

## Implementation of Gasing Learning in ARCS Learning Strategy to Enhance Students' Motivation in 9<sup>th</sup> Grade of SMP Muhammadiyah 1 Banjarmasin

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### ABSTRACT

The lack of motivation will affect to the students' learning outcomes. The research was conducted to enhance the students' motivation with the Gasing learning in the ARCS learning strategy on the static and dynamic electricity. The specific objectives of this research was to describe effect of the gasing learning on the students' learning motivation. The research consisted of 3 cycles of Hopkin's Classroom Action Research Model. Each cycle consists of the plan, the action/the observation, and the reflective. The data of students learning motivation obtained by questionnaires and be analyzed with method of successive interval (MSI). The findings of the research are: (1) the result of questionnaire of ARCS motivation in cycle I was 3,71, cycle II was 3,80, and cycle III was 3,99. These results indicate an increase in student learning motivation; (2) The completeness of students' learning outcomes in cycle I was 68,18%, in cycle II was 90,90%, and in cycle III was 100%. It can be concluded that the Gasing learning in ARCS strategy can enhances students' motivation on static and dinamic electricity in 9<sup>th</sup> grade of SMP Muhammadiyah 1 Banjarmasin. The Gasing learning can be an alternative for the teachers to enhance students' motivation in learning physics through the provision of comic media and calculations without formulas.

**Keywords:** ARCS strategy; Gasing learning; learning motivation

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## INTRODUCTION

Motivation is one of the factors that can influence learning outcomes. According to (Mitchell, 1982), motivation is psychological process that causes the emergence of the persistence of voluntary activities which directed at particular purpose. On the other hand, Gray and Starke in Dhaliwal (2016) explains that motivation is amount of internal and external processes on the person, and then appearing an enthusiasm attitude in carrying out certain activities. Both of these meanings have almost the same sense, that is motivation will move person to do something to achieve goal.

Hamalik (2006) explains that motivation can be driving a person to perform an action, determines the direction of the action to be achieved, and determines the actions that must be done to achieve the goal. When it linked to learning process in the classroom, with learning outcomes as the ultimate goal, motivation has an important role on moving students to learn, stay focused on achieving goals, and sorting out the steps that must be taken to achieve the desired learning outcomes.

The source of motivation is divided into two sources, which comes from inside (intrinsic) and from outside (extrinsic). Examples of intrinsic motivation are self desire, interest, perception, and ideals. While extrinsic motivation for examples are the reward, competition, learning environment, and praise. However, the teacher's ability to teach and design the lessons will greatly affect the student's learning motivation (Brown & Green, 2016). Motivation not only important for making student active in academic activity, but it is important also to determine student's readiness in learning (Sutriningsih, 2005).

Physics is one of the lessons that are considered difficult by students. Even the most difficult when compared to Chemistry and Biology (Ali, Ibrahim, Abdullah, Surif, Talib & Saim, 2015; Erdemir, 2009). Ornek's research (Ornek, Robinson & Haugan, 2008) revealed that students consider physics difficult because of its abstract, unattractive, and could not be studied without having high mathematical ability. Erinosh's research (Erdemir, 2009) also reveals that students believe physics is difficult because it has too many formulas and materials that must be remembered, theoretical, and dull. Those complex conditions made students think that physics is boring.

The finding problems in 9<sup>th</sup> Grade of SMP Muhammadiyah 1 Banjarmasin also revealed the same thing. The results of the observations in the class indicate that students have problems with their learning motivation. The reason was the teacher did not teach physics concepts and principles in simply way. When giving an equation, the teacher emphasizes the mathematical aspect only without explain the physical meaning of the equation.

This study was conducted to overcome the findings of the problem. The objectives of this research was to enhance student motivation. To achieve that goal, Gasing learning was combined with ARCS strategy. The ARCS motivation model is a way to increase the attractiveness of the learning material to make students motivated to learn (Sholiah, Jamal & Salam, 2016). This model has three distinctive features: The first, it contains four conceptual categories which include

many concepts and characterize variable of human motivation. The second, it includes the units of strategies to improve the attractiveness of learning. The third, it includes a systematic design process that called motivational design (Hopkins, 2011), which can be used effectively with instructional design models.

The ARCS model was based on macro theory of motivation and instructional design that developed by Keller (Keller, 1987). The ARCS model was also based on Tolman and Lewin's expectancy value theory, which assumes that human will be motivated to do something if it is allegedly related to personal fulfillment and if there is a positive expectation to succeed. The ARCS model requires four main conditions: attention, relevance, confidence, and satisfaction. These conditions must be fulfilled for human to remain motivated.

The first condition is attention. It is an element of motivation and prerequisite of learning. The goal is to acquire and maintain student motivation, and then direct it to the desired stimulus by the teacher (learning objectives). The second condition is relevance. It arises when students understand their learning goals. The relevance not only derived from the content of the lesson, but it can come from the teachers's teaching method. The third condition is confidence. It can be established by convincing students that they can succeed and not fear to fail. The last condition is satisfaction, according to the theory of reinforcement (reinforcing theory), people should be more motivated if the tasks and the rewards are clear.

The ARCS strategy was applied with Gasing learning. Gasing Learning is a method where physics can be learned and taught easily, enjoyable, and fun. Students are taught about the concepts of physics through simple lab exercises and logic in daily life to understand the physics concepts. In addition, Gasing learning teaches how to think like a physicist in solving physics problems with logical approach and barely with physics equation. Gasing learning use logical methods based on basic concepts of physics and basic mathematical abilities, include addition, subtraction, division, and multiplication. Students can work on the problem quickly and correctly. The priority in this method is the students' conceptual understanding and the formulas can be taught later (Dinata, Jamal & Mastuang, 2016).

The Gasing method has introduced by Yohannes Surya since 1996. Even this method was used by him in guided students to won gold medals in International Physics Olympiad (IPHO). But this method haven't yet widely applied in the classroom by the teachers. Some researches on learning Gasing were done by Astawan (2013) and Irawan (2015). Astawan examines about the effect of Gasing learning on student activities and problem-solving abilities. While Irawan was researching on improving student learning outcomes through the Gasing method with experiments. Both of these studies have not examined the effect of Gasing on student motivation. The media used did not even support the imagination phase. Therefore in this study, the Gasing learning was combined with ARCS strategy to improve student motivation. And the media of this research was a comic that can facilitate students in imagination.

The Gasing learning has five phases (Dinata, et al., 2016) as shown in table 1. The simple dialogue phase aims to attract students' interest in learning. This phase

related with the attention and the relevance aspects of ARCS strategy. In the imaginative phase the teacher gives comic media to the students. This comic contains conversations about the physics concepts that being studied. Students' attention aspects can be improved By provide interesting learning media. In the third phase, the students are trained to answer questions by using the physical meanings of the physics concepts. At this stage, students are also trained independently to improve their confidence. When the students' answer is wrong, the teacher will give guidance. If the students' answer is right, then the teacher will give praise. The praise that given relates to the student's satisfaction aspect. In phase 4, the teacher gives more difficult problem for students to challenged them. The approach to answer it is as same as with the problem in the previous phase. The result of stage 4 is the discovery of physics formulas that commonly used in conventional learning. In the last stage, the teacher gives more varied question or variable that must be sought.

Table 1 Stages of Gasing Learning (Dhaliwal, 2016)

<b>Phases</b>	<b>Teacher activity</b>
Phase 1 Simple dialogue	The teacher starts the lesson by having a simple dialogue with the students about the material to be learned
Phase 2 Imagination	Teachers help students to imagine phenomena which related to the material being studied.
Phase 3 Presents examples of relevant questions	The teacher gives questions that only use simple mathematical formulation in the form of addition, subtraction, multiplication and division.
Phase 4 Present the subject matter in depth	The teacher gives a physical meaning after the students are able to answer all the simple questions.
Phase 5 Provides variations of questions	The teacher gives the problem more varied, the problem can be a story question.

The example of comic media that given at the stage of imagination are shown in Figure 1. This comic contains the fictional characters of electric charges, which called mupo and mune. The concept taught in this comic was the description of the electric field that can affect the positive and negative charges around it. The media such as this will affect the motivation and the way students in viewing the subject of physics.



Fig. 1: Panel of electric field comic

The electric field in point A is 100 N/C. What is the force that felt by the 2 Coulombs charge in that point ?

Answer:

The electric field represents the magnitude of the electric force that act on 1 Coulomb charge. The electric field amount 100 Newton/Coulomb means if at point A is placed 1 coulomb charge, then the charge will felt electric force by 100 Newton.

If the charge was 2 Coulomb, it will felt electric force about  $2 \times 100 \text{ N} = 200 \text{ N}$

100 N/C → (1 C) → 100 N

(2 C) → 200 N

Fig. 2: Example question in the student worksheet

The example of physical meanings that be taught about the electric field in phase 2 was "the electric field represents the magnitude of the electric force which act on 1 Coulomb charge". Through this physical meaning, students calculated on the student worksheets with simple mathematics as in figure 2. In this calculation there is no equation was used, so student do not need to bother remembering it. As long as the student is able to multiply, divide or sum, then the question can be answered.

The Gasing learning emphasizes the achievement of analogue transfer ability and conceptual understanding because students are taught to understand the concept first with analogies in daily life before starting to do the calculation using basic math skills. Although it is possible to apply it to more complex theories and concepts of physics. The students' transfer analogy ability is trained by teaching the concepts that students will learn with the concept approach that they has been studied previously. Through a simple physics lab demonstration and can be tested by the students themselves, students will feel that physics is closely related to life. This will develop students' physics knowledge more structured.

## METHODS

This research was a Classroom Action Research (CAR) which aimed to improve students' motivation. The subjects of this study were 22 students of 9<sup>th</sup> grade of SMP Muhammadiyah 1 Banjarmasin in first semester of 2015/2016 academic year. The object of the research was student motivation. The research time required in this study was 3 weeks in November 2015. The CAR model in this research is Hopkin's Model which consisting of 3 cycles. Each cycle consists of the plan, the action/the observation, and the reflective (Hopkins, 2011).

Table 2 Ideal Scoring Criteria

Scale Range	Value	Category
$X > Mi + 1,80 Sbi$	A	Outstanding
$Mi + 0,60 Sbi < X \leq Mi + 1,80 Sbi$	B	Good
$Mi - 0,60 Sbi \leq X \leq Mi + 0,60 Sbi$	C	Adequate
$Mi - 1,80 Sbi < X \leq Mi - 0,60 Sbi$	D	Less
$X \leq Mi - 1,80 Sbi$	E	Poor

The planning was undertaken to prepare subjects specific pedagogy and questionnaire instruments with pay attention to learning and research objectives. The implementation and the observation was the implementation stage of the planning that has been made. The reflection was done to examine the actions towards achievement of the various objectives. Based on the results of reflection, then the errors that occurs during the learning be taken into consideration to correct errors in the next cycle.

The data of students' motivation was obtained through ARCS questionnaire after learning. The ARCS questionnaire consists of 24 statements in likert scale. The 24 statements are divided into 4 aspects, those aspects was attention, relevance, confidence, and satisfaction. The ordinal data from Likert scale then converted into interval data with method of successive interval on microsoft excell program. The results are then matched with the ideal scoring criteria in table 2. This research succeeded when the students' motivation had good category and classical completeness reached at least 70% of the total students in the class.

## RESULT AND DISCUSSION

### *The Cycle I*

The planning in the first cycle was to compile subject specific pedagogy including lesson plan, learning material of electric field, student worksheets, presentation slides, test of learning outcomes, and questionnaire of ARCS motivation. During the learning, the gasing was applied in the ARCS strategy. In phase 1, the teacher discussed with the students about the term "field" that they have know with humor interspersed. It aimed to keep students from being strained and gave students good impressions of teachers to strengthen the connection of stimulus and response. Furthermore, the teacher explained the benefits of the learning material in order to students are interested in learning it. In phase 2, the teacher explained the material of the electric field with comic media. The purpose of using comics is to attract students' attention and facilitate them in imagining electric field phenomena. Students paid attention to each teacher's explanation carefully. In phase 3, the teacher gave examples of electric field being worked out by applying the physical meanings of electric fields and simple math calculation. Students could receive well on how to work on the problem. However, when the students was given the exercise questions, many students have difficulty in solving it because not used yet. The phase 3 took long time because teachers have to guide students in turn. In phase 4, the teacher gave the same problem as the exercise, but the teacher replaced the number with the variable to obtain the electric field equation. It is intended that students understand the meaning of the electric field equations that they obtained. In phase 5, the teacher only had time to provide enrichment, but did not have time to ask the students to answer it completely. This is because the learning time was running out. After the lesson, students filled out the questionnaire of ARCS motivation and answered the test of learning outcomes to measure the classical completeness.

Table 3 The Number of Students by Motivation Category in Cycle I.

Category	Number of students
Outstanding	3
Good	11
Adequate	8

The table 3 showed that cycle I has not reached the target of research. Nevertheless, these results have shown improvement if it compared to observations before the study began. On the attention aspect, the students got stimulus from the comic media in order to attract attention. The teacher also used the powerpoint slides with laser pointer, so the teacher could go around in the classroom and did variations of movement during the lesson. In the relevance aspect, the students got stimulus by explanation from the teacher about the benefit of electric field material. In the confidence aspect, the teacher embedded the basic competencies and the learning objectives on the student worksheet. In practice questions, the students were asked to work individually. The teacher convince students that they were able to learn well by their self. In the satisfaction aspect, the students got stimulus in the form of praise that given by the teacher.

eventhough their answers was not right. In addition, the students who are able to finish the exercises quickly were asked to help their friends who have difficulty. These stimuli could enhance students' motivation in every aspect.

The result of reflection from cycle I was the lack of time in closing activities, the students' motivation was increasing but not reaching the target of the research, and there are some students who did not focus on the learning. The completeness of learning outcomes in cycle I was 68.18%. To correct the deficiencies in cycle I, re-planning of the cycle was taken to make better learning scenarios. Therefore the learning time could be used optimally, reduced the student's irrelevant behavior, and improved the results. The Gasing learning in the ARCS strategy was used because it has positive impact on student motivation. Another positive point in cycle I was the students like the comic media.

### *The Cycle II*

The learning material in cycle II was electric potential. The subject specific pedagogy arranged in the planning stages were similar to previous cycle, which including lesson plan, learning material of electrical potential, student worksheets, presentation slides, and test of electric potential. At the implementation stage, the teacher was teaching by considering the reflection from cycle I. At the phase 1, the teacher gives some questions that related to the electric field material in the last meeting. The teacher also associated the material of the electric field and the electric potential. Then the teacher explained the benefits, the learning goals, and the basic competencies. In the phase 2, the teacher gave comics about humans that "push" an electrical charge to describe the electric potential energy. It easier for students to understand the concept about "work done on a charge". The teacher gave also repetition questions to the students to check their understanding. In phase 3, the teacher gave examples of questions for one type of problem, then it followed by questions with different types of answer. This is meant to make it easier for the teacher to manage the time. At this phase, the students were fluent to calculate with logic. It was indicated by the some students who are able to work quickly. In phase 4, the teacher gave back the question in variable to obtain the equation of electric potential. The teacher gives back the repetition questions to the students. In phase 5, the learning was good because the learning time is still sufficient. The teacher provide questions with different variations until students are able to answer them. After the learning was complete, students filled out the ARCS motivation questionnaire and answer the learning outcomes test.

Table 4 Number of Students by Motivational Category in Cycle II

Category	Number of students
Outstanding	2
Good	16
Adequate	4

The result of ARCS questionnaire showed that motivation in cycle II has increased from cycle I (Table 4). The number of students who reached "good" and "outstanding" was 18 people or 81.82% of students in the class. These results have fit with the reseach target of this study. The stimulus that given to attention,



relevance, confidence, and satisfaction aspects has been successful. In the aspect of attention, the teacher remain to stimuly by interesting media and learning material. The relevance aspect was also given the stimulus by explaining the benefits of the electrical potential and related it to the previous knowledge. The learning of electric potential also uses an analogy of the energy and work material that they have learned in 8th grade. The confident aspect still given reinforcement in the form of individual exercises. In the aspect of satisfaction remains given the stimulus by providing positive comments to the student response.

The reflection result from cycle II was the comprehension check method that added in phase 2 and 4 was successful, because the number of students that reach standar score was increased. The completeness of learning outcomes in the cycle II reached 90.90% and it reached the target of the research. But in this cycle there is an increasement of students who did not pay attention to learning. To resolve this problem, the students who unfocus will be given more direct questions when in the next cycle.

### *The Cycle III*

The planning of cycle III was done by considering the reflection results from the cycle II. Subject specific pedagogy was arranged as same as the previous cycle but in different material (dynamic electricity). In the phase 1, the teacher gave some questions which related to static electricity in the previous chapter. The teacher discussed also with the students about the phenomenon of being stung by electricity. This was intended to attract students' attention early in the learning process. Further the teacher explained the learning benefits, the learning objectives, and the basic competencies. In the stage 2, the teacher gave the comic to the student about explanation of electric charge movement and its relation to the voltage between two points. In this phase, teachers provide repeated questions to the students. It was intended to strengthen them as well as to rebuke them when students began to engage in irrelevant behavior. This phase had more time portion than the previous cycle so that the reinforcement can be given longer. In phase 3, the teacher gave an example of electric currents problem in one variation only. At this stage, the majority of students were fluent to calculate with logic. They immediately respond when the teacher presents an example of problem and practice questions. In phase 4, the teacher presented the question in variable form to obtain the equation of the electric current. In this case, students got trouble to do it and need help from the teacher. Furthermore, the phase 5 runs fluent when the teacher giving variations of questions. Some students have been able to think and count results without writing it first. At the closing phase, the teacher asks the students to re-explain the material based on the learning objectives. After the student answer the problem, the teacher concludes learning and provides home work. In this lesson, providing reinforcement questions can be done at any time if there is an irrelevant behavior from the students. Just like the previous cycle, students filled out the ARCS motivation questionnaire and answer the test after learning.

Table 5 Number of Students by Motivational Category in Cycle III

Category	Number of Students
Outstanding	3
Good	17
Adequate	2

The result of the ARCS questionnaire for cycle III has enhanced from cycle II (Table 5). The amount of the students who reached the good and very good category was 20 students or 90.90% of students in the class. These results have fulfilled the success criteria of this study. At this cycle, the attention aspect becomes the lowest. It was because the comic in this cycles has more explanations than previous cycles in order to make the students bored. But this aspect still enhance because of questions variety that provided by the teacher. The teacher also explained that the dynamic electric is important for life because it is the electricity that we use in the house. In the aspect of relation, the teacher gave the stimulus information about magnitude of the electric current and its effect on the human body. This makes the student know how much of an electric current to be considered dangerous. In the self-confidence aspect students still keeps working individually. And on the satisfaction aspect the teacher always gave stimulus by avoid negative comments and give positive comments. All of the stimulus that are given can improve the aspects of student motivation.

The reflection was a review of learning during cycle III. In this cycle the teacher can teach very well. The irrelevant behavior can be reduced by providing repetitive questions. Motivation can be enhance which the students who achieve good motivation and very good reach 20 students. And finally, the completeness of learning outcomes reaches 100%. There was no revision in cycle III because succeed criteria have been achieved.

## DISCUSSION

The Gasing learning was a teacher-centered learning method because the teachers control the information in the classroom. The teacher determine which students answer the questions. Nevertheless, students remain freed in asking questions and expressing opinions. Most of the students feel reluctant in asking. Therefore, in cycle III, the teachers took initiative to give students questions during the learning process. In addition to suppress irrelevant behavior, it was also intended to check students' understanding. The activity of irrelevant behavior had increased in cycle II, although the teacher had reprimanded many times. And in the third cycle the teacher decided to rebuke the unfocussed students by asking them a question. This method was effective because students who are unfocussed and not paying attention became focused on the teacher. Students who were questioned will not be ashamed because they are not directly reprimanded. This way was appropriate with the ARCS strategy and the law of effect from Thorndike's Theory (Schunk, 2011). Thorndike explained that the stimulus and the response will get closer when accompanied by feelings of pleasure or satisfaction, but become weak or vanish if accompanied by displeasure. Pleasure causes hormone secretion in the

synapses, so the relationship becomes smooth. Therefore praising and encouraging students (pleasure) is better in teaching than punishing or reproaching (displeasure).

The Gasing learning has the merit in explain the physics concept with comics and the students can easily imagine the physical phenomena that being explained. The explain of the physics phenomenon was made in simple language. To answer the question, the gasing use the physical meaning of the phenomenon that being studied and it can strengthen the students' conceptual understanding.

The cognitive learning theory states that "learning is a mental event which related to thinking, attention, perception, problem solving and consciousness" (Schunk, 2011). This theory underlies the notion that the learning process is insufficient to apply only to stimulus and response (SR) relationships and to reinforcement, but also to the logical and rational relationship that involves the process of acquiring or changing from within (insight), outlook, expectations or thinking patterns.

In accordance with this theory, Gasing learning not only emphasizes the stimulus and the response aspects of the students, but also the mental aspects because Gasing learning makes students learn in delight way. Gasing learning can teach physics concepts with simple lab work that students can try themselves at home. In addition, Gasing learning also emphasizes the use of logic to make students understand the concept of physics and students can construct his understanding more easy.

The results showed all aspects of student motivation was enhanced in each cycle. Students who reached "good" and "outstanding" category on the cycle I amount 12 people, which has not yet reached the criteria of research success. Then it increased to 18 people on cycle II and became 20 people in cycle III. The attention aspect always be given the stimulus by interesting learning variations and interesting learning media. The relevance aspect was be given stimulus by explained the benefits of the material and gave examples in everyday life as well as associated with previous knowledge. The confidence aspect was enhanced by providing objectives for each teaching content, gave an example of an easy problem, and trained students to do the exercises independently. The aspect of satisfaction was be given stimulus by praise them whenever they succeed and motivating them when they are failed. The teacher try to guide students individually by checking students during the exercise.

TABLE 6 CLASSICAL COMPLETENESS

Score	Category	Cycle I	Cycle II	Cycle III
≥ 70	Passed	68,18%	90,90%	100%
< 70	Not passed	31,82%	9,10%	0%

The ARCS motivation strategy could help to stimulated, enhanced, and nurtured students' motivation in learning. The results can be seen in table 6, where classical completeness increased from cycle to cycle as enhancement of students' motivation. The ARCS model is based on the expectancy value theory by Lewin who assumes that humans will be motivated to do something if the act is allegedly related to personal fulfillment and if there is positive expectation to succeed.

Cumulative learning involves various aspects of the ARCS strategy, therefore it can enhance students' motivation in each cycle.

## CONCLUSION

The stages of Gasing learning impacted on the aspects of attention, relevance, confidence, and satisfaction in the ARCS strategy. Students' average motivation in cycle I was 3.71, in cycle II it enhanced to 3.80, and in cycle III it enhanced to 3.99. Students' classical completeness also increased from cycle I = 68.18%, cycle II = 90.90%, and cycle III = 100%. This result showed that Gasing learning in ARCS strategy could be used to enhance students' motivation of 9<sup>th</sup> grade of SMP Muhammadiyah 1 Banjarmasin.

Based on the research results which obtained in this classroom action research, some suggestions that can be asked are as follows. The first, the teacher should be careful in selecting the content for Gasing because not all content match with the phase of the Gasing learning. The second, multiply the time portion for the imagination phase because in that phase the physics concept is given to the students. The third, provide repeated questions to students to reinforce the concepts that has been taught and prevent students from unfocusing. The fourth, avoid negative statements in admonishing students not to reduce the student satisfaction aspect.

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