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The Implementation of Chemistry Practicum at SMA Laboratorium Undiksha Singaraja in the School Year 2016/2017

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Abstract

This research aimed to describe and explain the practicum topics conducted in chemistry learning, the teacher's way conduct experiment, and the factors affecting experiment feasibility in SMA Laboratorium Undiksha Singaraja. This research was a qualitative research. Subjects involved in this research were laboratory documents, chemistry teachers, a laboratory assistant, and students. Data collection techniques used were study of document, observation, and interview. Data were analyzed by using descriptive interpretive analysis. The results of this research revealed that (1) only one of five practicum topics that should be implemented was conducted in chemistry learning in class X , in class XI only five of fourteen , and in class XII only five of eleven; (2) the teacher's way of implementing chemistry practicum at SMA Laboratorium Undiksha Singaraja was by group. (3) factors influencing the implementation of chemistry practicum in SMA Laboratorium Undiksha Singaraja were tools and practicum materials, teachers and students' readiness, laboratory assistant, learning time, and laboratory space.For the teachers in teaching chemistry is will be expected to not only give priority to the giving of the material only but the activities to be conducted also practicum so that the basic competencies that are available on the syllabus.

Keywords*: chemistry practicum, SMA Laboratorium Undiksha*

1. Introduction

Chemistry is one of the branches of science that underlies the development of advanced technology and the important concepts in everyday life. The nature of chemistry includes two things, namely chemicals as product and process. Chemicals as product includes a collection of knowledge that consists of facts, the concepts and principles of chemistry. Chemicals as process includes the skills and attitudes that are owned by the scientists to acquire and develop knowledge of chemistry. One of the ways to perform the skills of the process is through practicum. Practicum is an important activity to be undertaken to improve the ability of students in the aspects of knowledge, attitudes and skills. Through practicum learners are also trained to develop the ability to solve the problem with the scientific approach.

In accordance with the school-based education curriculum (KTSP) which is one of the components of the syllabus nearly every Standard Competence and Basic Competence has the purpose to make students understand the sense of the concept learned by doing experiments and interpreting the results. Rustaman (2002) presents three aspects of the purpose of the practicum implementation, (1) to develop basic skills experiment; (2) to develop the ability to solve the problem with the scientific approach; and (3) to increase the understanding of the subjects.

Mamlok-Naaman & Barnea (2012) proposed that laboratory activities have the role and important benefits in the science curriculum. It is also stated that the practicum activities can improve the understanding of learners in chemistry subject. Therefore, it will be more meaningful and conceptual. The results of the research showed that the practicum implementation can improve the results of the study learners.

Laksmi (2014) research shows that the management of the tools and practicum materials has not been done well, especially in the process of the utilization, maintenance

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and destruction, which can be seen from the amount of material that is practiced. In the class X,among five topics of practicum in the curriculum only one topic that has been practiced. In grade XI among 14 topics only four practiced. In the class XII among 10 topics only three topics practiced. In addition, there are a number of problems faced by teachers in conducting practicum activities, i.e., time management and laboratory conditions. The research showed that practicum conducted is not optimal yet, not in accordance with the applicable curriculum.

Another research from Samiasih (2013) shows the intensity of the use of the laboratory at SMK Negeri 2 in the school year 2012/2013 falls into enough category with the percentage of 67%. For all of the vocational education programs in class X only one practicum have been conducted, for grade XI there are five practicums that have been conducted, and for grade XII there are four practicums that have been conducted. The implementation of the number of low practicum in the class X, XI and XII in all vocational education programs are caused by many factors, i.e., the limitation of the tools and chemicals material so that practicum cannot be performed, students focus more on productive lessons such as implementing productive practice, limited time for teachers to prepare for lab work, and lack of laboratory technicians.

The facts of the research result above shows that the practicum implementation at school has not optimally been done yet in accordance with the basic competencies that have been specified by the curriculum. Based on the need to do further research related to practicum implementation there are things that need to be done, i.e., (1) topic/matter implemented within practicum chemical learning; (2) How teachers conduct practicum; and (3) the factors that affect a practicum implementation .

SMA Laboratory Undiksha Singaraja is an A accredited private school in the city of Singaraja which has been using school-based curriculum (KTSP). This school has two chemical teachers that have met professional education qualifications shown by certificates that they possess. In addition, there is a laboratory assistant who helps to prepare the tools and practicum, but the laboratory assistant is not a graduate of chemical education. The laboratory assistant is only an SMK graduate but has become laboratory assistant since 1997 in SMA Laboratory and has received training as laboratory assistant three times. One of the teachers of chemistry teaches chemistry in classes X and XI. Another chemistry teacher teaches chemistry in grade XII. The X class consists of nine classrooms with 248 students. The XI class SCIENCE consists of two classes with 72 students and grade XII SCIENCE consists of three classes with 76 students . The X class gets chemical lessons once in a week (2 hours lessons). The XI and XII class SCIENCE gets chemical lesson twice a week (4 hours lesson).

SMA Laboratory Undiksha Singaraja has a chemistry laboratory. Although the chemical laboratory was built separately from biology laboratory, not all practicum can be conducted in accordance with the syllabus. Based on the results of the preliminary study in SMA Laboratory Undiksha Singaraja at the time of the implementation of PPL-Real by asking questions with one of the teachers and laboratory assistant and some of the alumni, the following information was obtained. Chemical teachers stated that there was indeed a laboratory which designed as a laboratory for research , not for chemistry learning. Based on the claims of the teachers, the researchers assume that the practicum implementation makes the students too busy with activities. Permendiknas RI No. 41 2007 states that students at least use an area of 2.4 m^2/student. In addition the teacher also said that there is a limited amount of time learning so that the time for the practicum implementation is not always sufficient and there are not enough tools and chemicals.

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Alumni 2015 stated that practicum was rarely done. The average was 3-4 times in one year. Usually the teacher used virtual media. This is supported by the information from the laboratory assistant that chemistry laboratory management is good enough and equipped with a variety of administration to support the effectiveness of the implementation of the practicum. But according to the laboratory assistant practicum activities get a little bit frustrating because of the problems with inadequate tools and materials and time of learning.

The result of the study above needs to be examined. Therefore, research about ″The Implementation of Chemistry Practicum at SMA Laboratorium Undiksha Singaraja in the School Year 2016/2017**″** needs to be performed. This research was done in the school year 2016/2017 with the focus on three issues, i.e., (1) the practicum topic or subject conducted in chemistry learning; (2) the teacher's way in conducting experiments ; and (3) the factors affecting experiment feasibility in SMA Laboratorium Undiksha Singaraja.

Practicum is an important activity in the teaching and learning process. The practicum implementation can measure the ability of students in cognitive, affective, and psychomotor simultaneously. In addition, in the components of the syllabus of school-based curriculum (school syllabus development) nearly every competence standard and basic competence has the purpose to make students understand the sense of the concept learned by doing experiments and interpreting the results. If not executed, practicum and basic competences cannot be achieved and finally the teacher can not achieve SKL. Therefore this research is important to be done.

The implementation referred to in this research is the practicum activities conducted in schools including the type of practicum conducted and how it is implemented. Practicum activities can be said to be accomplished when the activities are carried out by the students as individuals and groups in the laboratory.

2. Research Method

This research was a qualitative research. Subjects involved in this research were laboratory documents, chemistry teachers, laboratory assistant, and students. The data were collected from each practicum topic or subject conducted in chemistry learning, the teacher's way of conducting experiments, and the factors affecting experiment feasibility.

Data collection techniques used were study of document, observation, and interview. Data were analyzed by using descriptive interpretive analysis. Study of document techniques used to obtain data related to inventory in the form of the chemistry syllabus of classes X, XI, and XII of the first and second semesters used by schools and the topic of practicum that is planned to be seen from the implementation lesson plans for classes X, XI, XII in the first and second semesters, practicum journals that contain topics of the practicum conducted. The syllabus Analysis was done by mapping the practicum material from basic competencies. Analysis of the journals practicum and lesson plans for the practicum activities was done by filling out the *check-list*. The information obtained from the lesson plan documents and practicum journals contains a practicum topic/subject planned and conducted.

Observation techniques used to obtain data related to the teacher's way in conducting experiments and laboratory infrastructure. The technique of observation was done by observing directly the learning activities in the laboratory and the infrastructure to support the practicum implementation. After the observation was conducted, then a transcript of the observation result was written.Techniques of interview was used to explore information data related to the data of the the practicum topic or subject conducted in

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chemistry learning, the teacher's way of conducting experiments, and the factors affecting experiment feasibility related to the chemistry teachers, laboratory assistant and the students. Analysis of the results of the interview was strengthened by creating a certified transcript of the results of the interview. The results of the interview were validated by performing the member check.

Data analysis in this research was performed in three stages : (1) data presentation, (2) data reduction; and (3) data verification.

Data credibility was enhanced by triangulation. The analysis was ended with the interpretive technique by considering all data/information collected.

3. The Research Results and Discussion

The results of this research showed the practicum topic or subject conducted in chemistry learning, the teacher's way of conducting experiments, and the factors affecting experiment feasibility in SMA Laboratorium Undiksha Singaraja.

Planning the implementation of a chemistry experiment at SMA Laboratorium Undiksha covers the writing of lesson plans, worksheet, and the preparation of the tools and materials for practicum. The types of chemistry experiment for classes X, XI and XII as a whole were planned in accordance with syllabus used, but not all topics of practicum required by chemistry syllabus for classes X, XI and XII were planned by the teachers. Preparation of learning in the form of the writing of lesson plans and student worksheets for practicum were prepared a long time before the practicum was conducted. Preparation of the tools and the materials were done by the laboratory assistant with a coordination with each of the teachers of chemistry. The process of preparation of the tools and the materials was done a day or two days before the activities of chemistry experiment begins or the possibility the preparation of the tools and the materials was done several hours before the practicum activities started. Before the practicum was conducted, the laboratory assistant also checked the capabilities of the tools and the materials for practicum. Setting the schedule of the use of the laboratory was performed each new school year followed by the schedule of chemistry learning in each class. The schedule was written by the Deputy Head of the curriculum.

Observed from the planning process chemistry experiment at SMA Laboratorium Undiksha Singaraja ran well in accordance with Permendiknas No. 41 the year 2007 on process standards. According to the theory in Permendiknas No. 41 2007, the syllabus can be arranged independently and in groups. So the implementation of syllabus development was in accordance with the theory. In the process standards it is also required that every teacher must write his or her lesson plans. So, the planning of chemistry experiment activities by the chemistry teachers was in accordance with Permendiknas No. 41 the year 2007 on process standards as specified standards.

The planning phase of learning is not limited to practicum on syllabus and lesson plans alone. The preparation of the tools and the material is also one of the planning phase of the practicum. The tools and the material support for practicum activities were prepared by the laboratory assistant. The existence of laboratory assistant is essential in the chemical laboratory. Before the practicum activities is conducted the tools and the materials must be prepared carefully. If the preparation is only done by the teacher, it will make the teacher have too much work, since the teacher also has numerous daily responsibilities. This is assured by the opinion of Kertiasa (2006) that teachers need to be assisted by a laboratory technician and/ or laboratory assistant. If the school has more than one laboratory, each laboratory assistant requires at least one helper and may also one laboratory technician to

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lead. Preparation of the tools and the materials by a laboratory assistant is also stated in Permendiknas No. 26 year 2008 on the standard of a school laboratory that the competent laboratory assistant is one who serves practicum activities. So the preparation of the tools and the materials before the practicum has been specified in the standards.

The practicum topics or subjects conducted in chemistry learning are still limited in number. Not all the types of chemistry practicum required in the school syllabus development in SMA Laboratorium Undiksha can be implemented. In the class X, of the five topics of practicum in the curriculum only one was practiced. In grade XI, of the 14 topics only five practiced. In the class XII, of the 11 topics only five practiced.

In the context of the implementation of the chemistry experiment at SMA Laboratorium Undiksha, the number of the implementation, seen from the number of practicums that have already been carried out, is still limited number and does not meet all the basic competencies that are specified in the syllabus for chemistry in the school syllabus development. This indicates that chemistry learning in SMA Laboratorium Undiksha is not optimal yet. The teachers prefer the giving of the material in the classroom to providing practicum learning in the laboratory. The teachers use only references for the National Examination in implementing the practicum. This indicates that the teachers consider practicum not important in chemistry learning. If seen from the school accreditation, practicum implementation that is not in accordance with the syllabus does not reflect the accreditation A.

On Permendiknas No. 22 the year 2006 on content standard in the case of chemistry lessons in SMA/MA it is mentioned that Natural Sciences (IPA) is related to how to find out about natural phenomena systematically so that science is not only the mastery of the knowledge of these facts, concepts, or principles but also is a process of discovery. Chemistry learning and assessment of the results of the study should consider the characteristics of chemistry as process and product. So, practicum learning in learning chemistry cannot be ignored because it is the principle in accordance with the characteristics of chemistry as process.

How teachers teach practicum seen from the implementation process of practicum learning from the beginning to the end. The teacher teaches practicum in group. The number of students in one group in the class X was 4-5 , in grade XI 6-7, and in grade XII 4-5. It is adjusted with the number of students in each class. For practicum activities which have already been carried out, the number of groups is six. This is due to the fact that the laboratory has desks only, so that the number of groups allowed is six. The implementation of the practicum learning is the implementation of planning that had been arranged. According to Permendiknas RI No. 41 2007, implementation stages of activities include introduction, the whilst and the conclusion. In the implementation of the chemistry experiment, stages of implementation are not much different from the stages in the classroom learning activities.

Practicum activities observed involved electrolyte and non-electrolyte, identifying acids and bases solution, titration acids and bases and the making of a compound ethers. On the experiment about electrolyte and non-electrolytes in class X and tritation acid-base in class XI, it was seen that teacher I used inductive approach, experiment method and discussion. On the initial activities, the teacher gave apperception and motivation so that students got description about practicum that would be implemented. On apperception activities, teacher I gave questions about the material that had been studied and associating it with the materials to be learned about the components of the solution in the topics

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electrolytes non electrolytes and the meaning of the level of/concentration along with some concentration units that have been known in titration acid-base.

In the experiment about the identification of acid and bases with the indicator, it was seen that teacher I used discovery learning model, process approach, experiment method and discussion. In the initial activities, teachers gave apperception and motivation so that students get description about practicum that would be implemented. In apperception, teacher I gave questions about the material that had been studied and associated it with the material to be learned, about the components of the solution. Teachers motivated the students by displaying the citrus fruit and a bottle containing the solution that was not known and then gave the question of how do we know whether the citrus fruit and an unknown solution are acidic or base.

Apperception and motivation given by teacher I have been in accordance with the demand of Permendikbud No. 22 2016 that in the initial activities teachers are required to give motivation to learn to learners in the appropriate and useful context for applications of the lesson materials in daily life by providing examples and comparisons from local, national and international contexts and adjusted to the characteristics and levels of the learners; asking questions that associate prior knowledge with the materials to be learned.

The whilst activities carried out by the teacher I on practicum learning about electrolyte and non-electrolytes and titration acid-base were conducted with three stages, i.e., exploration, elaboration, and confirmation in accordance with the school syllabus development. In exploration activities, the teacher directed the students to work on the worksheets, pointed to each group in turn to read the worksheets from the title of the purpose of the tools and the materials and work steps, soldering tools test electrolytes and titration, and doing experiments with modeled on worksheets.

In elaboration activities, the teacher directed the students to do the discussion in the group about each of the test results that they got and to write the results of observation data in the format of the report of the group. At this stage, the teacher supervised and guided the students in the discussions. In the confirmation activities, the teacher pointed to one of the groups to write the results of experimental data on the blackboard and present them. The teacher straightened the things that were still confusing from the results of the class discussions. In the teaching practicum of titration acid-base, the confirmation was done in class at the next meeting because the time was up. The exploration, elaboration, and confirmation done by teacher I have been in accordance with Permendiknas No. 41 2007.

The whilst activities in the practicum learning about identifying acids and bases with the indicator was carried out by teacher I in six stages, i.e., (1) in the level of the stimulus, teacher I provided a stimulus to the students about how to know the nature of acid-base balance of a solution through questions; (2) in the identification of the problem, teacher I directed the students to formulate the problem and make the hypothesis; (3) in the data collection stage, the teacher directed the students to test the hypothesis that they made in experiments in accordance with the existing procedure in the practicum worksheets. The teacher directed the students doing experiments and guiding the students when they did not yet understood; (4) at the stage of data processing, the teacher directed the students to group discussion about the results of experiments that have been done and draw conclusions; (5) in the data verification stage, the teacher appointed one of the groups to write down their observation table and then present it. The teacher guided the class discussion and facilitated the students to ask for things that were not clear; (6) in the final stages of the generalizations, the teacher led the students to conclude the results of

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experiments that have been done. One of the students wrote the conclusion on the blackboard in the form of a scheme that the solution can be divided into three based on his nature, i.e., acid solution, bases, and salt.

Based on the stages it can be concluded that teacher I had implemented the stages of the learning in the discovery learning model. Discovery learning is one of the model of teaching where the teacher does not directly provide the end result or conclusion from the material taught, but the students are given the opportunity to search for and find the results of the data. So that this learning process will be remembered by the students over time so that the results cannot be easily forgotten (Aini, 2015). Using the discovery model, the students will be led to seek and find their own materials or answers that are being studied. Discovery learning model emphasizes learning that centered on the students. This makes the students more active in learning and search for the material and make the lessons more meaningful (Rizkiana, 2016). The research that has been done by Kadri & Rahmawati (2015) shows that teaching of Natural Sciences using discovery learning model provides a more significant effect than conventional learning in improving the students' learning outcomes.

At the end of the activity of the experiment about electrolytes and non-electrolytes, titration acid-base, and identifying acids and bases with the indicator, the teacher gave the task to write a group practicum report and told about the next lesson plan. But, in the experiment on titration acid-base and identifying acids and bases with the indicator that was done by the teacher I did not tell about the next lesson plan. The follow-up activities in the form of a task was in accordance with the Permendikbud No. 22 2016 (Depdiknas, 2006) teachers should convey the plan for learning activities for the next meeting. Widyastono (2007) stated that the delivery of the next lesson plan is very important to take in a learning process so that students can prepare themselves to follow the next lesson.

In Permendikbud No. 22 2016 it is stated that in the closing activities, teachers with students both individually and groups do a reflection to evaluate the entire range of learning activities and the subsequent results obtained collectively to find direct or indirect benefits from the outcomes of the teaching that has been in progress, provide feedbacks to the process and learning outcomes, do follow-up activities in the form of tasks, both individual and groups tasks and inform the plan of learning activities for the next meeting.

The results of the observation of the practicum learning by teacher I showed that the teacher I taught practicum in a systematic, communicative, confident, enthusiastic and sympathetic way In addition, the teacher also always tried to stimulate active participation from the students by providing basic questions related to the material and always gave the opportunity to the students to answer the questions so that the students were motivated to learn. This is in accordance with the the Regulation of the Department of education of the year 2008 about assessment of Teacher Performance that teachers must act as an effective communicator, give encouragement to the students to grow the spirit to learn, perform the discussion in class and ask questions.

In the practicum learning about creating a compound esters done by teacher II, it was seen that teacher II used deductive approach, experiment method and discussion. Practicum learning by teacher II did not look systematical, not in accordance with the steps of learning is in the lesson plan. In the initial activities, before giving apperception and motivation the teacher introduces the tools and the material used and explained the work of the experiment. The teacher can then explain competence standard, basic competences and indicators.

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Teacher II used deductive approach. This could be seen from the teacher presenting the material on ether briefly first before performing the practicum. This is in line with the expressed by the Widyastono (2007), the step that can be done in the activities of the introduction can only consist of one activity, that is, explaining briefly the contents of the lesson. At the beginning of the lesson the students want to know immediately what will be studied at a meeting at the time. Curiosity will be met when teachers explain briefly so that the students get a description about the lesson that will be discussed and practicum that will be implemented.

In apperception, teacher II reminded people about the types of carbon compounds. The teacher motivated the students by asking questions: What is the use of of ether in everyday life? The teacher gave exercises to the students to write down some of the structure of the ether compound. Apperception and motivation given by the teacher II is in accordance with the demands of Permendikbud No. 22 2016 (Depdiknas, 2006).

The whilst activities carried out by the teacher II was done in three stages, i.e., exploration, elaboration, and confirmation in accordance with the school syllabus development. In the exploration activities, the teacher directed the students to work on the worksheets, and do experiments as modeled in the worksheets. In elaboration activities, the teacher directed the students to make a group discussion about the results of experiments that they got. The students did group discussions with the guidance of the teacher. In the confirmation activities, the teacher pointed one of the groups to write the results of experimental data on the blackboard and present it. The teacher straightened the things that were still confusing from the results of the class discussions. At the closing activities, students gathered group reports and the teacher led the students to conclude the result of the experiment.

The results of the observation practicum learning by teacher II showed that teacher II taught practicum in a communicative, confident, enthusiastic and sympathetic way, but less systematical. The teacher also always tried to motivate active participation from the students by providing basic questions related to the material and always gave the opportunity to the students to answer the questions so that the students were motivated to learn. In addition teacher II also utilized learning media (power point) to make it easier for the students to understand the material. The ability to teach that needs to be mastered by the teacher in relation to classroom management is the ability to use media, preferably visual and audiovisual media (Depdiknas, 2008).

Teachers are required to facilitate the students when exploring and collecting data so that the obtained data are related to the concept. Teachers I and II have facilitated students by giving worksheets to lead the students to find the information (Depdiknas, 2008).

The factors that affect the implementation of practicum consists of those that support and those that inhibit the implementation. The factors that support the practicum implementation are (1) the completeness of the tools and practicum materials; (2) the readiness of the teacher and the students to implement the practicum activities; (3) there laboratory assistant; and (4) learning time is sufficient to carry out the experiment. While the factors that inhibit practicum implementation are (1) the limitation of the tools and materials; (2) the lack of the implementation of the practicum; (3) the lack of understanding of the learners about the procedure of the practicum and (4) narrow laboratory space . These findings are almost the same as the findings of an earlier research conducted by Lubis (2012) with the results on the obstacles faced by teachers in the implementation of chemistry laboratory practicum management and inadequate practicum tools/materials and the lack of

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the allocation of time to carry out the practicum. The research done by Suandewi (2015) shows that the factors that affect the implementation of the chemistry practicum are teachers, learners, laboratory tools and materials, and laboratory assistant.

Seen from the availability of the tools and the material to support the implementation, practicum activities can be carried out in 6 groups. This shows that the dominant factors that cause the nonimplementability ot the practicum activities are not b the less availability of the tools and the materials, but the chemistry teachers who manage learning. It is apparent that teachers are not ready to implement chemistry experiment. Teachers prefer to teach materials in the classroom.

According to the Sylvia (2005) a teacher should attempt to improve his or her professional quality. In addition to having provisions for how to teach chemistry well, teachers also need to have laboratory skills as a support for the implementation of the tasks in the field and troubleshooting capabilities, so it is not easy to give up when facing the problems that are associated with the task to teach. With a good laboratory skill and the ability to troubleshoot a teacher can always do, create and design activities for the practicum for their students even in the condition where the laboratory facilities and infrastructure are inadequate.

Laboratory assistant becomes a factor that supports the implementation of experiments. Although the laboratory assistant does not meet the qualification, it does not become an obstacle to carry out the practicum activities. Without the existence of laboratory assistant, practicum can still be held as long as the teacher has time to prepare the tools, materials .

The next problem experienced by the teachers of chemistry is the lack of time to carry out the chemistry experiment. The time in the curriculum is not in accordance with the real time that is in the field. The time to carry out the practicum is always not sufficient if it is not adjusted to human resources (the ability of students). This causes the skill owned by the students to be very low.

As we know chemistry is the science of abstract things and chemistry is studied with how to simplify most of the objects in this world and the discussion is not merely to answer questions about numbers (numeric questions) but also about the explanations about chemical phenomena through experiments. So the experiment or practicum is an important part of chemistry learning. This is due to the fact that chemistry is the natural science which is based on the finding based on the physical phenomena in everyday life. Chemistry experiment helps learners get technical skills, for example to manipulate the equipment and materials, observation, data collection, data analysis, interpretation of the result of observation, troubleshooting, team work, design experiments and communicate skills (Suardana, 2010). This means that chemistry is not only learned in cognitive domain., but there are absolutely affective and psychomotor aspects involved.

Other problems experienced by teachers is the learners' lack of understanding about practicum procedure. Learners still think that in the process of learning the teacher is the main source of learning process. Learner's curiosity about new things is also still low so that they are less prepared for a practicum. If the learner's curiosity is still low, the practicum implementation will always be inadequate.

The chemistry laboratories play an important role in the practicum implementation. The chemistry laboratory is a place to perform chemical experiments and are supported by the tools and materials for the experiment. However, based on observation, interview and document study, it was found out that the area of the chemistry laboratory is 54 m^2 , already including a wide space for the laboratory management of 4 m^2. According to Permendiknas

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No 24 Year 2007, each learner does an activity in an area of 2.4 m^2. If reviewed from the number of students in each grade, the average number of students is 28. So the area of the laboratory which is needed as a place of learning is at least 60 m^2. Seen from the number of students, the laboratory in SMA Laboratorium Undiksha does not meet Permendiknas standard.

In terms of learning facilities, according to Permendiknas No 24 2007 , include a chair for each student, desk in each group, demonstration table, preparation table, tools cabinet, materials cupboard, acid cabinet, sink, and learning media such as the blackboard. Based on the government regulation, the laboratory facilities is still not complete. That is indicated by the number of the tables that is not adequate, lack of acid cabinets used to react acid. The demonstration table used by teachers to demonstrate the practicum also does not exist. It is obvious that the teachers do more demonstrations in the class room so that the learning atmosphere more comfortable. Reviewed from its function is clearly the practicum implementation in class room violates the laboratory function.

The teacher has to offer solutions to solve the problem of limited tools, materials and limited time to carry out the practicum, i.e., to do demonstrations and discussions with assisted media. Demonstration method is one of the methods recommended in science lessons. The demonstration method is done to overcome time constraints. Some advantages of the demonstration method are the attention of the students can be focused on the things that are considered important by the teacher so that things that are important can be observed as needed and not directed at other things, can reduce the errors when compared with only reading things in the book because the students have obtained the bigger picture of the results of the observations, some issues that raise questions in themselves the students can answer the time they are observing the demonstration process, this forms the students' clear understanding of a process or work of an object, makes it easier to repair various types of explanation and mistakes that occur from the knowledge learned from an oral presentation , thus the results of the oral presentation can be improved through observing concrete examples, by presenting the actual objects (Silitonga, 2009).

Demonstration method can improve the results of student learning. This is in line with the research done by Situmorang (2013). The results of the research showed that demonstration method can improve the student learning on teaching the system of colloids at SMK students because the students can see directly the chemical processes that explain the concept of the colloid system . Differences in the level of the ability to control the students caused by the delivery method that gives the impression of learning will be remembered longer by the students. Demonstration method is very effective in improving the student learning achievement in teaching colloid system when compared with the lecturing method indicated by the percentage of student achievement of the experiment group (96%) higher than the control groups (91%) in both high and low achieving students .

Another solution offered is in discussions with assisted media. Learning Media have an important role in supporting the quality of teaching and learning process. The Media can also make learning more interesting and fun. In general the media has a purpose: to clarify the message that is not too verbalistic, to overcome constraints of space, time, energy and resources and sensory organs, to invigorate learning in a more direct interaction between students with learning resources, to allow children to learn independently in accordance with the talent and visual , auditory & kinesthetic capabilities, to give the same stimuli, to liken the experience & cause the same perception (Purwono, 2014).

Purwono (2014) stated that the audio-visual media have some excesses or uses, among others :(1) to clarify the presentation of the message that is not too verbalistic (in the

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form of words, written or oral); (2) to overcome constraints of space, time and resources senses, like: object that is too large , replaced with a picture , frame movies, movies or model; (3) audio-visual media can play an important role in learning the tutorial.

In general, a solution that is given by the teacher of chemistry can be useful to the understanding of the learners about the concept that is taught. But the lack of demonstration method is as follows; (1) demonstration method is not fair when the tools demonstrated cannot be observed carefully by students. For example the tools are too small or the explanations are not clear; (2) demonstrations become less effective when they are not followed by an activity where the students themselves can participate in experimenting and making the activity is a valuable experience; (3) not all things can be demonstrated in the classroom. For example the tools that are very large or in other places that are far from the classroom; and (4) Sometimes when a tool is brought into the class and then demonstrated the students see something different from the process in the actual situation (Situmorang, 2013). The disadvantages of media-assisted discussion method is that learners do not have direct experience so that their ' skill aspects can not be developed.

Essentially practicum is different and superior to demonstration. The course includes teaching the students who are working directly with the tools and chemicals while in the demonstration most of the students act only as observers. The students who are taught through practicum have a higher motivation than those who are taught through demonstration. The involvement of the students might be the cause of the motivation.The results are in line with the results of research done by Rizkiana (2016) that explained that there is a difference in motivation between the students who learn through practicum and those through guided inquiry. The students who learn through practicum and guided inquiry have higher motivation to learn than those through demonstration and guided inquiry. Therefore the implementation of chemistry practicum is crucial to the development of cognitive , affective, and psychomotor aspects.

4. The Conclusion and Suggestions

Conclusion

Based on the results and the discussion that have been described above, the followings can be concluded. The topics or materials of the practicum conducted in chemistry learning in SMA Laboratory Undiksha Singaraja (1) in the class X, differentiating electrolytes from non-electrolytes; (2) in the class XI, endothermal and exothermal reactions and the determining the ΔH reaction based on the experiment, the factors that affect the rate of the reaction, identifying acids and bases with the indicator, and tritation acid-base; (3) in the grade XII, determining the decrease in freezing and boiling point by increasing electrolytes and non-electrolytes, electrolysis inert solution with the grounding electrodes and not inert, identifying the reactivity and reaction flame metal compounds (especially alkaline and alkaline earth) and the making of an ether compound. In the context of the implementation of the chemistry learning at SMA Laboratorium Undiksha , if seen from the number of practicums that has already been carried out is still limited in number and does not meet all the basic competencies that are allocated in the syllabus of chemistry in school syllabus development. This indicates that the chemistry learning in SMA Laboratorium Undiksha is not optimal yet. The teachers prefer teaching the material in the classroom rather than providing practicum learning in the laboratory. The teachers use only references for the National Examination in implementing the practicum. This indicates that the teachers consider chemistry practicum not important in chemistry learning.

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The way of the teachers teach chemistry practicum at SMA Laboratorium Undiksha Singaraja is in a group. The number of students in one group in the class X is 4 or 5 , in the class XI is 6 or 7, and in class XII is 4 or 5. It is adjusted to the number of students in each class. For practicum activities which have already been carried out, the number of groups is 6. It is adjusted to the laboratory space that can hold 2 desks that allow for six groups. Teacher I used inductive approach, experiment method and discussion, EEC learning cycle, and Discovery Learning model. Teacher II used deductive approach , experiment method, discussion and EEC learning cycle.The factors that affected the implementation chemistry practicum at SMA Laboratorium Undiksha Singaraja consisted of supporting and inhibiting factors. The factors that support the implementation of the practicum were (1) the completeness of the tools and practicum materials; (2) the readiness of the teachers and students to implement the practicum activities; (3) the availability of laboratory assistant, and (4) sufficient learning time to carry out the practicum activities. While the factors that inhibit implementation of the practicum were (1) the limitation of the tools and materials, (2) the lack of the implementation of the practicum, (3) the lack of understanding of the learners of the working procedure work of the practicum and (4) narrow laboratory space.

Suggestions

Based on the research results and the conclusion that have been described above,some suggestions can be proposed as follows. For the teachers in teaching chemistry it will be expected that they dot not only give priority to teaching the material but practicum activities should also be conducted so that the basic competencies that are specified in the syllabus can be accomplished.

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