile and Learning Tools*
The sample in this study is that there are 4 high school physics teachers from different schools. Selection of teachers from several different schools with the aim of supporting the characteristics/differences in the

presentation of each teacher's learning tools. Planning in physics learning is very important where the teacher's role includes 3 things, namely planners, implementers and evaluators. A teacher as a curriculum implementer both in planning, implementing and evaluating is expected to improve student learning outcomes so that students benefit from learning (Mallo, 2013). The profiles of these teachers are as shown in the following Table 1.

**Table 1.** Teacher Profile and Learning Tools

| Teacher Code | Initials Name of Teacher | Origin School | Learning Device |
|---|---|---|---|
| 1 | ZF | SMANW Nurul Jannah Ampenan | Lesson plan, Students worksheet, Test Instruments |
| 2 | FSM | SMAN 1 Gunung Meriah | Lesson plan, Student worksheet, Test Instruments |
| 3 | TM | SMAN 2 Wates | Lesson plan, Instrument of Test Questionnaire |
| 4 | AW | SMAN 1 Baturetno | Lesson plan, Instrument of Test Questionnaire |

Based on the Table above, it shows that there are still teachers whose learning tools are incomplete. Such an objective statement is based on the acquisition of research data in the form of a learning device softfile. As a result, it can be analogized that each teacher has different abilities in carrying out learning. In line with the views of Febriyani and Jumadi (2017), that the teacher's ability to carry out learning is the teacher's ability to organize the overall learning setting of the learning process and the planned formation of

competencies, including: (a) managing learning spaces and facilities; (b) carry out learning activities which include preliminary activities, core activities, and closing activities; (c) managing classroom interactions; (d) demonstrating special abilities in learning subjects; and (e) carry out assessments in scientific learning.

So, it is still possible that regardless of the time of data collection, the teacher is able to complete it again to support the learning process and evaluation. The form of strengthening the statement is by having a teacher who has compiled a lattice of test questions but has not compiled the instrument. Based on the results of research by Fadilah and Suparwoto (2016), it was revealed that almost all teachers in reality RPP were done partly at the beginning of the semester and the rest was done during the learning process. This condition occurs because of the limited time that respondents have if the entire lesson plan is done at the beginning of the semester.

*Description of Learning Tools*

In this study, the review of learning tools is the lesson plan, student's worksheet, and instrument questions.

a) Lesson Plan

Lesson plan type learning tools are tools as a reference for teacher's learning process about applying learning models, learning approaches and learning steps to support the achievement of learning objectives or in general basic competencies and subject matter indicators. Each teacher certainly has a different form and way of presenting lesson plans, as evidenced in the following Table 2.

**Table 2.** Details of the Contents of the Lesson Plans for Each Teacher.

| Teacher Code | Basic Competence/ Indicator | learning objectives | Model/Approach /Learning Method | Media/Learning Resources | Time Allocation/Assessment |
|---|---|---|---|---|---|
| 1 | 3.11 | 3.11.1 Explain the concepts and principles of the restoring force on harmonic vibrations in everyday lif 3.11.2 Analyzing problems related to the restoring force on harmonic vibrations | Model project-based learning Online/offline learning methods | Tutorial video Physics Book for Class X Students, Ministry of Education and Culture, 2016. Marthen Kanginan. 2017. Physics for SMA/MA Class X. Jakarta: Erlangga. | Introduction (10 minutes) Core (40 minutes) Closing (10 minutes) Evaluation: Cognitive aspects (practice questions/exams) Affective aspect (students worksheet group work) Skill aspect (experimental performance) |
| 2 | Does not include Basic Competence, only the main material, namely Electromagnetic Wave Radiation | Students are able to present and process descriptive statistical data into distribution tables and histograms. | Not included the types of models, methods and learning approaches | Learning media does not exist Learning resources in the form of (Class XII Physics textbooks) do not include the title or author | Introduction: 15 minutes Core: 60 minutes Closing: 10 minutes Cognitive assessment with written test Attitude assessment by observation Assessment of attitudes with performance. |

| Teacher Code | Basic Competence/ Indicator | learning objectives | Model/Approach /Learning Method | Media/Learning Resources | Time Allocation/Assessment |
|---|---|---|---|---|---|
| 3 | 3.2 | 1) Students can analyze the elasticity of a material | Cooperative learning model | Learning media does not exist | Introduction: 10 minutes Core: 60 minutes Closing: 10 minutes |
| | | 2) Students are able to understand Hooke's law, the arrangement of series and parallel springs | Scientific learning approach Discussion method | Learning resources in the form of (Class XII Physics Textbooks) do not include the title or author | Cognitive assessment with written test Attitude assessment by observation. |
| 4 | 3.5 | 1) Students can analyze physical quantities in parabolic motion through discussion and watching videos correctly. | Problem based learning learning model, scientific learning approach, | Learning media in the form of: parabolic motion learning videos, and parabolic motion power point | Introduction: 5 minutes Core: 20 minutes Closing: 5 minutes Cognitive assessment with description test technique |
| | | 2) Students can calculate problems related to parabolic motion through discussion correctly. | Lecture method, discussion | | Attitude assessment with discussion |

Lesson plan has a function as a basis and guide for a teacher when carrying out learning activities in order to help him organize learning effectively (Zendrato, 2016). The study of the content of the lesson plans for each teacher based on table 2 above shows some facts about the concept, content and form of the lesson plans prepared by the teacher as a form of organizing learning.

In the concept section based on the analysis of learning tools, there are differences in the concept of lesson plans prepared by the teacher. The teacher (1) shows the concept of a broad lesson plan and has the characteristics of the latest 2013 Curriculum. This is shown by the content of the lesson plans that are able to contain subject matter/teaching materials with varied references other than school textbooks. While the other three teachers did not load the subject matter into it. Furthermore, in the content section there are several forms that are not fulfilled such as not including the basic competencies number but only mentioning the main material, and not including the learning model or approach. This can be seen in the teacher's lesson plans (2). Then the other thing about the RPP supporting devices, namely in the form of learning media, is also not mentioned, so the indication is that there are no learning media such as student's worksheet or other media, namely the teacher (2) and (3). Meanwhile, teacher innovations (1) and (4) show using instructional video media and also student's worksheet. Finally, in the lesson plan content section, each teacher has been able to show the form of assessment that will be used in cognitive, attitude and psychomotor aspects, but in the time allocation only teachers (4) do not reach the 2013 curriculum content standard, which is a minimum of 45 minutes in one meeting. Teacher (4) only conducts

learning with an allotted time of 30 minutes, with an explanation of 5 minutes each for the introductory and closing activities, and 20 minutes for the core activities.

The difference in the presentation of lesson plans by the teacher is a separate strategy, because it is believed that the teacher is an educational component that will determine the implementation of the education process properly. In line with the opinion of Nadeem (2011) that in all education systems, teacher performance is one of the main factors determining school effectiveness and learning outcomes. Not many teachers are able to carry out their roles and functions adequately. The problems faced come from the facilities, the local school's social culture, or the education system. Teachers are required to be able to manage teaching, namely in determining learning strategies and planning (RPP), making media or learning aids such as student's worksheet, and ending with an assessment. Supported by research by Febriyani and Jumadi, (2017), that the percentage of teacher's ability to plan learning has varying values. The teacher's ability to plan learning has a percentage of 82.99% in the good category.

b) Students Worksheet

The student activity sheet (students' worksheet) is a form of learning tool that can also act as a learning medium to support student learning activities and lead to student-centered learning (student center). In line with the following view, student worksheet contains instructions and procedures for activities that must be carried out by students so that they are able to develop thinking skills and solve problems according to learning objectives (Firdaus &Wilujeng, 2018).

**Table 3.** Details of the Contents of Each Teacher's Student Worksheet

| Teacher Code | Model/Students Worksheet Concept | Time Allocation | Material/Purpose |
|---|---|---|---|
| 1 | Experiment based<br>Contains a table of experimental quantitative data<br>Contains questions as qualitative data in the form of answers to questions | 40 minutes | Restoring force on harmonic vibrations<br><br>After conducting the experiment, students are expected to be able to determine the restoring force as the cause of the object to make harmonic vibrations. |
| 2 | - | - | - |
| 3 | - | - | - |
| 4 | Based on group discussions for solving problems | 20 minutes | parabolic motion<br>After working on the student worksheet, students are expected to be able to calculate problems related to parabolic motion |

Based on the content analysis of each teacher's student's worksheet which is briefly listed in table 3 above, there are several indications. Teachers (2) and (3) did not compile student worksheet as a supporter of lesson plan in the same basic competencies. This aligns the previous discussion in the lesson plan section, that there are teachers who do not use interactive learning media in general, namely student's worksheet. The focus of the analysis of the student's worksheet tools is on teachers (1) and (4) with different characteristics of the student worksheet. The teacher (1) uses the students worksheet concept which contains experimental activities to obtain supporting data to solve the questions listed in the student worksheet. While the teacher (4) uses the student worksheet concept which includes group discussion activities to work on the questions in the students' worksheet. Furthermore, there is a difference in the allocation of time for working on the student's worksheet given by the teacher to students. It can be seen that teacher (1) allocates time of 40 minutes, while teacher (4) allocates time of 20 minutes. This shows the alignment of the contents of the student's worksheet with the lesson plan prepared by the two teachers, namely in the allocation of learning time. The two teachers each used the entire time allocated for the core learning activities by working on the student's worksheet by students.

Through the use of student's worksheet, it is able to be a representation of the assessment of students' attitudes. At the SMA/MA level, teachers who assess attitude competence with an observation sheet are 48.00%, those who assess attitude competence with a self-assessment sheet are 42.00%, those who conduct an attitude competency assessment with peer assessments are 42%, and those who conduct an attitude competency assessment are by keeping a journal. 41% (Setiadi, 2016).
c) Instrument test

The question instrument is one of the learning tools used by teachers to evaluate learning achievement both in terms of objectives, learning outcomes, mastery of the material or the level of understanding of students.

In Table 4, several points of analysis on the daily test instrument for each teacher. First, the number of questions for each teacher is mentioned and the average is 5 questions with different time allocations. Second, the form of the question only for teachers (1) and (4) is mentioned, namely a description, while for the other two teachers it is not mentioned. Finally, there is a difference in time allocation in line with the number of questions and the level of the question category. As shown in the category of teacher questions (1), namely the categories C3 (applying), C4 (analysis), and C5 (synthesis) it takes 90 minutes for 5 items. The researcher indicates that the higher the level of the question category, the longer it takes to do it. It was also indicated by the teacher (4) with category C4 (analysis) which took 30 minutes for 3 questions.

**Table 4.** Details of the Contents of Each Teacher's Question Instruments

| Teacher Code | Question Form | Many Questions | Question Category | Time Allocation |
|---|---|---|---|---|
| 1 | Written test, description | 5 items | C3, C4, C5 | 90 minutes |
| 2 | Written test | 5 items | - | 60 minutes |
| 3 | Written tes | 5 items | - | 60 minutes |
| 4 | Written test, description | 3 items | C4 | 30 minutes |

The conclusion in this section is that each teacher can be said to have been right in adjusting the number of questions with the time allocation to work on them. However, not every teacher is able to classify the categories of questions they arrange based on cognitive level, for example based on Bloom's taxonomy, namely C1 (remembering), C2 (understanding), C3 (applying), C4 (analyzing), C5 (synthesis), and C6 (creating). In general, it has been able to reflect a fairly good question instrument.

According to the criteria for the success of good question writing, the teacher should conduct a qualitative instrument analysis based on considerations of substance, construction, and language, as well as analysis based on empirical data or based on the results of test questions, then from the results of qualitative and quantitative instrument analysis, the teacher must

choose items good so that the instrument meets the valid and reliable criteria. In general, the quality of the items is determined through a field trial process so that the character of each item can be evaluated (Gierl & Lai, 2013).

The questions that have been used in learning can then be applied again by paying attention to their validity and revising them. Supported by the opinion (Lissitz & Samuelsen (2017), the analysis of the items used can be one of the validation efforts based on empirical data analysis. Thus, the teacher does not need a special time for test questions. Each subject can collect questions with good quality (valid and reliable) in the question bank so that it is ready to be used whenever needed.

The question instrument is a way for teachers to assess or evaluate the ability of students to absorb subject matter. Preparing assessment instruments (questions) for teachers will adapt a lot to several things, such as students, learning media, as well as many references to assessment forms from the curriculum offer. Ruja and Sukamto (2015) also stated that the more complex forms and types of assessments would be difficult. It becomes even more challenging when faced with a large number of students. As a result, teachers still find it difficult to develop assessment instruments and then implement them appropriately.

A similar problem was also conveyed by Kustijono and Wiwin (2014), that teachers are still unable to carry out assessments or evaluations in accordance with the assessment standards of the 2013 curriculum, especially in adjusting the rules, scoring rubrics, and developing questions according to the indicators of the assessment instrument. In response to this, Setiadi, et al (2016) proposes to simplify the guidelines for assessment instruments in the curriculum. After that, socialization and training were carried out for teachers to support their ability to develop instruments according to the assessment standards.

*Description of Interview Results with Teachers*

This section is a form of research credibility analysis, which is an extension of the research to confirm previous research data. This interview was conducted semi-open to each teacher with the same form of questions, as detailed in the following Table 5.

**Table 5.** List of questions

| Questions |
| --- |
| What is your general view of high school physics learning? |
| What do you know about learning tools? |
| How is the relationship between learning physics and learning tools that you feel while being a physics teacher? |
| What do you know about the 2013 curriculum? |
| How are the content standards and K13 process standards achieved in the physics learning process that you have done so far? |
| What are the challenges of learning physics and physics learning tools in the current Covid-19 era? |

This interview activity was carried out by researchers to support the level of confidence in the learning device data previously given by each teacher. This interview is also with the aim of obtaining new data in the form of direct information from the responses to the questions mentioned above. These questions are generally about three (3) topics of discussion, namely physics learning, physics learning tools, and the implementation of the 2013 curriculum in the Covid-19 era at the time of this research. The concept of the interview was carried out semi-open, with the subject of the conversation having been notified at least 1 day before the interview took place. This semi-open concept is also carried out if there are respondents with the same free time in conducting interview sessions. This happened to the teacher respondents (2) and (3) by conducting interviews simultaneously. Semi-open was also chosen for researchers to be able to explain the aims and objectives of the research or this interview session was carried out in this study.

Based on the responses of each teacher to the 6 questions above, new information and information supporting data on previous learning devices were obtained. Some of the information intended is as follows:

a) Learning physics for teachers is one of the subjects that need special attention by the teacher, it is necessary to implement subject matter into the phenomena of everyday life, and need a contextual approach in its implementation even though in general the learning process is the same as other subjects. The researcher's statement is supported by the teacher (1) expressing that "physics learning in the process must be more contextual and explore its relation to everyday life". Then also the teacher (3) that "physics learning is like a 'scourge' for the learning load that is handled by a teacher, so it is necessary for the physics teacher to be the center of attention of students". Finally, the teacher (4) revealed "physics as a lesson about natural phenomena and their relation to mathematics in the process of operating the material".

b) The physics learning device by the teacher (2) states "like a map to provide basic competencies, indicators, and subject matter so as to support the achievement of the expected learning objectives". While the teacher (3) states it "as a weapon in all respects to support the whole process of implementing learning". Then by the teacher (4) states "as a guide or reference for a teacher in teaching". The last is the teacher (1) that "lesson plan, students worksheet, teaching materials, and evaluation tools are learning tools that must be owned to support learning".Based on the various responses above, it can be concluded that the learning device is a tool for the learning process with the aim of supporting the achievement of learning objectives and becoming a reference for

teachers in teaching in various forms such as in general, namely, lesson plan, student worksheet, teaching materials, and learning evaluation instruments.

c) Physics learning is strongly influenced by learning tools prepared by the teacher and is an integrated relationship in achieving and supporting learning objectives and learning outcomes along with adjustments to the subject matter and the character of students. This is in line with the opinion by the teacher (2) that "between physics learning and learning tools is analogous to a unitary hand, namely left and right which will support each other's activities even though they can still carry out activities with one hand". Also, by the teacher (4), namely "through learning tools, teachers are able to be more comprehensive in achieving learning objectives by adjusting the dynamic character of students".

d) Curriculum 2013 is a learning curriculum that is highly dependent on the ability of students and teachers with student-centred learning directions (student center) and is also an overhaul of the previous curriculum such as KTSP. Such views are in line with the opinions of teachers (1), (2) and (3). Meanwhile, the teacher (4) stated that "K13 is a more modern learning curriculum and a representation of STEM with the main abilities of students, namely being able to think, construct, and communicate.

e) The achievement of the standard content of the 2013 curriculum is generally in terms of the learning load, the achievement of competencies and the scope of the material. Based on the analysis of device data and the results of interviews with teachers, it shows that every teacher admits that the students' physics learning load is too dense, there are basic competencies that are not implemented, even though

the scope of the material is generally appropriate. As explained by the teacher (4) that "usually there are still 2 basic competencies that are not achieved or implemented". Also, from the teacher (3) that "it is better for the basic competencies to be achieved by students to be given authority to the teacher in regulating it to adjust the learning load that allows both for the teacher himself and for students".

f) Several challenges arise in the current Covid-19 pandemic situation in the learning process, especially physics. The positive is that teachers and students are able to master advanced technology with various forms of online learning applications that were previously unknown. Then the acceleration of student references is broader to the subject matter. As well as increasing the learning independence of students. While the negative is not being able to measure the ability of students effectively when an online test is carried out. Then there are forms of injustice or sportsmanship in learning between the social status of students and the strategic location of their residence. And will put excessive pressure on teachers to innovate learning concepts at any time and also limitations in supervising student learning activities.

*Achievement of K13 Content Standards and Process Standards*

This section will discuss the relationship between physics learning tools by teachers and their achievements in the content standard indicators and 2013 curriculum process standards. So that this section will be able to conclude an outline of the teacher's ability to meet the demands of content standards and process standards for implementing the 2013 curriculum. The Table 6 details of these achievements are as follows.

**Table 6**. Details of Achievement of 2013 Curriculum Content and Process Standard Indicators

| Teacher Code | Content Standard | | | Process Standard | | | Description |
|---|---|---|---|---|---|---|---|
| | Study load | Competency level | Material scope | Time Allocation | Class/laboratory management | Textbook tools | |
| 1 | √ | - | √ | √ | √ | √ | There is basic competence that are not implemented for every teacher |
| 2 | √ | - | √ | √ | - | √ | |
| 3 | √ | - | √ | √ | √ | √ | |
| 4 | √ | - | √ | - | - | √ | |

Based on Table 6, it shows that there are characteristics as differences in learning devices prepared by each teacher. The indicators of the difference in question are indicators of the achievement of content standards and 2013 curriculum process standards. This difference will also indirectly describe the condition of classroom management and learning support facilities in the school environment where the teacher teaches/works. The first difference is in the aspect of time allocation, it shows that there are still

schools whose lesson hours do not meet the 2013 curriculum content standards, which are shown to teachers (4). Second, there are still schools whose laboratories cannot be used properly, perhaps even if they do not have a special laboratory for physics. Another indication based on data from several teachers showing the management of the laboratory is the lack of supporting facilities in the laboratory itself, so that the laboratory functions are not optimal or cannot be used. The proof of this is very strong, namely based on some

of the four teachers whose form of student's worksheet contains group discussions to work on questions, then there are also teachers who show that they do not use student's worksheet in learning.

Indirectly, the lack of optimality in the use or management of the laboratory indicates the condition of the supply of supporting infrastructure has not been fulfilled. This condition becomes a topic of problems faced by teachers in implementing the 2013 curriculum. In line with Kristiantari's (2014) expression, that teachers have very high motivation in dealing with the implementation of the 2013 curriculum. This motivation is still constrained by the availability of supporting facilities and infrastructure.

It is also supported by the results of research by Suluh and Ate (2019), stating that in general school readiness in terms of the availability of facilities and infrastructure can be categorized as not optimal. Schools are still more dependent on the creativity or innovation of the teachers themselves in creating these learning supports. However, the role of schools is still trying to increase the availability of supporting facilities and infrastructure, such as libraries, laboratories, and other learning media needs.

Educational facilities and infrastructure can be an important requirement for teachers to help maximize their performance. The importance of educational facilities and infrastructure is also conveyed by Sutama (2016), that the fulfillment of educational facilities and infrastructure partially contributes to teacher performance. The reason is because it can support other factors that are more dominant and are able to make teacher performance maximal or increase.

Based on table 6 also shows that there are similarities to aspects that are not achieved/fulfilled, namely in the aspect of competency level or aspects of achieving the basic competencies of students. The four teachers indicated that in each semester, especially in the even semester, there would be 1 or 2 basic competencies that were not implemented or were not achieved. Based on interviews, this is caused by the heavy learning load of students so that it is not possible to master the material in one meeting, then because the allocation of short lesson time is even less especially for physics. The special cause for even semesters is because there are many school activities that cut effective lesson hours, such as national exams, try out national exams, and so on.

Another form of equation in the achievement of content standards and process standards is the aspect of learning load, material coverage space and textbook facilities. These three aspects in each school have been able to be achieved, showing that generally the learning load and the scope of material for each teacher for physics subjects are the same. Likewise with the means of textbooks, it shows that every school has provided textbooks that can be the main reference for students in learning. However, it does not limit the acceleration of teachers and students to use references outside of school.

In general, based on table 6 above, this research data shows that there are still teachers who are not able to achieve content standards and curriculum process standards. In addition to teacher guidance, research data shows that there are still schools that are not optimal in laboratory management or even do not have a special physics laboratory. Finally, based on research data, it also shows the need for special attention in improving the curriculum as well as on the aspect of effective school hours for the allocation of time for physics subjects. So that the basic competence planned in the curriculum can be achieved as a whole.

*Characteristics of Physics Learning Devices*

In this section, we will describe in general the characteristics of the physics learning tools compiled by the four teachers above. The preparation of learning tools as a reference for implementing 21st century skills in implementing the 13th curriculum is not an easy thing for some teachers, because it requires special skills. In general, teachers only compile learning tools based on their respective perceptions and do not take into account the standardization of curriculum implementation (Makhrus et al., 2018).

Referring to several forms and concepts of the content of physics learning tools that are analyzed, it shows that generally physics teachers have used modern learning models such as problem based learning, and cooperative learning. Then using a science learning approach in general or a scientific learning approach in particular. The tendency to use modern learning models and scientific learning approaches shows that teachers have been able to adapt these learning models and approaches to the nature of physics material which is relatively abstract and contains many theories. In addition, it also shows that teachers have been able to create innovative learning processes that will lead to the ability of students to play an active role during learning (student center).

The next point becomes the characteristics of the physics learning device that is analyzed, namely the aspect of the learning media used to support the learning process. Shows that teachers have been able to use interactive learning media such as student's worksheet in general and also modern media along with the development of technology, namely learning videos. Such conditions will lead to interactive learning and the role of the teacher will be lightened with the help of the media. The impact is that the motivation and learning outcomes of students increase as an early indication. In addition, this condition shows a teacher's willingness to learn in the use of sophisticated information technology-based learning media, such as learning videos. The

emergence of student's worksheet is also able to create a cooperative and collaborative learning environment among students. Thus, the maximum role of each student to be active will be created in a learning process like this.

Finally, based on interview studies, each teacher really hopes for an overhaul of the curriculum content section in the allocation of lesson time. More specifically, the determination of basic competencies for physics subjects and other subjects. This is the cause of the learning burden felt by the participants to be heavy or too dense, so that the condition of their cognitive abilities in mastering the subject matter is very limited and tends not to be optimal. Another effect is that the ability of teachers to achieve and implement all existing basic competencies is limited. The reason is of course the allocation of lesson time related to the division of effective lesson hours for each subject will complement each other. So that with the number of basic competencies and with the number of subjects available, the effective time allocation for each subject will be less. Through this research, teachers as respondents also expect that there is authority given to teachers in proposing or compiling and determining their own basic competencies for each subject at each level of students. Major adjustments will be made by the teacher in this case when this authority is achieved. The final goal is the high cognitive level of students, the achievement of standards in the curriculum and the achievement of all basic competencies or subject matter that is prepared.

## Conclusion

Based on the document analysis of learning tools and supported by interview studies of respondents, namely 4 teachers with the main objective of knowing the characteristics of high school physics learning devices referring to the content standards and process standards of the 2013 curriculum, it can be concluded that several important things became general findings in this study. First, high school physics learning tools generally consist of lesson plans, student's worksheet, learning media and learning evaluation instruments and have been able to achieve content standards and application process standards of the 2013 curriculum, although there are still some teachers who are still unable to achieve all aspects of content standards and standards the process. This achievement is not factored in by the teacher alone, but the influence of other subjects, school infrastructure and curriculum demands are also the cause of this. Second, the aspect of competency achievement is still a problem for teachers because on average each semester leaves 1 or 2 basic competencies which are not implemented or achieved. Finally, the characteristics of physics learning devices that have been able to achieve content standards and

process standards for implementing the 2013 curriculum are based on modern learning models and science learning approaches.

Behind the findings of the study, there needs to be a form of support for teachers with the many learning burdens and the dense demands of the curriculum. This support can be in the form of a further study of the effect of implementing the 2013 curriculum on aspects of basic competencies settings and materials, allocation of study time, and learning load on the effectiveness of teachers' abilities in achieving them. So, at the end of this study, the researcher suggests that it is more personal for the readers to try to do research on the effect of curriculum implementation on the effectiveness of teacher performance and the cognitive level of students.

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