

Initial Laboratory Skill of Senior High School's Students in Tidore Kepulauan at Chemistry Subject

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Abstract: The aim of this research was to know of initial Laboratory skill at grade X and XI natural sciences of Senior high school students in Kota Tidore Kepulauan. The initial laboratory skill was analysed by using descriptive method. The population in this study were all senior high school students in Tidore Kepulauan in the academic year 2016/2017. Determination of sample used cluster random sampling technique and random sampling technique. The sampling technique was through 2 steps, the first step based on the accreditation level of each school, and the second step used random technique to determine the sample of each school that has been determined in the first step. The sample was the students of class X and XI SMA in Kota Tidore Kepulauan with A school accreditation as many as 135 samples, B accredited were 77 samples and C accredited were 25 samples. The laboratory skill was measured by using instrument test. Techniques of data analysis used by descriptive data analysis techniques with SPSS 20 assistance. The result of the research showed that the average of the students' initial laboratory skill of the school: (1) Accreditation A was 51,56 (2) Accreditation B was 52,59, (3) Accreditation C was 59.86. Generally, the average of the students' initial laboratory skill on the medium category.

Keywords: analysis, laboratory skill, students of Senior High School, chemistry subject

1. Introduction

The laboratory has become one of the centers in science learning especially in chemistry learning. Laboratory where to see, try, test the existing science concepts so that learners can better understand about science especially chemistry (Wiratma & Subagia, 2011). Learning in the laboratory can help learners to sharpen the concept of science knowledge, the nature of science, methods, and application of science learning. In the laboratory learning can also stimulate high-level thinking skills of learners such as analytical, creative, and critical skills that play an important role in learning chemistry (Maknun, 2012). Activities in the laboratory include demonstrations, live activities, and experimental investigations. Work in the

laboratory encourages an active learning process that requires students to engage in observing or manipulating things. Learning in the laboratory will develop about students' understanding of the scientific concepts, cognitive enhancement skills, and affective students (Gobaw and Atagana, 2016).

Chemical learning deals with the universe systematically, and relies on practicum activities as a theoretical proof. Learning in the laboratory can create learners to be more skilled at understanding the sharing of natural phenomena. Various obstacles are found in the conduct of practicum activities and even some of them cannot carry chemical labs in high school. These constraints occur because laboratory facilities and infrastructure were less supportive, such as the availability of tools and

practicum materials. Other barriers to school practicum include lack of laboratory understanding, exposure and the ability of the science process that prevents students from achieving the desired practicum goals (Geleta, 2015).

Based on data from the Education Office of Kota Tidore Kepulauan, the availability of chemical laboratories in SMA is not sufficient. The results of observations conducted, SMA Negeri I Kota Tidore Kepulauan only held a small amount of practicum caused by lack of equipment, and chemicals. In SMA Negeri 9 and Muhammadiyah 3 Kota Tidore Kepulauan have same problem. These constraints can have an impact on students' laboratory skills.

Initial student skills management in the laboratory will result in higher understanding and skills in conducting laboratory chemistry practice (Ezeano & Ezeudu, 2013). Laboratory skills were defined as the skills of students using measuring tools, props, calculators, and computer software, to enhance the experience in the laboratory (Setyaningsih & Harjito, 2013). Laboratory activities require students to hypotheses prove, scientific thinking, observe, and interpret data. The success of an experiment depends on the ability to select and use laboratory apparatus appropriately. So it takes a skill management tools in the laboratory, among others; Skills of choosing, preparing, assembling and using tools for experimental purposes.

Laboratory skills were part of the psychomotor assessment. The laboratory skills students must possess include: 1) selecting, installing, operating, opening, cleaning and returning equipment, 2) matching equipment, 3) reading metering tools, 4) handling, preparing and being aware of chemical hazards, 5) detecting, Calibrate, and correct errors in regulating equipment ((Beasley, 1987) in Maknun, 2012). Based on the description of the problem, it was necessary to examine the skills of chemistry laboratory of high school students who have never and never practiced chemistry in school.

2. Method

The research method used descriptive quantitative. Descriptive method used to describe the ability of early laboratory students of SMA Tidore Kepulauan, Province of Maluku Utara. The population in this study was 30% of the total number of students of class X and XI SMA in Kota Tidore Kepulauan which was divided into three strata, namely accreditation A, B, and C. The study sample was taken more than 30% of the population. The number of samples used was presented in table 1.

Table 1. Number of sample of class X and class XI SMA in Kota Tidore

No	School Accreditation	Population	Sample
1	A	305	135
2	B	188	77
3	C	80	25
Total		582	237

Technique of collecting data using written test in the form of a number of question about the use of laboratory tool which was based on indicator on laboratory skill of essay student as much as 15 number for each matter class X and class XI. Data analysis technique using descriptive data analysis technique with SPSS 20. Indicator on laboratory skill showed in table 2.

Table 2. Indicators of laboratory skills

Indicator	Sub Indicator
Laboratory skills	1. Students was knew, prepared, and operated the tools properly in accordance with the practice manual
	2. Students was understand the function practicum tool properly
	3. Students choosed tools and materials practicum properly
	4. Students used and read the measuring instrument correctly
	5. Students can do safety handling practices in case of accident in the laboratory
	6. Know and classify chemicals by their nature

3. Result and Discussion

3.1 Result

Description of initial skills of high school student laboratory in Kota Tidore with SPSS 20 for accredited SMA A, presented in table 3.

Table 3. Description of initial skill of laboratory for accredited SMA A

	Class X				Class XI		
	A	B	C	D	A2	B2	C2
Minimum	19	30	9	11	53	61	31
Maximum	73	90	66	41	79	69	80
Mean	41,06	66,05	38,58	24,11	65,37	65,11	51,55
Standard deviation	16,980	15,460	14,025	8,452	6,906	2,132	13,461

Average initial laboratory skill of class X A, B, C and D respectively; 41.06, 66.05, 38.58 and 24.11, with the overall average initial skill of the class X student laboratory is 42.45. While the average initial skills of laboratory class XI A2, B2 and C2 respectively; 65.37, 65.11, and 51.55, with the average initial skill of the class XI student laboratory was 60.68. So, the average of A-accredited high school students' lab skills was 51.56.

The second sample of SMA accredited B was presented in table 4.

Table 4. Description of initial skills of laboratory for accredited SMA B

	Class X		Class XI
	A	B	A2
Minimum	24	3	46
Maximum	66	71	70
Mean	48,22	48,40	56,86
Standard deviation	11,128	15,766	9,356

The average initial laboratory skills for B accredited class XA and B were 48.22 and

48.40 respectively, while for grade XI was 56.86, so overall the average initial skill of laboratory for accredited B was 52.59.

The third sample of SMA accredited C was presented in table 5.

Table 5. Description of initial skills of laboratory for accredited SMA B

	Class X	Class XI
Minimum	44	51
Maximum	67	79
Mean	55,85	63,86
Standard deviation	5,803	9,173

The average initial laboratory skills for C accredited class X was 55.85, while for class XI was 63.86, so overall the average initial skill of laboratory for accredited C was 59.86.

Differences in initial laboratory skills of senior high school's student Kota Tidore Kepulauan can be seen in figure 1.

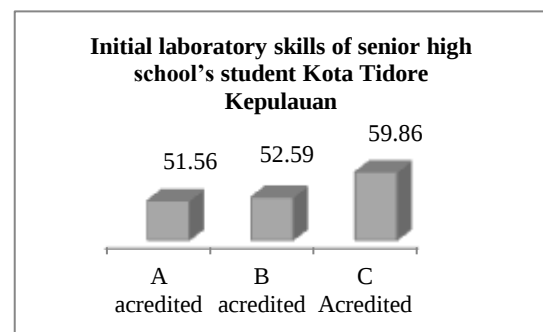


Figure 1. Initial laboratory skills of senior high school's student Kota Tidore Kepulauan

3.2 Discussion

The result of descriptive statistical analysis showed that the average of skill achievement result of high school student laboratory in Kota Tidore Kepulauan for accreditation A was 51.56 with medium category, accreditation B was 52.59 with medium category, and accreditation C was 59.86 with medium category. The results of this descriptive statistical analysis showed that accredited school C which has the highest initial laboratory skills of the students then

schools that have accreditation A and B. These results indicate that the initial skills of the student laboratory have no effect on the level of school accreditation. Although based on the results of observations at schools in Kota Tidore Kepulauan high school indicates that accredited C schools do not perform chemical laboratory in schools because the facilities and infrastructure was inadequate.

Teachers at SMA Kota Tidore Kepulauan introduce tools and chemicals theoretically by showing pictures and demonstrating some tools to students to overcome the limitations of laboratory facilities in schools. Thus, although the lab was rare or not performed, students have initial laboratory skills in the moderate category. The introduction of tools in the laboratory has in fact been done in junior high school (SMP) on natural science learning. That was also suspected to be the reason that the initial laboratory skills of senior high school's student in Kota Tidore Kepulauan at the same level.

In this study, the measurement of high school students' skills in Kota Tidore Kepulauan focused on three main indicators; recognize, discriminate the function of the tools, skills of selecting tools and chemical in high school chemistry laboratory. Based on data analysis, the average students have the skills in recognizing the chemistry with a presentation of 54.16%. Student's skill in describing chemistry laboratory function was lower by 43.24%, skill in choosing appliance and chemicals for praktikum equal to 4.32%.

4. Conclusion

Based on the result of data analysis, it can be concluded that: The initial skill of high school student laboratory in Tidore Kepulauan A accreditation is 51,56 with medium category, accreditation is B 52,59 with medium category, and accreditation C is 59,86 with medium category. The initial laboratory skills of senior high school's student Kota Tidore Kepulauan should be improved in order to perform many experiments in the laboratory. Practicum in chemistry subjects should be implemented in

order to provide students with experience in knowing the equipment and chemicals. Improving laboratory facilities and teachers' creativity in chemistry learning.

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