INQUIRY LEARNING MODEL WITH APPROACH TEACHING AT THE RIGHT LEVEL (TARL) TO COMPLETE STUDENT LEARNING OUTCOMES ON SALT HYDROLYSIS MATERIALS IN CLASS XI IPA 3 SMAN 1 MANYAR GRESIK

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Abstract. *The purpose of this research is to evaluate the completeness of learning outcomes in the application of the inquiry learning model with the Teaching at the Right Level approach to salt hydrolysis material. The subjects of this study were 35 students in class XI IPA 3 at SMAN 1 Manyar Gresik. Two cycles of classroom action research were conducted. The observation method and the test method are the methods used to acquire data. Based on the results of the analysis and discussion, it can be concluded that the application of the inquiry learning model with the Teaching at the Right Level (TaRL) approach in class XI IPA 3 SMAN 1 Manyar Gresik can complete student learning outcomes. The success of this application can be seen from the percentage of completeness in cycle I of 77.14% then increased in cycle II of 82.86%.*

Keywords: *Inquiry learning model, Teaching at the Right Level (TaRL) approach, Learning Outcomes, Salt Hydrolysis*

INTRODUCTION

Education is a deliberate and intentional attempt to establish a learning environment and learning process so that students actively develop their potential to have religious spiritual power, self-control, personality, intelligence, noble character, and the skills required by themselves and society [1]. Education in Indonesia has experienced several changes to the curriculum system to improve it. The efforts made by the government in improving it are changing and providing curriculum innovation. Among them, the KTSP/2006 curriculum became the 2013 curriculum to become an independent learning curriculum [2].

The Independent Curriculum is implemented with the aim of training students' independence in thinking. The most important core of freedom of thought is addressed to the teacher. If the teacher in teaching is not yet independent in teaching, of course, students are also not independent in thinking [2]. Independent learning is learning to prioritize the interests and talents of students who can foster creative and fun attitudes in students. The independent learning curriculum answers all problems in the education system. One of them is that the value of students is only based on the realm of knowledge.

Based on observations and conversations with chemistry teachers at SMAN 1 Manyar Gresik, it is known that students still find chemistry learning difficult because the chemistry material being taught tends to be conceptual. Student learning outcomes also tend to be low. One of the materials that has a low percentage of completeness of learning outcomes is salt hydrolysis material, which obtains a score of 63% below the Minimum Completeness Criteria (KKM) decided by the school, namely 75. The low mastery of student learning outcomes is because in previous learning, the teacher only taught using the lecture method without any practicum activities. This is because learning is still carried out through blended learning during the COVID-19 pandemic. So that not all students can take part in face-to-face learning and are actively involved in learning activities because learning is more teacher-centered. This causes learning activities to be felt as meaningless for students because they are not directly involved in them, especially in discovering concepts through practicum activities. The material characteristics of salt hydrolysis, when viewed from the perspective of the learning outcomes, have material characteristics that are conceptual and procedural. Therefore, to discover the concepts and theories studied, practicum is required.

Innovative solutions are needed to overcome these problems; a student-centered learning approach is one solution. The student-centered learning method is one of the learning methods that must be carried out in the independent learning curriculum. This curriculum has a learning focus that is centered on students while the teacher is only a facilitator; in this case, the teacher is not employed as the primary source in delivering teaching materials, but students are required to be more active and independent in searching various sources of learning. So, the student-centered method, can be a learning method that is suitable for use in a breakthrough independent learning curriculum, especially in education in Indonesia [3].

One learning model that can be applied to an independent and learner-centered curriculum is the inquiry learning model. The inquiry learning model is a learning model that allows students to collect information through critical investigation so that adequate data or information is obtained to solve problems [4]. This is in accordance with the characteristics of salt hydrolysis material, which are both conceptual and procedural. To discover the concepts of the theory being studied, a practicum is required. Experimental activities train students' thinking skills through investigation, analysis, making conclusions, and evaluating activities. The inquiry learning model may assist learners become more logical thinkers. So that students can become more engaged in their studies and enhance their learning outcomes [5]. Results from earlier studies that demonstrate how applying inquiry learning frameworks can enhance student learning outcomes further corroborate this. [6]. Likewise, according to the study's results, using the guided inquiry model may intensify students' motivation and academic success [7]. In keeping with research findings that explain that the inquiry model is effective in influencing learning outcomes, where students achieve higher scores with inquiry learning than learning traditionally [8].

In the implementation of blended learning, the division of groups is still carried out randomly without looking at the development of student’s abilities so that students cannot learn according to their characteristics, needs, and level of understanding. So that this can affect student learning outcomes that are not optimal. Therefore a solution is needed to overcome this problem. One of the solutions offered by the author is to apply an inquiry learning model combined with a learning approach. One of the learning approaches that can be used is the Teaching at the Right Level (TaRL) approach. TaRL is an approach to learning that refers to students’ ability levels rather than their class level [9]. Using interactive worksheet in the form of student worksheet (LKPD), which are created based on the findings of diagnostic assessment prior to the execution of learning activities, the Teaching at Right Level (TaRL) approach is put into practice.

The inquiry learning model with the TaRL approach is very effectively integrated into the current independent curriculum. This is also supported by Ausubel's learning theory, Bruner's discovery theory, and constructivist theory. After students master the concepts learned through discovery, they can be strengthened by asking students to solve11 real problems. So that the concepts obtained are more meaningful [10]. Therefore, based on the previous explanations, the researcher will conduct research on the application of the inquiry learning model with the Teaching at the Right Level (TaRL) approach to complete student learning outcomes on Salt Hydrolysis material in class XI IPA 3 SMAN 1 Manyar Gresik.

METHOD

The research method used is classroom action research (CAR) modeled by Kemmis & McTaggart which has been slightly modified [11]. This classroom action research was carried out collaboratively with chemistry teachers. Because the teacher better understands the condition of the class and the ability of students. So that researchers can analyze the problems experienced by teachers in previous learning by providing solutions through this research. This research consists of four basic stages, namely planning, acting, observing, and reflecting . The following is a modified Kemmis and Mc.Taggart class action research chart:

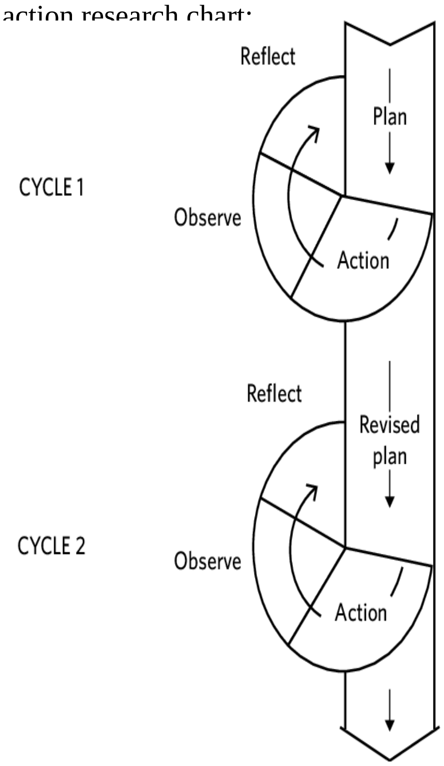

Figure 1. Kemmis and McTaggart Classroom Action Research Diagram

The participants in this research were the XI IPA 3 at SMAN 1 Manyar Gresik, consisting of 35 people. This study was carried out in two cycles, with planning, implementation, observation, and reflection making up each cycle. The chemical material studied is salt hydrolysis material including the sub-topics of properties, types, hydrolysis reactions, and the sub-topics of calculating the pH of salt solutions.

Data collection methods used are observation methods and test methods. The observation method is used to analyze problems in previous learning through observation and interviews. The test method for measuring student learning outcomes is with the instrument pretest and posttest learning outcomes. Pretest and posttest values can be calculated using the formula:

$$Value = \frac{total\ score\ obtained}{maximum\ total\ score}\ x\ 100\%$$

If a student receives a score of 75 or more, their education is considered to be complete. The percentage of completeness of student learning outcomes can be calculated using the formula:

$$\%Completeness\ of\ learning\ outcomes = \frac{the\ number\ of\ student\ who\ complete\ total}{total\ number\ of\ student}\ x\ 100\%$$

Learning can be said to be successful if the percentage of complete learning students is obtained ≥75% who have achieved Minimum Completeness Criteria (KKM) 75.

RESULT AND DISCUSSION

Based on results of classroom action research conducted using the inquiry learning model and the TaRL approach over two learning cycles, the following results are obtained:

Pre Cycle

Before engaging in classroom action research activities, the researcher and the chemistry teacher in class XI IPA 3 SMAN 1 Manyar Gresik had a reflective discussion. to analyze the problems experienced in the previous lesson. According to the results of this analysis, the most basic problem is related to the incompleteness of the still-low students' learning outcomes, especially in salt hydrolysis subjects. Therefore the researcher provides a solution by conducting classroom action research through the application of an inquiry learning model with the TaRL approach which is expected to complete student learning outcomes on salt hydrolysis material. After reflecting with the chemistry teacher, the researcher conducted a cognitive and non-cognitive diagnostic assessment. Cognitive diagnostic assessment is used to measure students' initial abilities before applying the inquiry learning model. Meanwhile, non-cognitive diagnostic assessment is used to determine the characteristics of students through profiling results in terms of interests, learning styles, social aspects, and emotions. So that through this diagnostic assessment, the researcher can group students according to their characteristics, needs, and level of ability by the Teaching at The Right Level (TaRL) approach that will be carried out. Where this approach aims so that students are not tied to the class level. However, they are arranged in groups according to the same students' ability levels or developmental phases. Thus, reference is to learning outcomes, but it has been changed to take into account the needs, potential, and qualities of the students [9].

Cycle I

Cycle 1 was carried out during one meeting which discussed the sub-material properties, types, and reactions of salt hydrolysis. The activities carried out in cycle I started from the planning process, in planning activities the teacher prepared matters related to the implementation of learning activities by making teaching modules, Student Worksheets (LKPD) which could facilitate the needs and learning styles of students, learning media such as Power Point (PPT), learning videos, and instruments that used to assess student learning outcomes in the form of pretest and posttest questions. In addition, the teacher also prepares the division of groups before the learning activities are carried out based on the outcomes of the diagnostic test that the students have done at the previous meeting. This planning activity is intended so that the learning activities to be carried out can be structured and well-planned.

After planning, the teacher carries out classroom action research in the first cycle for two hours of lessons, starting with an opening activity, a main activity, and a closing activity. There are preliminary actions taken with greetings and carrying out attendance, then the teacher invites students to carry out STOP activities so that they feel relaxed, focused, and enthusiastic about learning. This STOP (Stop, Take a deep breath, Observe, Proceed) activity is a form of social-emotional competency technique, namely self- awareness which aims to focus attention, increase concentration (focus), provide a sense of calm, and create conditions for a comfortable learning atmosphere for students both physically and psychologically. After that, the teacher gave apperception and motivation. Giving apperception aims to remind students again of previous material. Meanwhile, giving motivation aims to make students more focused on the material to be studied and more enthusiastic about learning. Next, the teacher conveys the learning objectives that will be studied.

The core activity begins with the first stage of confrontation with the problem, where the instructor divides the class into multiple groups to discuss determining the formulation of the problem related to the phenomena contained in the student worksheets (LKPD). The second stage is the verification of data collection. At this stage, the teacher directs students to make a hypothesis from the formulation of the problem made. To make this hypothesis The teacher directs students to collect good information from various sources through modules, e-modules, and learning videos provided in Student Worksheets (LKPD). These diverse sources of information serve as a form of content differentiation in the learning process as well as to facilitate different learning styles of students according to the TaRL approach used. Furthermore, the third stage, namely the collection of experimental data, this data collection activity provides an opportunity for students to prove the truth of the hypotheses they propose [12]. At this stage, students are asked to determine tools and materials, develop work procedures, determine experimental variables, conduct experiments, and instruct them to organize the data that has been obtained in the observation table. The fourth stage is organizing and formulating an explanation where each group discusses to answer the analysis questions contained in the Student Worksheets (LKPD) then the teacher asks each group representative to present the results of the experimental data analysis that has been discussed. The last stage in the core activity is the analysis of the inquiry process, where students are asked to discuss and make conclusions from the experiments that have been carried out based on the experimental data and ensure that the formulation of the problem has been answered and test the correctness of the hypothesis.

The learning activities in cycle I ended by asking students to self-reflect or examine their feelings about understanding the material and the learning process that had been carried out. The teacher gives a posttest to students, and informs them regarding the preparation of a practicum report which can be presented in the form of a written report or video by the abilities and interests of students. Where this activity is a form of product differentiation to facilitate students who have different learning styles, interests, and abilities. Furthermore, the teacher informs the students of the reading material from the earlier meeting and closes the lesson with a greeting.

After carrying out the learning, an evaluation of learning outcomes was carried out in cycle I through the posttest. The results of this test are used to determine students' understanding of salt hydrolysis material. The results of this test can show an increase or decrease in the learning outcomes of each student which can be described in the following graph:

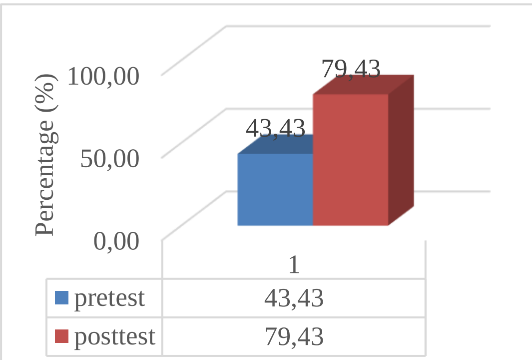

Figure 2. Bar Chart of The Percentage of Learning Outcomes Pretest and Posttest Cycle I

Based on Figure 2, it is considered that the average score of students from the posttest is 79.43%, which increased from the pretest results of 43.43%. This shows that the application of the inquiry learning model with the TaRL approach is effective in increasing student learning outcomes in cycle I. The classroom action research conducted in cycle 1 has strengthened the results, which revealed that guided inquiry learning on the topic of salt hydrolysis can increase learning motivation and mastery of students' concepts [4]. In line with the research results, which explained that the application of the inquiry model can improve student learning outcomes in salt hydrolysis material, the experimental class scored 90%, while the control class scored 43% [13]. Furthermore, the completeness of student learning outcomes in Cycle I can be seen through the following graph:

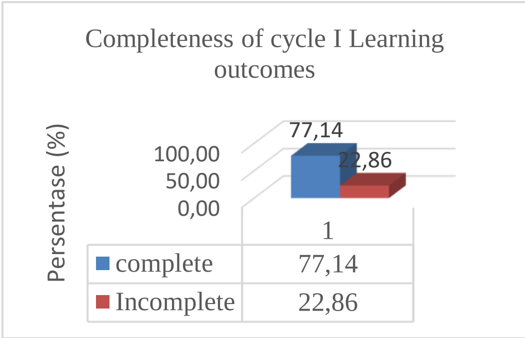

Figure 3. Completeness Diagram of The Cycle I Learning Outcomes

Based on the data from Cycle I, it can be seen that the percentage of complete learning outcomes of students in Cycle I who obtained a score of 75 was 77.14%. This indicates that the learning outcomes' level of completion has been achieved as expected. Learning can be said to be successful if the percentage of complete learning students is obtained ≥75% who have achieved Minimum Completeness Criteria (KKM) 75. This classical mastery shows that students have mastered the concept of salt hydrolysis material in the nature, type, and reaction sub-material hydrolysis. Students have played an active role in discovering the concept of a material they learn through practicum activities.

After conducting an evaluation, a plan for improvement is made to improve Cycle II learning through reflection on learning in Cycle I. The learning outcomes in Cycle I have achieved the expected mastery of learning outcomes but there are still some problems encountered during learning activities. Therefore it is necessary to improve in the next cycle. Based on reflection's findings on learning in cycle I, Improvements that should be made in subsequent learning include the lack of time allocation for practicum activities. As evidenced by the learning reflections conveyed by students at the end of learning activities, students feel that learning activities carried out with practicum activities are very enjoyable, but the time needed for experimental activities is very less. So that students feel rushed in carrying out practical activities. Therefore, the teacher needs to plan the allocation of time well for learning activities in the next cycle so that all stages of learning can be carried out effectively. In addition to the allocation of time for learning activities, in cycle 1 it is known that the readiness of students to participate in learning is still lacking. This can be seen in some students who are still late in participating in learning activities. So that the activities at the beginning of learning become longer. Therefore, the teacher needs to discipline students who are still late in learning. In cycle I there were 8 students who did not achieve complete learning outcomes. So the teacher needs to do remedial improvements so that the completeness of classical learning outcomes in the next cycle will increase.

Cycle II

Cycle II held one meeting to discuss the sub-topic of salt hydrolysis pH calculations. Cycle II activities were implemented based on the results of Cycle I reflection. These included rearranging the time allotted for each activity to ensure that it could be completed correctly and creating rules requiring those who were late to answer questions in front of the class as a form of discipline. for students, as well as modifying the stages of learning activities, namely in the experimental data collection section. This improvement was carried out with the hope that the learning completeness of students in cycle II was more improved than in cycle I. The actions of cycle II consisted of several stages, planning, implementing, observing, evaluating, and reflecting. The learning activities carried out in cycle II are almost the same as learning activities in cycle I, namely by applying the inquiry learning model with the TaRL approach equipped with worksheets where students are divided into several groups to discuss according to their respective abilities. This inquiry learning model helps students to find and understand difficult concepts if students discuss them with each other while carrying out learning activities [14]. The researcher did the planning first by compiling learning tools on the sub-material for calculating the pH of salt hydrolysis. Researchers have prepared open modules, student worksheets (LKPD), PowerPoint (PPT), learning videos, and assessment instruments in the form of pretest and posttest questions to assess student learning outcomes. Before carrying out learning activities, students do a pretest first to measure students initial abilities in the sub-material for calculating the pH of salt hydrolysis. Furthermore, learning activities are carried out starting from the introduction, core activities, and closing. Preliminary activities carried out in cycle II began with greetings, presence presence, giving ice breaking with the STOP technique, giving apperception, motivation, and conveying learning objectives. The inquiry learning model's full syntax is used to carry out the main activities, which are almost the same as cycle I, which includes the stages of confrontation with problems, verification of data collection, collection of experimental data, organizing and formulating explanations, and analysis of the inquiry process. However, the researcher has made modifications to the experimental data collection stage where at this stage the researcher provided a virtual lab video related to the experiment of calculating the pH of hydrolysis of sea salt. Based on the practicum video, students are asked to collect data and analyze the results of the experiment. This modification was made because in the first cycle, students needed a long time to carry out practicum activities directly so practicum activities carried out became ineffective. In addition, in cycle II, the material taught is more focused on calculating the hydrolysis pH of salt solutions. After all stages of the core activities are carried out, the learning activities end with learning reflection, working on posttest questions, and greetings.

Following the application of the knowledge activities, the researcher asseses the learning outcomes in cycle II by looking at the students' posttest results. This posttest question is used to measure students' abilities after implementation of the inquiry learning model with the TaRL approach. The results of the posttest in cycle II can be seen in Figure 4 below:

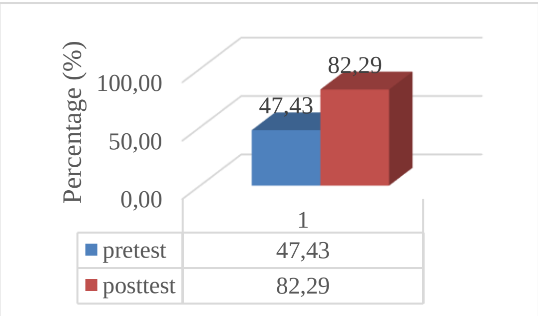

Figure 4. Bar Chart of The Percentage of Learning Outcomes Pretest and Posttest Cycle II

Based on Figure 4, it is considered that the average score of students from the posttest is 82.29%, which increased from the pretest results of 47.43%. Matter This shows that the application of the inquiry learning model with the TaRL approach is effective in increasing student learning outcomes in cycle II. The results of this classroom action research also reinforce previous findings, which explain that the application of inquiry learning models can improve students' chemistry learning outcomes. The advantages possessed by the inquiry learning model can encourage student learning activity and enthusiasm so that it can improve students' scientific attitudes and chemistry learning outcomes [15]. This is also in line with the results, which explained that the inquiry model provides a significant increase in understanding of concepts and ways of explaining material, as shown by the results of the pretest and posttest [16]. Likewise, research results explain that the guided inquiry learning model can increase learning activities and outcomes [17].

In addition to applying the inquiry learning model, the Teaching at the Right Level (TaRL) approach also greatly influences student learning outcomes in the research conducted. Because of this approach, students can learn according to their characteristics and abilities. So that students can learn according to their learning needs. I agree with the results, which explain that classroom action research conducted using the Teaching at the Right Level (TaRL) approach can improve student learning outcomes in the learning process. Where the average student learning outcome increased from 65% in Cycle I to 80% in Cycle II [9]. Furthermore, the completeness of student learning outcomes in Cycle II can be seen through the following graph:

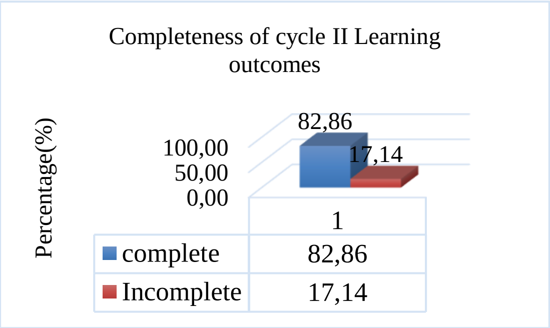

Figure 5. Completeness diagram of cycle II learning outcomes

Based on Figure 5, it can be seen from Cycle II data that the percentage of complete learning outcomes of students in Cycle II who obtained a score of 75 was 82.86%.This shows that the level of completeness of learning outcomes has been achieved as expected. Learning can be said to be successful if the percentage of complete learning students is obtained ≥75% who have achieved Minimum Completeness Criteria (KKM) 75. This classical mastery shows that students have mastered the concept of salt hydrolysis material in the sub-material for calculating the pH of hydrolysis of salt solutions. However, in this second cycle, there were still students who had not achieved learning completeness of 17.14% so researchers needed to reflect by making improvements through remedial activities by guiding students in answering questions that were considered difficult to achieve learning completeness. A Comparison of cycle I and cycle II student learning outcomes for completeness can be shown through the following Table 1:

Table 1. Comparison of Completeness of Learning Outcomes of Cycle I and II Students

Cycle	Number of Students		%Completeness	
	Complete	Incomplete	Complete	Incomplete
I	27	8	77,1	22,86
II	29	6	82,86	17,14

Based on Figure 6, it is apparent that the completeness of the learning outcomes of students in cycle II has increased when compared to cycle I. In cycle I, it was 77.14%, while in cycle II, it was 82.86%. These results indicate that the results obtained have reached the Minimum Completeness Criteria (KKM) that was determined by the school, namely 75. This shows that efforts to improve learning activities that have been carried out in Cycle II can affect the completeness of student learning outcomes.

Thus, based on a comparison of completeness data on learning outcomes in cycle I and cycle II, The conclusion that the application of the inquiry learning model with the Teaching at the Right Level (TaRL) approach can complete student learning outcomes in salt hydrolysis material.

CONCLUSIONS AND SUGGESTIONS

The analysis and discussion's findings led to the conclusion that using the inquiry learning model with the Teaching at the Right Level (TaRL) approach in class XI IPA 3 SMAN 1 Manyar Gresik can complete student learning outcomes. The success of this application can be seen from the percentage of completeness in cycle I of 77.14% then increased in cycle II of 82.86%. This shows that the inquiry learning model applied to this classroom action research can affect the completeness of student learning outcomes in the two cycles, and the percentage in the second cycle has increased.

The researcher suggests that chemistry teachers use the inquiry learning model in chemistry instruction as substitute for traditional methods to address the remaining gaps in student learning outcomes. This recommendation is based on the outcome of classroom action research that has been finished and reinforced by prior findings.

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