

## EXPLORATION STUDENTS' LEVEL PROACTIVE DECISION MAKING (PDM) BASED ON METACOGNITIVE SKILL IN SOLVING REACTION RATE PROBLEMS

Aprilia Chorera, Bambang Sugiarto, and Mitarlis Mitarlis

Chemistry Department FMIPA Universitas Negeri Surabaya  
email: [apriliachorera18@gmail.com](mailto:apriliachorera18@gmail.com) Mobile phone: 085748418484

### Abstract

This research has aim to describe and analyse students' level Proactive Decision Making (PDM) based on metacognitive skill in solving reaction rate problems for upper, middle, and lower students' groups in chemistry subject. The subjects in this research is students XI-Light Vehicle Technique (*Teknik Kendaraan Ringan*) in Vocational High School (*Sekolah Menengah Kejuruan*) Kudu Jombang. This is qualitative research, the data source are students' evaluation test results and interviews. The validation method that use is method and times triangulation. The Proactive Decision Making (PDM) level are Object, Alternative, Information, and Decision Radar. The results showed that students' level Proactive Decision Making (PDM) in the planning stage upper group has the highest level, which is Decision Radar, middle group is Information, and lower group is Alternative. The monitoring stage level of the three groups is Decision Radar, and the reflection stage level of the three groups is Object.

**Keyword:** proactive decision making, metacognitive skill, problem solving

### INTRODUCTION

Regulation of minister education and cultural No.20, 2016 (*Permendikbud nomer 20 tahun 2016*) that graduates competency standards for primary and secondary education for the knowledge dimension stated, "Students have factualknowledge, conceptual, procedural, and metacognitive on a technical level, specific, detailed, and complex" [1]. Regulation of minister education and cultural No.20, 2016 (*Permendikbud nomer 20 tahun 2016*) metacognitive at the technique level means student have to are aware of things that known.

In the learning context, the students know techniques of learning, capabilities and learning moralities, and know the best learning strategies for effective learning. Metacognitive consist of planning, monitoring, and reflection [2]. Regulation of minister education and cultural No.21, 2016 (*Permendikbud nomer 21 tahun2016*)in the standards of competence must be possessed by the student who reads "Inspiring and practicing honest behavior, discipline, manners, care (help others, cooperation, tolerance, peace), responsible, responsive and proactive in interacting effectively in accordance with the development of children in the neighborhood, family, school, community and the surrounding natural environment, nation, state, region-nal, and international areas". The purpose of establishment Regulation of minister education and cultural No.21, 2016 (*Permendikbud nomer 21 tahun 2016*)

especially particular competence in social attitudes [3]. In teaching learning process teachers have to investigate and explore students' differences in order to adapt the education in accordance with the difference. Students will develop according to their respective capabilities [4]. Proactive attitude will be very useful when entering the real world, but it will unachieved if lack of training in school [5]. Proactive attitude is an attitude that reflects the actions that taken based on the premise that has passed the high level of thinking. It can determine what will they do and find out the solution when there are obstacles [6]. Proactive stance can not be done without thinking process [7].

Proactive attitude has include a level to make decision which is Proactive Decision Making (PDM). Siebert and Kunz states that four knowledge proactive capabilities are as follows systematic identification of objects, systematic identification of alternative, systematic identification information, and systematic identification of radar decision [8]. The main goal of this research was to know the Proactive Decision Making (PDM) level of students' groups on upper, middle, and lower in chemistry ability solving reaction rate problems based on metacognitive skill.

### METHODOLOGY

The type of this research is qualitative. The prominent of data source in qualitative research are words and action, in this research the data source are evaluation test result and interviews.

This research was done in Vocational High School (*Sekolah Menengah Kejuruan*) Kudu, Jombang with 12 students research from 11<sup>th</sup> grade student of Light Vehicle Technique (*Teknik Kendaraan Ringan*) vocation. Procedure of this research are as follows:

#### 1. Students selection

Selection of research students are based on observation to student's communication activity in learning process, result evaluation test, and teacher recommendation. 12 research students were obtained to be interviewed. The students consist of 5 students in upper group, 3 students in middle group, and 4 students in lower group.

#### 2. Written test

Written test was done in the last meeting of reaction rate. Students answer three questions in 45 minutes. All questions in evaluation test in evaluation domain.

#### 3. Interviews

Interview was done in two times. The first interview after evaluation test, the process of interview was done by giving the students their result evaluation test. In this interview comparing student activities from their evaluation test answer with their activities in answer interview questions. The second interview at the day after the first interview, the process of interview giving the students their result evaluation test which their answered. In this interview comparing activities in first interview result with second interview result

#### 4. Triangulation

The validation method that use is method and times triangulation. Method triangulation is compared students' of evaluation result with their interview answered. Times triangulation is compared students' interview answered at first day with second day.

Analysis technique that used in this research is activities metacognition based on activity of metacognition by Sugiarto [9], and analysis level Proactive Decision Making (PDM) based on Johannes Siebert and Reinhard Kunz [8].

## RESULT AND DISCUSSION

Proactive Decision Making is thinking and decision-making styles. Siebert and Kunz Reinhard states Proactive Decision Making have four stages that Object, Alternative, Information, and Decision Radar.

#### a. Object

Object is assumed to be a dimension of PDM. Activities of object is write what they know at planning stage. Rereading, use formula, and

consider of mistake at monitoring stage. Reflection the concept with fact at reflection stage.

#### b. Alternative

Alternative takes object into account is considered to be a dimension of PDM. Activities of Alternative is set goal, and make strategy to solve problem at planning stage. Care full in step and give argument when solve the problem at monitoring stage. Reflection strategic after all at reflection stage.

#### c. Information

Information is regarded as a dimension of PDM. Activities of Information is representation result at planning stage. Subject can show lack of planning at monitoring stage. Reflection strategic formula at reflection stage

#### d. Decision Radar

Decision Radar is considered to be dimension of PDM. Activities of Decision Radar is make representation image at planning stage. Monitoring fact and goal at monitoring stage. Reflection decision strategies at reflection stage.

The level of PDM can be used to group individuals. Individuals can be classified and described as being proactive or reactive decision makers. In particular, PDM can be used for explanation and prediction purposes in studies dealing with individuals' satisfaction with their decision making or actual decisions. Especially satisfaction is a attributive construct, which is determined by a variety of different factors[8].

From metacognitive activity data which have been analyzed and validated the proactive decision making level in XI-Light Vehicle Technique solving reaction rate problems can be seen at table 1:

Table 1. Proactive Decision Making in planning, monitoring, and reflection stage

Group	Level Proactive Decision Making (PDM)		
	Planning	Monitoring	Reflection
Upper	Decision Radar	Decision Radar	Object
Middle	Information	Decision Radar	Object
Lower	Alternative	Decision Radar	Object

### 1. Proactive Decision Making (PDM) in planning stage

Activities of Proactive Decision Making (PDM) Alternative level is setting goals, and make strategies to solve problem. Activities of



lower group did not detect setting goals, but there are detection making strategies was detected. Recognition students RT, from the interview question that "What is you do to solve the problem". It can be seen from the following answer:

... I give mark in third and fourth data experiment.

Students electing a strategies that which they will be used. This argument prove they know what resources need to be collected, how to start, and which should be followed or implemented. [10]. Lower group activities at planning stage not indicate of set goal but Implicit they have too, so they can choose the best strategies to solve the problem. Proactive Decisions Making (PDM) at lower group is alternative level [8].

Activities of Proactive Decision Making (PDM) information level is representation result. Activities of middle group did not detection set the goals, but there are detection representation result. Recognition student YK, it can be seen from the following answer with same interview question as before:

... I have to give answer in this section before, so it more easy to answer.

Student give representation result before solve the problem clearly. This argument prove they know what resources need to be collected, how to start, and which should be followed or implemented [8]. Middle group activities at planning stage not indicate of set goal but Implicit they have too, so they can choose the best strategies to solve problem and give representation result. Proactive Decision Making (PDM) at middle group is information level [8].

Activities of Proactive Decision Making (PDM) Decision Radar level is representation image. Activities of upper group show they at Decision Radar level. Recognition student MA, it can be seen from the following answer with same interview question as before:

... I have to make table for experiment data.

Student representation image before they solve the problem. Proactive Decision Making (PDM) at upper group is Decision Radar level [8].

## 2. Proactive Decision Making (PDM) in monitoring stage

Activities of Proactive Decision Making (PDM) Decision Radar level is monitoring fact and goal. Activities of lower group show they at Decision Radar. Recognition student RT, from the interview question that "What is the

conclusion ?". It can be seen from the following answer:

... So, that statement is true.

Student monitoring fact and goal they solve the problem with comparing goal form the question and their answer. Proactive Decisions Making (PDM) at lower group is Decision Radar level [8].

Activities of Proactive Decision Making (PDM) Decision Radar level is monitoring fact and goal. Activities of middle group show they at Decision Radar. Recognition student YK, it can be seen from the following answer with same interview question as before:

... The answer is two. So, that statement from the question is true,

Student monitoring fact and goal that they solve the problem with comparing goal form the question and their answer. Proactive Decisions Making (PDM) at middle group is Decision Radar level [8].

Activities of Proactive Decision Making (PDM) Decision Radar level is monitoring fact and goal. Activities of upper group show they at Decision Radar. Recognition student MA, it can be seen from the following answer with same interview question as before:

... NO order is two. So, that statement from the question is true,

Student monitoring fact and goal they solve the problem with comparing goal form the question and their answer. Proactive Decision Making (PDM) at upper group is Decision Radar level [8].

## 3. Proactive Decision Making (PDM) in reflection stage

Activities of Proactive Decision Making (PDM) Object level is reflection the concept with fact. Activities of lower group show they at level Object. Recognition student RT, from the interview question that "Did you check your answer ?". It can be seen from the following answer:

... Yes, I have check my answer once.

Student reflection the concept with fact they solve the problem with check goal form the question and their answer. Proactive Decisions Making (PDM) at lower group is Object level [8].

Activities of Proactive Decision Making (PDM) Object level is reflection the concept with fact. Activities of middle group show they at Decision Radar. Recognition student YK, it can be seen from the following answer with same interview question as before:

. . . Yes, I have check my answer twice.

Student reflection the concept with fact, they solve the problem with check goal form the question and their answer. Proactive Decisions Making (PDM) at lower group is Object level [8].

Activities of Proactive Decision Making (PDM) Object level is reflection the concept with fact. Activities of upper group show they at Decision Radar. Recognition student MA, it can be seen from the following answer with same interview question as before:

. . . Yes, I have check my answer twice.

Student reflection the concept with fact, they solve the problem with check goal form the question and their answer. Proactive Decision Making (PDM) at upper group is Object level [8]

## CLOSURE

### Conclusion

Based on analysis data and findings level Proactive Decision Making (PDM) students in solving reaction rate problem based on metacognitive skill in this research. Students' level Proactive Decision Making (PDM) in the planning stage upper group has the highest level, which is Decision Radar, middle group is Information, and lower group is Alternative. The monitoring stage level of the three groups is Decision Radar, and the reflection stage level of the three groups is Object.

### Suggestion

1. Improve student proactive attitude in problem solving. So students have sensitivity in solving problems.
2. In this research, only determine the Proactive Decision Making (PDM) level in students. Hope in next future can develop of student worksheets to train proactive attitude.

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