

# A Study of Problems on Applied Science Learning of First Grade Students at Vocational High School Pekanbaru

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## ABSTRACT

Based on the results of observations and interviews to the teachers and students at Pekanbaru State Vocational High School, the researcher achieved data that low accomplishment of Applied Science is giving impact to the quality of learning objectives, several KD are assessed quite difficult to the students, lack of interest in applied natural science, and lack of teachers' capability to use technic and media in the process of learning in Applied Science. Considering the problem, research deliberately took role by examining with the title "Study on Problems of Applied Science Learning at X Grade 1st semester of State Vocational High School Pekanbaru. This research is mixed methodology which combines the quantitative and qualitative research. The source of data achieved by several respondents and documents and also the data types such as primary and secondary data. Data collecting technic is questionnaire, observation, interviews, and documents studies. The research concludes that the internal factor of causes of learning difficulties are body condition, aptitude, motivation, and learning types. The external factors are teachers, facilities and infrastructure, and curriculum.

**Keywords:** *Problems, Applied Science Learning*

## 1. INTRODUCTION

Law Number 20 of 2013 concerning Article 15 of the National Education System states that vocational education is secondary education which prepares students primarily to work in certain fields. This means that Vocational High Schools (SMK) prioritize at preparing students to enter the workforce and develop professional attitudes. This makes SMK different from Senior High Schools (SMA) or Madrasah Aliyah (MA), because Vocational Schools are more focused on developing skills so that students after completing their education in Vocational Schools can enter the workforce. But even so at the Vocational School still taught general subjects such as Natural Sciences (IPA).

At Pekanbaru city, Riau Province, there are 7 vocational high school consisting of Vocational High School State 1, Vocational High School State 2, Vocational High School State 3, Vocational High School State 4, Vocational High School State 5, Vocational High School State 6, Vocational High School State 7. Based on first observation on 2<sup>nd</sup> May until May 10<sup>th</sup> 2017, it was known that not all Vocational High School learn applied sciences at Pekanbaru, also not all majors learn applied sciences at Pekanbaru Vocational High School. Applied sciences are development of basic sciences to control how the nature works and can be applied on skill competency that students learned.

The results are measurements that can be used to discover skills and understanding to master materials that

teachers given. Based on 2<sup>nd</sup> May until 10<sup>th</sup> May 2017, this applied sciences obtained the lowest score at Pekanbaru Vocational High School on the mid semester.

Based on Pekanbaru Vocational High School's table data which learns applied sciences are State Vocational High School 1, State Vocational High School 3, and State Vocational High School 4 there still students got scores below the minimum score. State Vocational High School 1 have 10 students who got score above 70 or 33,33 %. While State Vocational High School 3 have 30 students who got score above 75 or 16,66%. State Vocational High School 4 have 20 students who got score 75 or 33,33 %. The students who got score below the minimum average score indicate that the goal has not accomplished maximum on applied sciences. There some students who lazy to count with formulas. Because of many students who got score below the minimum score indicate the problems in study. According to those problems, that is important for teachers to understand ideal teaching mechanism for students in Vocational High School.

Based on interview with teachers and students on applied sciences at Pekanbaru State Vocational High School who learn applied sciences on August 16<sup>th</sup> 2017 until September 22<sup>nd</sup> 2017 shows that some KD are still hard for students on applied sciences subjects :

Table 1. Problems of Basic Competence on applied sciences at Pekanbaru State Vocational High School.

School	Basic Competence
State Vocational High School 1	Relation between force, work , and energy problem
State Vocational High School 3	Relation temperature and heat
State Vocational High School 4	Elasticity and surface tension and voltage

Source: SMK Negeri di Pekanbaru

Table 1 shows that some basic competences are difficult for students on applied sciences. The problems are on the certain condition that students through and can blocked the goals of education. Dimiyati dan [1], explained there are 2 kinds of problems learning, are internal problem and external problem. Internal problem is the source problem from the student themselves, meanwhile the external problem is source from the outside of the students.

Based on interview with all of students tenth grade at Pekanbaru State Vocational High School who learned applied sciences on August 16<sup>th</sup> 2017 until September 22<sup>nd</sup> 2017, shows that some general problems were told by students about applied sciences. First, students are generally not interested in applied sciences because there are many theories must be memorized. Second, the majority of the students declared how their teachers teach applied sciences are normal, and the materials that teachers are used is applied sciences literature but teachers don't give obligate the students to have the literature. Third, students also declared that teachers didn't use infocus media to shows pictures that relate with applied sciences subject, also teachers didn't use the media in process applied sciences.

The problems for family, some students declared that their parents rarely ask their subjects or activity in the school, and students don't have learn their study room at home, they just learn on family room or their bed room and sounds of television or family can disturb their concentration when they study. From the results of interview shows that in their house they don't repeat their applied sciences subject and they don't evaluate their studies.

Based on the results of observations of researchers on August 14, 2017, to August 31, 2017 at the State Vocational Schools in Pekanbaru from the aspects of students it was known that students were less motivated in learning Applied Natural Science. This can be seen when the learning process takes place where students do not listen seriously to the teacher explaining the lesson, when the teacher asks students the difficulty to answer, the students are much silent than asking questions about the subject matter delivered by the teacher, and in general, the Applied natural Science notebooks of students are incomplete and not neat. While from the teacher aspect it is known that the learning methods used in general are lecture methods, question and answer methods, and methods of giving work, so that students are not actively

involved in the learning process. During the learning process the teacher often does not use media or teaching aids owned by the school, while Applied Natural Science lessons are part of science that requires practicum to improve students' understanding. The use of laboratories for practicum is also very necessary to support the learning process of students, but the fact is that not all State Vocational Schools in Pekanbaru have laboratory space for practice.

The research conducted by [2] revealed that basically the problems that occur in students are internal and external factors. As educators of the nation's young generation, teachers are obliged to find and find learning problems faced by students. [3], revealed that the main problem in science education in West Sumatra is the teacher (quality, uneven distribution, and teaching burden), curriculum (implementation regulations), students (interest in learning and creativity), managerial (principals and leadership) Based on this, the researcher is interested in conducting research to study those problems.

**2. RESEARCH METHODOLOGY**

This type of research is mixed methodology. Mixed method, which combines quantitative methods and qualitative methods. The purpose of using mixed method research is to find out more comprehensive facts about the problems faced by class X students of State Vocational Schools in Pekanbaru in Applied Natural Science subjects. This research was conducted at State Vocational Schools in Pekanbaru that studied Applied Science and used the K13 curriculum. The type of data in this study is in the form of secondary and primary data. Data sources include respondents and documents. Data collection techniques in this research are in the form of questionnaires, observation sheets, interview sheets, and document studies.

The data inspection technique used is data triangulation. Data triangulation is a technique of checking the validity of data that uses something else to check or as a comparison to a data [4]. The data validity technique was carried out in this study by comparing and combining the results of observations, answers to the questionnaire of students, the results of interviews and discussion of researchers with Applied Natural Science teachers, and so on analyzed.

Data analysis techniques were analyzed using data according to Miles and Huberman. [5] state that data analysis consists of four lines of activities that occur simultaneously, as seen in Figure 1.

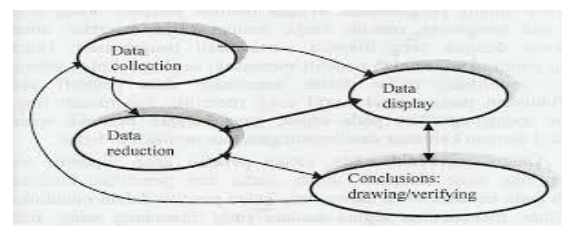


Figure 1. Components of Data Analysis of Miles and Huberman

The data is then presented through:

- a) a matrix that is data display of SMK Negeri 1, SMK Negeri 3, and SMK Negeri 4.
- b) Presenting the reasons given by each student in the form of a matrix.
- c) Presenting the results of observations of students.

### 3. RESEARCH RESULTS

#### 3.1. Internal Factors Causes of Applied Science Learning Difficulties Class X students

Internal factors are factors that originate from within the students that can cause students difficulties in learning Applied Science, both in terms of physical condition, talent, motivation, and the type of learning of each student. Based on the results of the study obtained scores from 10 indicators of internal factors causing the learning difficulties of Applied Natural Science students of class X of State Vocational Schools in Pekanbaru (Figure 2).

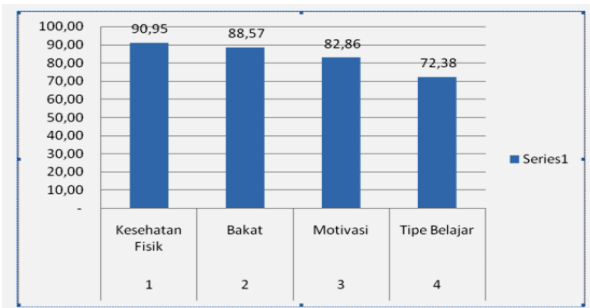


Figure 2. Internal Factors Causes of Applied Science Learning Difficulties Class X students.

Description of data from internal factors causing learning difficulties Applied Science students are as follows.

##### 3.1.1. Physical Health

Body condition is the most influential internal factor that causes students to have difficulty learning Applied natural Science. Based on the data obtained there were 191 people (90.95%) experiencing problems with physical health. Where students are sleepy, tired or lacking in enthusiasm in taking Applied Natural Science lessons. The most dominant reason for students is lack of sleep at night and difficult to understand Applied Natural Science. so that during the day that causes students to be too tired and sleepy.

Evident from the results of observations and interviews that researchers have carried out in the field that students are often tired or lack enthusiasm in learning Applied natural Science even to sleep. Based on observations that have been conducted for 5 meetings with different material, there are students who fall asleep in class as experienced by class X students of SMK N 1 Pekanbaru, SMK N 3 Pekanbaru, and students at SMK N 4 Pekanbaru. After being interviewed, the reason for students is lack of sleep at night and difficult self-condition factors that are too tired to follow the routine at school every day.

##### 3.1.2. Talent

Talent is the potential for basic skills born from birth. Students who have talent in Applied Natural Science subjects will have no difficulty in doing the assignments given by the teacher. Based on the results of the study obtained data, many students who did not have talent in Applied Natural Science as many as 186 people (88.57%) had difficulty in answering the applied natural science questions given by the teacher. The reasons for students are also diverse but the most dominant reason is that students do not understand science material. Applied because it is difficult to work on questions that have many physical formulas, and do not understand the applied natural science material. In addition, because the talent of students is more to productive lessons than to general learning such as learning Applied Natural Science.

##### 3.1.3. Motivation

Students who have a great motivation in learning Applied Natural Science can be seen from actively participating in the learning process and will actively ask the teacher and peers. Students who always ask lots of questions to increase their knowledge or indeed to ask for material that is poorly understood can anticipate the learning difficulties of Applied natural Science that natural students have.

Data obtained from the results of the study still contained students who did not want to ask about the applied science material as many as 174 people (82.86%). This is due to lack of courage, shame, and nervousness in asking. Based on the results of observations that researchers get the activity of asking students very low. Only a few people ask questions to the teacher. So, the activity of asking is an internal factor that indicates the lack of motivation of students in learning Applied Natural Science. So that grade X students have difficulty learning Applied Natural Science.

##### 3.1.4. Learning Type

Class X students have diverse learning habits but the most dominant they like and are considered as a way of learning that can facilitate the application of the applied natural science learning process is a discussion system and uses variations of learning methods and teacher explanations plus visual media. The reason for choosing a discussion system is accompanied by a teacher's explanation because with discussion students are more free to express opinions and can exchange ideas with peers. While students who like the way of learning with teacher explanations are equipped with visual media because the teacher can provide certain concepts to the material equipped with media so that students will increasingly understand the material of the Applied Natural Science. The learning habits of class X students can be seen in Figure 3.

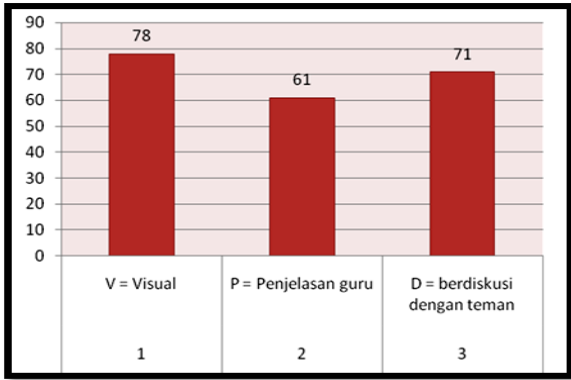


Figure 3. Learning habits of students.

Based on observations in the field, data obtained as many as 152 people (72.38%) had difficulty learning with the method delivered by the teacher. Teachers in Applied Science fields during the new learning process use the lecture method with material explanations only. So, with the diverse learning habits of students and the lack of variations in learning methods used by teachers as a result, there are still many students who experience learning difficulties because they are not in accordance with their respective study habits.

### 3.2. External Factors Causes of Applied Science Difficulties Learning Class X students

External factors are factors that originate from outside of the students that can cause students difficulties in learning Applied Natural Science, both from the family environment, school environment, and community environment.

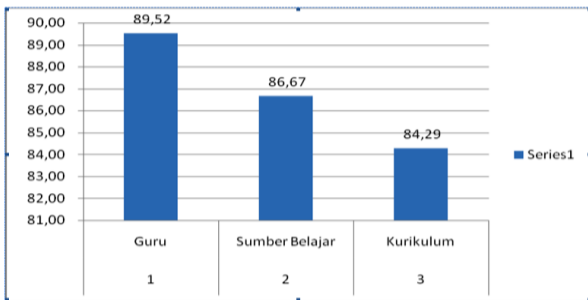


Figure 4. External Factors Causes of Learning Difficulties in Applied Science Class X students.

Based on the results of the study, it was obtained data that the external factors that caused the learning difficulties of Applied natural Science were the influence of the school environment, namely aspects of the teacher, facilities and infrastructure, and the Applied Science curriculum. Description of data from external factors. Applied science students are as follows.

#### 3.2.1. Teacher

Teachers are educators who provide a number of knowledge to students. A teacher has different ways of teaching. Teaching methods or presentation of learning

materials for students in the classroom, both individually and in groups so that students can be mastered, understood and utilized properly.

From the results of the study obtained data as many as 188 people (89.52%) stated that the teacher's teaching method made it difficult for students to understand Applied natural Science lessons where students said that the methods used by the teacher could not facilitate students to understand the material. The reasons for students are diverse but the most dominant is the teacher always uses the lecture method in delivering material and does not use learning media and the voice of the teacher, so that students get bored quickly by the way the teacher delivers Applied Science material. The summary of the learning methods used by the teacher while studying Applied Science is as follows.

Table 2. Learning methods used by the teacher

No	Topic	Class		
		SMK N 1 Pekanbaru	SMK N 3 Pekanbaru	SMK N 4 Pekanbaru
1	Relationship between style, effort, and energy in motion problems.	Lecture	Lecture	Lecture
2	Temperature and heat	Lecture	Lecture	Lecture
3	Surface elasticity and tension, electrical quantities	Lecture	Lecture	Lecture

In addition to the use of learning methods, other factors that cause learning difficulties in Applied Natural Science are mastery of the material and background of the teacher that is not in accordance with the field, resulting in a lack of understanding of the material and explanation of the material to students.

#### 3.2.2. Learning Resources

Learning resources that can help smooth learning of Applied Science students including textbooks in the school library. The lack of Applied Science package books in terms of quantity and quality can lead to learning difficulties for students. Based on the results of the study found 182 people (86.67%) students did not have an Applied Science handbook, and inadequate availability of Applied Science books according to K13 from the school library. The absence of an Applied Science book is in accordance with K13 so students must buy or photocopy the Applied Science package. Lack of textbooks makes it

difficult for students to understand Applied Science material because it lacks literature when the learning process.

So that students experience difficulties in reading Applied Science books. The reason for the most dominant learners is the explanation of each book differently, using many formulas, and having difficulty understanding images.

Besides the books that are limited and not owned by schools, Another factor that causes difficulties in Applied Science learning students is the unavailability of labor to support the applied science learning process in both SMK 1, SMK 3, and SMKN 4 Pekanbaru. The effect that teachers only teach in the classroom with theories without learning that brings students into the real world.

### **3.2.3. Curriculum**

#### **Difficulty Level**

Learning material as created in the curriculum has several levels, easy, medium and difficult. Each lesson material contains different levels of difficulty and affects the learning speed of students. Data obtained as many as 177 people (84.29%) had difficulty in understanding Applied Science material. Reason for learning difficulties in Applied Science was that the material was too much and complicated and many used formulas and calculations. In addition students also complained about the difficulty of the material, namely in KD 3.3 Analyzing the elasticity of stresses and surfaces, 4.3 Conducting elasticity and surface tension fields and KD 3.5 Applying electrical quantities, KD 4.5 Calculating the cost of electrical energy used based on the use and technology of electronic devices in the field tourism.

Based on interviews with deputy principals in the curriculum field, in terms of the level of difficulty of the applied class X science, in particular, the relationship between force, effort and energy in the problem of motion, the relation between temperature and heat and KD elasticity and surface tension with the needs of students. Fast or slow material understood by students depends on the teacher who conveys information or material to students.

Each subject matter contains different levels of difficulty and affects the speed of learning. Based on observations made from several classes, the average class is slow to understand the applied science material in SMK 1, SMK 3 and SMK 4.

From the statement of the subject matter teacher, the material in the KD was classified as difficult. Many students do not understand the material because the composition of a lot of material there are formulas in the field of physics and count problems.

Evidently from the daily test on the KD, only a few students received complete grades.

#### **Material Composition**

##### **a. Formulas and Counts**

Lack of students' ability to remember formulas in Applied Science material is the main factor that causes learning difficulties, students find it difficult to remember the formulas that exist in the material because formulas

and questions count are more difficult than listening to stories and historical stories that are indeed related to life in real.

This is evident from the results of interviews of researchers with students, the difficulty of remembering the formula of each Applied Science lesson related to the count questions that makes their minds more easily tired and bored, especially students who hate it with calculation lessons.

##### **b. Concluding Material**

There are still many students who have difficulty in concluding Applied Science material that has been delivered by the teacher in the learning process. The reason for students because they do not understand the material, because of a large amount of material presented in the semester I.

### **3.2.4 Factors that cause the most dominant applied science learning difficulties**

In this study there were 7 indicators that were the cause of the learning difficulties of Applied Science in class X students.

Based on the data obtained from the results of the study, it is clear that there are 6 indicators that are the most dominant causes of learning difficulties in Applied Science experienced by class X students, namely body condition (personalization), difficult to remember the formula and activeness of questions and the difficulty level of material (participation), and methods the learning used by the teacher is less varied (knowledge attractiveness).

## **4. DISCUSSION**

Learning difficulties are situations where students cannot learn properly. Learning difficulties are characterized by symptoms of difficulties experienced by students. One determinant indicator is the low learning achievement of Applied Science. In this study, it was known that the factors that caused the learning difficulties of Applied Science experienced by students came from internal factors and the external factors of the students themselves. In line with [6], states that difficulties in Applied Science learning are caused by various factors, starting from the wrong perception of students to Applied Science, material that is too dense, teacher's teaching style that is not attractive, negative attitudes of students, wrong learning habits of students, lack of availability of facilities.

### **4.1. Internal Factors Causes of Applied Science Learning Difficulties Class X students**

Internal factors in the study in this study are factors that originate from within the students that cause students to experience learning difficulties during the applied science lesson.

#### **4.1.1. Physical Health**

Body condition is the main internal factor that causes students to have difficulty learning Applied Science. Based on the results of data analysis, observations, and interviews conducted by researchers, many students lacked

enthusiasm to participate in Applied Science subjects. Students look lethargic and some even fall asleep in class. From the information obtained the cause of this is due to lack of maintaining a healthy body and lack of sleep at night. Students are preoccupied with learning activities but are not accompanied by efforts to maintain a healthy body. So students will get tired easily, lack enthusiasm, and ultimately not optimally receive the information conveyed by the teacher during the learning process.

With the state of the condition of the students as above, students do not concentrate anymore on accepting the lessons delivered by the teacher. As a result of this, students do not understand the applied science lesson material proven by the low daily test scores of students. In connection with these internal factors there are levels that need to be discussed according to [7], namely physical factors, psychology and fatigue factors. Physical factors can be divided into two, healthy factors and disability factors. Health factors are very influential on the learning process of students, if the health of a person is disrupted or exhausted, lack of enthusiasm, easy dizziness, sleepiness, if the body condition is weak and lacking in blood or there are abnormal sensory devices.

#### **4.1.2. Talent of Learners in Answering Applied Science Questions**

Talent is a person's ability to become one of the components needed in the learning process. If someone's talent is in accordance with the field being studied, then the talent will support the learning process so that it will most likely succeed. Gifted students in Applied Science subjects will be much easier to answer the Applied Science questions given by the teacher. This is evident from the number of daily tests in certain KDs, only a few students get scores above the KKM set by the school. Based on the results of observations, the difficulties of students in answering applied science questions are caused by several things. Students lack understanding of Applied Science material. Seen when the teacher gives a question, the students are more silent than responding to the teacher's question.

This indicates the lack of readiness of students in learning, students will learn if there is a task given by the teacher or if tomorrow there is a daily test of Applied Science. In accordance with Mulyani's research [8], the readiness of individuals as students in learning will determine the quality of the process and the learning achievement of students. Students who rarely repeat lessons at home, study when there is a task and when going to the test alone, the assignments given by the teacher are generally done in the morning or when the teacher explains the lesson. The achievements obtained by these students were very disappointing.

#### **4.1.3. Motivation**

Motivation is one of the factors that influence the effectiveness of student learning activities. Motivation as a process in individuals who are active, encouraging, giving direction, maintaining behavior at all times. Students who actively ask can increase their knowledge or strengthen

their understanding of the applied science material. In reality, there are very few students who want to ask questions to the teacher. Even though the activeness of the question can anticipate the learning difficulties of Applied Science that natural students have. Based on the results of observations in each class, during the learning process in the KD, it is rare for students to ask questions, other students choose silence or tell stories with friends next to them. Learning difficulties are caused by several things.

Students lack confidence in asking questions. Students are less brave, shy and nervous about asking questions. Students are afraid to laugh at friends when asking questions and if there is the courage to ask sometimes the teacher does not respond. Finally, students choose silence, even though students are still hesitant and have not understood the material delivered by the teacher. According to students, it is better to ask friends than to the teacher because it is easier to ask questions and the language of friends is easier to understand.

According to [7] that motivation is closely related to the goals to be achieved in learning, in determining that goal can be realized or not, but to achieve that goal needs to do, while the one who will be the cause of doing is motivation itself as power drive or driver.

#### **4.1.4. Learning Type**

According to its modality, the type of learning can be divided into three types of visual, auditory and kinesthetic learning [9]. Everyone has a tendency to one modality. The teacher also has the same modality tendency as his learning style. A student will literally easily absorb information in accordance with the type of learning. The lecture method that is often used by teachers makes students not motivated in learning Applied Science. Because it is only suitable for students with audiotorial modalities. But still, it is possible that students will get bored if there is no variation, especially if the teacher talks monotone. This is what makes students experience learning difficulties.

Teachers should in each meeting have a varied teaching style and even better if they combine the three learning modalities of the learners (audiotorial, visual, and kinesthetic), so that learning is more meaningful and students' learning achievement increases. In line with Abidin's research [10], students who have many learning styles, namely listening to teacher explanations, like visual media, using skills, want to solve problems, and discuss with friends have better achievements.

#### **4.2. External factors that cause learning difficulties**

External factors or factors from outside the students that cause students to experience learning difficulties in Applied Science subjects in this study there are 3 indicators, namely teachers (89.52%), learning resources (86.67%), curriculum (84.29 %).

##### **4.2.1. Teacher**

Teachers are educators who provide a number of knowledge to students. A teacher has different ways of teaching. [1] define the lecture method as the presentation

of lessons by the teacher by giving verbal explanations to students. The method of teaching or presenting learning material to students in the classroom, either individually or in groups so that the lessons can be absorbed, understood and utilized by students.

From the results of the study, it was obtained data that 188 people (89.52%) students stated that the teacher's teaching method made it difficult for students to understand Applied Science lessons where students said that the methods used by teachers could not facilitate students to understand the material. The reasons for students are diverse but the most dominant is that the teacher always uses the lecture method in delivering the material and does not use learning media and the voice of the teacher so that students get bored quickly by the way the teacher delivers the applied science material.

#### **4.2.2. Learning Resources**

The source of learning for students is the second external factor that causes students to have difficulty learning in the subject of Applied Science, which is 182 people (86.67%). This shows that learning difficulties are due to a lack of learning resources such as the Applied Science books and literature books used by students. Learning resources are closely related to the way students learn because the resources used by the teacher at the time of teaching are also used by students to receive the material taught. Complete and appropriate learning resources will facilitate the acceptance of learning material and master it so learning Applied Science will become more meaningful. In accordance with the study of [12], the supply of textbooks available in schools is one of the supporting factors for the smooth teaching and learning of 60% of the textbooks or learning resources that hinder the learning process, where students cannot understand the subject matter without the book.

The reality in the field, the availability of Applied Science package books especially for class X students is inadequate. It is impossible to learn Applied Science without a textbook, students will find it difficult to understand Applied Science material. In general, students already have textbooks but are privately owned and there are those who only copy Applied Science books of friends and do not even have Applied Science books. Based on interviews with students, the lack of source books makes students less aware of the applied science lesson material. For example, a photocopy of a textbook, all the images in black sometimes are not interested in reading the package book. In addition, the textbooks used by the teacher are different from those used by students so that students are a little bit big because books are not the same.

#### **4.2.3. Curriculum**

The curriculum is interpreted as a number of activities given to students, the activities of which are mostly presenting learning materials. Learning material that should be presented in accordance with the needs of the talents and ideals of the students as well as the local community. So the curriculum can be considered not good if the curriculum is too dense, above the ability of students, not

according to the talents, interests and concerns of students. Material that has a high level of difficulty makes students not motivated to learn and learning achievement decreases [6].

Just as found in this study students experienced learning difficulties in Applied Science due to material difficulties as many as 177 people (84.29%). This is evident from the daily test scores on certain KD students. Many are not complete. According to [5] research, there are four types of knowledge that must be mastered by vocational students, namely the applied science term, concepts, principles, and subject matter of applied science. According to the information the researchers got, the learning difficulties of Applied Science experienced by students was caused by the irregularity of students in repeating applied science lessons at home as well as the amount of material that contained physical formulas and matter counts so that the applied science material was only dropped by students' memories. In addition, the teacher also has not emphasized important indicators at each meeting that must be mastered by students. Teachers should be able to make important concepts on the board so that students become focused and focused on learning.

#### **4.2.4. Factors that cause the most dominant applied science learning difficulties**

In this study, based on data analysis shows that there are 5 dominant indicators of the learning difficulties of Applied Science students, namely the condition of the body of students (personalization), difficult to remember latin names and activeness of questions and the level of material difficulties (participation), and learning methods used teachers are less varied (knowledge appeal). In accordance with the opinion of [13], learning must include three main elements, namely personalization, participation, and the attractiveness of knowledge itself. If there are problems in one of these elements, it will cause difficulties in learning.

Personalize students is the first element of smooth learning in school. Good personalization can foster and enhance lifelong learning activities. Good learning positions students as a subject or student center. Good learning will be created if students have readiness in learning.

Participation is the involvement of active students in the learning environment and the surrounding community. In this study the participation of students is seen from the activity of students asking, understanding the material and the ability of students to remember Scientific Language in Applied Science learning. Active students ask to increase their knowledge or strengthen their understanding of Applied Science material.

Difficulty remembering the scientific name of Applied Science and the level of material difficulties that are currently also making it difficult for students to understand the Applied Science. According to the analysis, the researchers have done everything back to the internal factors of the students. Most students do not regularly repeat Applied Science lessons at home. Of course they become difficult to remember and understand the material.

Scientific language will be remembered by the students themselves if students are accustomed to independent learning and often do exercises in applied science problems at home or at school and are given direct learning experiences such as practicum at school.

Practicum is very important in Applied Science subjects, which is to strengthen the knowledge gained by students. The Physical Magnitude delivered by the teacher, both scalar and vector material will be more meaningful if students see examples of each case in daily life. From the implementation of practices students can see real objects. Direct experience will be more meaningful for students and by themselves students will also find it easier to remember the formulas of objects that have been practiced in the first semester. According to [14], learning from what is read, earning only 10%, learning from what is seen as learning is only 30%, while learning from what is said and doing learning gains is 90%.

In terms of the level of difficulty of the material, Physical Magnitude is material classified as moderate difficulty. If students really learn diligently and diligently, any difficult material will certainly be easy to understand. Reality in the field, students' motivation is lacking in Applied Science lessons. Drawing on students, Applied Science is a memorization subject that makes students burdened in learning.

The final element that causes science learning difficulties Applied students are the attraction of knowledge (the learning method used by the teacher). [15], there must be good relations between teachers and students, learning seriously but casually. Teachers can guide students in learning according to their interests and hobbies, teachers are able to make students curious so that students ask a lot of questions, and guide students to use the method of scientific memory that students are able to provide material links with the surrounding life.

## 5. CONCLUSION

Based on the results of the study, conclusions can be obtained as follows:

1. Internal factors that cause learning difficulties Applied Science students are physical health, talent, motivation and type of learning.
2. External factors causing the learning difficulties of Applied Science, namely teachers, learning resources and curriculum.
3. There are five indicators that are the most dominant as the cause of the learning difficulties of Applied Science which experienced by class X students of SMK N Pekanbaru namely personalization (body condition), participation (asking questions, difficulty remembering Scientific Language, and difficulty level of Applied Science material), and pull knowledge (less varied learning methods).

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