

IMPROVING LEARNING MOTIVATION THROUGH INFORMATION TECHNOLOGY-ASSISTED ACTIVE LEARNING IMPLEMENTATION TOWARD BIOLOGY

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ABSTRACT

The low learning motivation of students of SMK (Vocational High School) Cangkringan on Biology subjects raises concerns for the researcher. Students with low learning motivation immediately stop trying to learn every time they face learning difficulties or when facing exams. Based on this, the purpose of this Classroom Action Research is to increase the learning motivation of class XI APP SMK Cangkringan in Biology by implementing technology information assisted active learning. The study was used as a Classroom Action Research (CAR) procedure. The CAR was carried out in two cycles, focus on observation of the activeness of students during the learning process. The subjects of this study were the biology teacher who also acted as a researcher and all students of class XI APP SMK Cangkringan. There are 29 students in class XI APP 3, consisting of 23 females and 6 males. The results showed that the implementation of information technology-assisted active learning can increase the learning motivation of class XI APP students towards Biology subjects, this is indicated by the level of student activeness in all behaviors observed reaching the criteria set by the researcher, which is 85%.

Keywords: learning motivation, active learning, information technology.

INTRODUCTION

Learning Biology at SMK (Vocational High School) Cangkringan refers to the 2013 Curriculum. SMK Cangkringan has four Programs. They are the Ruminant Agribusiness, Agribusiness Processing of Agricultural Products, Light Vehicle Engineering, and Chemical Engineering Analysts. Biology is the basics of the program in the Ruminant Agribusiness. Biology is pure science that forms the basis of agricultural and animal husbandry technology. Biology is a basic subject of vocational competence that should be mastered by students, both as a support for vocational competence and as a preparation for students who will continue their studies at higher education. However, the considerable amount of biology subject matter, with very little time allocation, and low student intake, is the main obstacle to achieving this goal.

Based on the observations of the researcher in the last 6 (six) months, students have very low learning motivation. Only 5 among 29 students (17.24%) have a high motivation to learn. During the learning process, they are passive and are reluctant to think. Likewise, when facing exams or tests, students quickly give up and take the exam half-heartedly. However, the learning process must still run optimally, with difficult learning material, because Biology is the basic concept for other training courses, especially for the Agribusiness Program for Agricultural Product Processing (APP). However, the large gap between student intake and the demanding curriculum demands that there is a way out if there is a will to overcome it. It is proven that some students have been successfully accepted at State Universities, the Animal Husbandry faculty, the Agriculture faculty, and the Biology faculty. Based on this

background, the formulation of this research problem is: Does the implementation of active learning assisted by information technology can increase student motivation in biology.

Meanwhile, the purpose of this study was to determine whether the implementation of active learning assisted by information technology can increase student motivation in biology. The results of the implementation of Classroom Action Research (CAR) which is self-reflective teaching are expected to provide significant benefits for the following. The researcher can find various learning strategies that can improve the quality of learning in the classroom. So that problems faced by students and researchers can be handled properly. Also, the researcher will become accustomed to doing similar research which will be very useful for improving learning and for the researcher's career. For fellow teachers, this action research can trigger motivation and as a source of inspiration to conduct similar research. Finally, the results of this research are expected to improve the quality of learning in schools. This action research is expected to increase student motivation and understanding of learning material. Increased learning motivation allows them to learn independently so that success will be easier to achieve.

THEORETICAL FRAMEWORK

The Importance of Learning Motivation

Motivation is an absolute requirement for dynamic thinking and learning. People who do not have great motivation to succeed in learning will never succeed. Multitudes of people meet every requirement for success, except motivation. Programs for teachers and educators to revive excitement in the learning process have proven successful. At Super Camp, an educational institution in America, motivation to learn has increased by 68%. The program also succeeded, among others, in increasing 73% of the learning outcomes score, and 81% of children becoming more confident. (Dryden & Voss, 2005).

On the other hand, the teacher is the leader and manager of the class. As a teacher manager must motivate, in addition to other duties. Motivating will be effective if the four conditions that must be present in the motivating person are met. They are knowledge, sincerity, enthusiasm (enthusiasm), and practice. To be able to provide motivation, people must have sufficient and deep knowledge about the subject of the field. He also must be sincere with what he says. If he conveys that certain knowledge is necessary and useful for others, then he must be sure that it is necessary and useful. So motivating is not just a task, while in itself is not sure about it. He must also be enthusiastic about motivating others. Enthusiasm cannot be created and forced, but only when there is sincerity. The last imperative is practice. He must always perform this motivating task every time. Thus, the task of motivating will be smoother and more natural as you get used to it. (Cullough, 1986). Motivation is very important for learning in school. According to Hewitt in Leary (2012), "attentional set" is the basis for the development of social motivation. This means that the child likes to cooperate with other children and with the teacher. He expects respect from his friends and prevents their reproach, and wants to gain self-respect among his classmates. Furthermore, the child gets the motivation to master the lesson (mastery), including mastering intellectual skills. With appreciation for its success, that motivation can be cultivated. According to Hewitt, the highest level of motivation is the motivation for "achievement", which is a condition for the child to be driven by his own will and to feel satisfaction in overcoming increasingly difficult and heavy tasks. When this level is reached, the child can learn on his own.

Other researchers suggest the importance of reinforcement in the form of praise, the reward is given when children's learning outcomes approach the desired form of behavior. No

need to wait until the learning outcomes are completely correct. Students need to be informed about the results of their work. Thus he can judge both success and failure. Ultimately the child must rise in the form of appreciation from concrete to satisfaction with his success according to the standards he has set himself. (Leary, 2012).

Ausubel in Gouws (2014) states that motivation which is associated with social motivation is not important when compared to motivation related to task mastery and success. This kind of motivation is intrinsic and its success will give a sense of satisfaction. Also, success will enhance his self-esteem and sense of ability. Furthermore, Ausubel said that although there is a relationship between motivation and learning, motivation is not an absolute requirement for learning. There is no need to wait for motivation before we teach something. When learning is successful, motivation will arise automatically. And a desire to learn more will arise. Success in learning will generate motivation to learn.

Skinner in Gouws (2014) states that the problem of motivation is not a matter of providing motivation, but controlling learning conditions to provide reinforcement. Motivation to produce something is more stable and encourages a large number of activities, including activities related to school lessons. Although the theory of motivation is very different, the educational application is concurrent. Students or learners must be rewarded in praise, good numbers, a sense of success for their learning outcomes. Thus they will be more interested in the lesson. Likewise, mastery of educational program objectives provides a sense of satisfaction in successfully interacting with the learning environment. Mastery of the goals of educational programs is also a constant source of motivation for children, which will enable them to learn about their long lives. The ability to learn by himself throughout life can be considered as one of the most important educational outcomes (Gouws, 2014).

Characteristics of Vocational High School Students

The characteristics of vocational high school students are 15-17 years old. At this age, they are a group of teenagers who start looking for self-identity. They are in a formal operational cognitive development phase. Children in this group have started can think conceptually and abstractly, but, they are also looking for self-identity. Teens think more abstractly than children. The ability of adolescents to monitor their social cognition effectively is an important indicator of their social maturity and competence.

The Role of Information Technology-Based Media in Learning

Today's software can design visuals to become stars. Users must be able to control electronic media so that the media can function optimally. If used properly, information technology-based media will greatly support us. Moving pictures can display events and the sequence of these events. Both pictures and living pictures greatly expand the stimuli for learning, real or imagined situations. On the other hand, the sophistication of this information technology-based media will be the worst thing if we don't use it properly. Media that is too flashy and too attractive can distract and make it difficult (Woodall, 1996).

Active Learning

We can tell students something quickly. However, students can forget it more quickly (Silberman, 1996). Teaching is not just a matter of telling. Learning is not an automatic consequence of pouring information into the minds of students. Learning requires the mental involvement and work of the students themselves. Explanations and demonstrations will not produce lasting learning results. What can produce lasting learning outcomes is only active learning (Silberman, 1996) Children have to do a lot of tasks, to learn to be active. Students or children have to use their brains, have to study ideas. They must learn to solve problems and try to apply what they learn. Active learning must be agile, joyful, energetic, and passionate. If necessary, they must often leave their seats and move freely and think hard (moving about, thinking aloud) (Silberman: 1996). Teacher roles must be played in active

learning. These roles include the preparation stage, organizing learning activities, monitoring and intervention, and evaluating learning processes and outcomes. There are many things that teachers can strive to create active learning.

Framework of thinking

Motivation to learn is very important in learning. The teacher is a class manager. It is fully responsible for motivating their students. So far, Biology learning has been mostly carried out using lecture and discussion methods. As a result, the student learning experience is very limited. Moreover, schools are not equipped with biological laboratories or science laboratories. Learning becomes less varied and feels boring. Meanwhile, information technology-based learning media can visualize learning materials in the form of live images. Which are impossible to observe directly, for example about viruses. After all, learning will be successful if it takes place in a pleasant atmosphere while paying attention to and serving a variety of student learning styles. This frame of mind is more clearly presented in the picture on the following page.

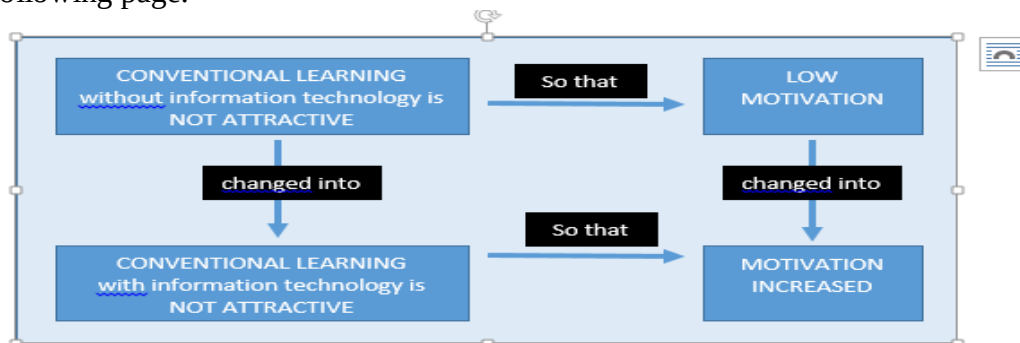


Figure 1. Thinking Chart

Based on the theoretical framework, empirical experience, the hypothesis in this Classroom Action Research is: the learning motivation of students of class XI APP SMK Cangkringan in biology subjects can be improved by implementing active learning assisted information technology.

METHODS

The subjects of this Classroom Action Research were all XI APP students of SMK Cangkringan, Sleman Yogyakarta. They are 29 students are consisting of 23 females and 6 males. This Classroom Action Research was carried out by the following Classroom action research cycles (Baumfield, et al: 2009).

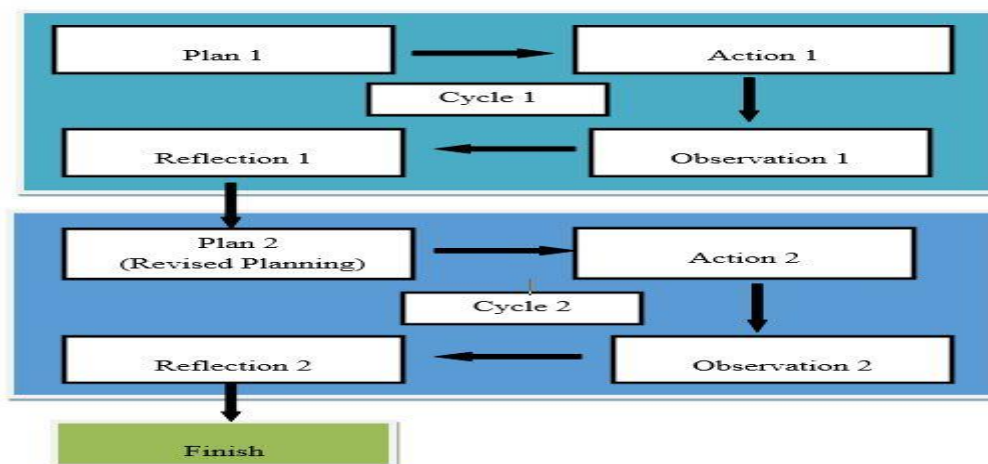


Figure 2 Classroom Action Research Cycles

Cycle 1

Plan 1: The researcher analyzed the learning material according to the learning agenda namely on the basic competencies of Ecosystem Components. The material analysis aims to identify and classify material of facts, concepts, principles, or procedures.

Researchers prepare learning media by the material and competencies to be achieved. First, do labeling of all files which originally were only codes that did not describe the contents of the file. This labeling is important because it will facilitate the selection of the files needed. Labeling is done by opening the file, after it is clear the contents of the file are labeled according to the contents of the file, by using the Rename submenu, namely by right-clicking on the file - Rename (attached list of files before and after labeling).

Researchers determine how and strategies for presenting material in learning according to the type of material. The material in the kinds of facts (abiotic components, biotic components) and concepts (basic concepts of ecology, habitat, individuals, populations, ecosystems, biosphere, food chains, etc.) are presented with concept maps and tables in a PowerPoint presentation file. The material in the form of principles (Biomagnification, environmental balance, interaction) as material for group discussion with the Group Discussion Sheet (GDS). The material in the form of procedures (utilizing various types of interactions between biotic components) is prepared in the form of interactive multimedia (in the flash media files). Simulations and interactive quizzes were prepared to determine the level of understanding of students. The quiz is accompanied by comments about students' answers, so it is hoped that it will give a sense of pride to students who managed to answer correctly. All of these media are also prepared in the form of print outs to anticipate possible blackouts. Prepare a Lesson Plan and its attachments. Developing Observation Instruments. Preparing a recording device, among others, in the form of a digital camera. Action 1: Carry out the Teaching and Learning Process activities as scheduled, accompanied by an observer and a photographer. Action 1 is carried out in two meetings, namely: Learning about environmental balance: Interactions among environmental components are presented with interactive puzzles.

Observation 1: The researcher observes the learning process and records all the facts that occur by filling out the observation sheets that have been prepared. The photographer recording with a digital camera. These observations include aspects or behaviors of student activeness and involvement in the learning process. Reflection 1: The researcher reflects on the findings of Action 1. Depend on reflection 1, the researcher compiles Cycle 2, with the next learning material, namely various types of interactions among ecosystem components.

Cycle 2

Plan 2: Arranging the action design in Cycle 2. The action design in Cycle 2 is based on the results of the reflection in Cycle 1. Action 2: Carry out learning according to the learning design (planning) Cycle 2 which consists of two actions, Active learning discussions about various types of interactions among ecosystem components. Active learning: presentation of the results of group discussions on various types of interactions among ecosystem components.

Observation 2: The researcher observed the learning process during Cycle 2, both in Action 1 and in Action 2. During the observation, the researcher was assisted by a fellow teacher as a photographer who helped record all events with a digital camera. Reflection 2: The researcher reflects based on findings from observations during Cycle 2. If at least 85% of students are actively involved in the learning process, this Classroom Action Research is considered sufficient and successful. This is based on the fact that before the action research, only 17% (5 of 29 students) participated in active learning. The rest, as many as 83% (24 of 29 students) participated in learning passively.

The researcher performed data triangulation techniques by using various research instruments simultaneously. The research instruments used in this Classroom Action Research are: **Systematic Observation Sheet**: used to record student activity during the learning process which includes 9 aspects of student behavior that have been determined by the researcher. The nine aspects of student behavior are: don't come late, pay attention, actively answering, don't leave class, no fuss, Active in Group, Doing Ask, and Presence. This student activity observation sheet is filled in by writing numbers 1, 2, 3, or 4 into each column according to the behavior scale (Likert scale) which means 1 = not doing, 2 = doing after being asked or ordered, 3 = doing on initiative yourself, 4 = Doing it on your initiative at least 2 times.

Structured Observation Sheet: used to observe teacher preparation and activities during the learning process and to observe students' readiness and interaction in receiving lessons. The observer fills in this observation sheet by placing a checkmark (√) in column 1 (Poor), 2 (Enough), 3 (Good), or 4 (Very Good). **Focused observation sheet**: used to record all important events related to students outside the aspects listed in the systematic observation sheet. The observer fills in this instrument by making short notes as deemed necessary.

Open observation sheet: used to record all important events during learning that occurred incidentally.

Photo: is used to record events during the action, especially the stages that are predicted to occur or spontaneous events that still allow the opportunity for shooting and are further analyzed during reflection. The photo was taken by a colleague who specifically helped as a photographer.

Video Recording: this video recording can mainly record unexpected events that occur during learning, which occur spontaneously and can be played back for analysis at the reflection stage. The recording is done by a photographer who carries two cameras. One camera is positioned as a camera, the other camera is prepared for video recording.

Interview Sheet: used to monitor student readiness and student impressions of the learning being carried out. **Portfolio**: used to analyze the performance and behavior of students in groups. This portfolio is a collection of results from group discussions, pretest, and posttest results. **Field Notes**: used to record important things during the research. The researcher made field notes as additional information for reflecting.

Data Analysis and Reflection

This Classroom Action Research was conducted in two cycles. Each cycle consists of two actions or two meetings. In each cycle, observations were made before, during, and after the action was taken. Observations were made by the researcher and assisted by a photographer as well as a video recorder. Various research instruments are used to complement and support each other. From the various research instruments, data were obtained as presented in Table 1 and Table 2. The data from each cycle were separated into two groups. Data about student activeness, which is obtained from the results of observations covering 9 aspects (behaviors), is quantitative data which is then analyzed descriptively. The researcher used descriptive statistical analysis by calculating the percentage of students who displayed behavior for each observed behavior. This research is declared successful if the student's learning activeness has increased according to predetermined criteria. The researcher set the following success criteria:

pay attention	85%
don't leave class	85%
not chat/fuss	85%
active in groups	85%
doing task	85%

ask the teacher	85%
Answer questions	85%
respond statements	85%
come not too late	85%

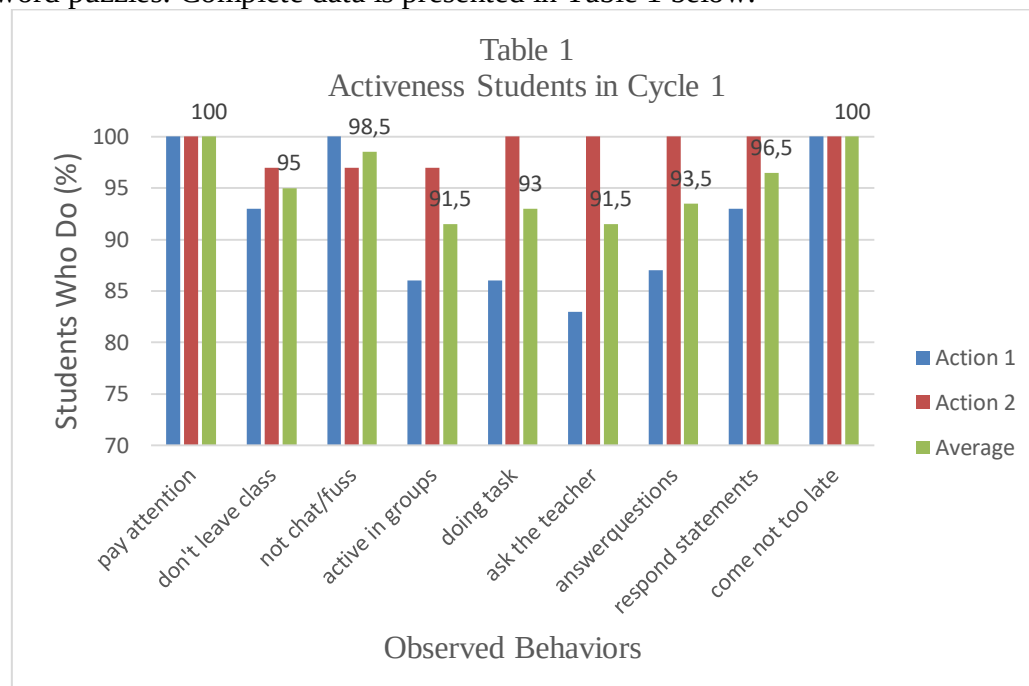
Data from other instruments were analyzed descriptively and qualitatively. They are used as reflection material for each cycle. This data is used as a basis for improving the learning process in the next cycle. Included in the data in this group are the results of the pretest and posttest, which are quantitative data, data on the level of readability and clarity of the media, and other technical matters that may still need improvement.

DISCUSSION

This Classroom Action Research (CAR) starts from July to November. The research activity begins with identifying problems in the field, limiting problems, and problem formulation. Meanwhile, the implementation of actions and observations starts from July to November, after the implementation of the Mid-Term Deuteronomy. According to a predetermined lesson schedule, Biology for class XI APP is every Wednesday, the 3rd to 4th hour. Two hours earlier, at the 1st and 2nd hour, students take other subjects. Before the implementation of the fourth research action (in Cycle 2), six (6) male students were punished, not allowed to attend lessons because they did not complete the assignment (homework). They have to sit in front of the classroom door for 2 hours of lessons and continue to take part in biology learning and be actively involved in this research. This Classroom Action Research was conducted in two cycles. The results of the observations from each cycle are presented as follows.

Data of Cycle 1

Cycle 1 consists of two actions. Each action lasts 2 hours of lessons. In the first action, learning about Environmental Balance (Ecosystem) was carried out. In the second action, learning about the basic concepts of ecology was carried out using interactive crossword puzzles. Complete data is presented in Table 1 below.



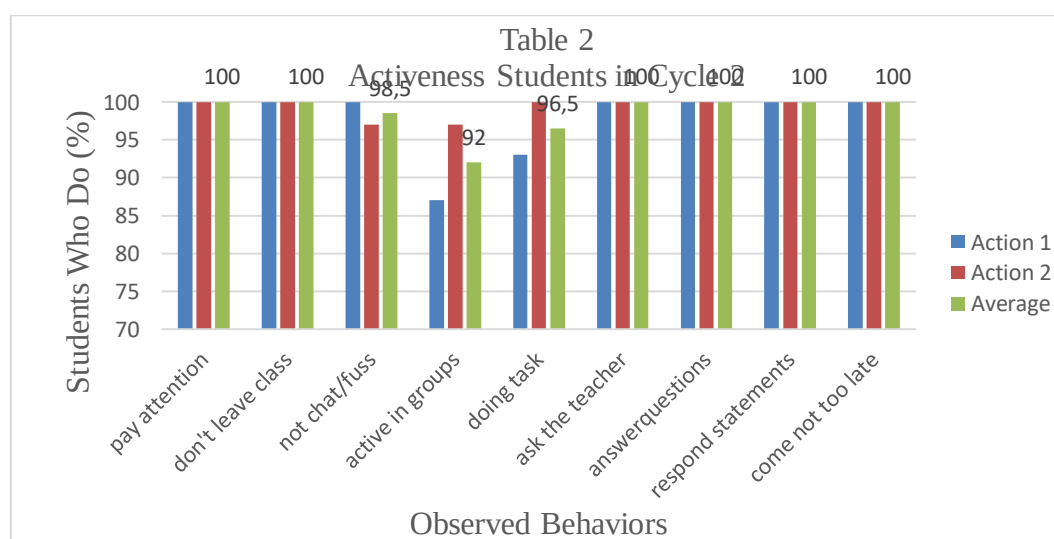
In Cycle 1, learning is carried out by implementing active learning. This active learning starts from the stage of group formation, core activities, and closing activities. Group formation is carried out with name labels using the names of the kinds of interactions between biotic components. There are 6 groups, namely Mutualism, Parasitism, Competition, Predation, Commensalism, and Antibiosis. This group labeling is one strategy for forming groups in active learning. Active learning strategies are also applied to core activities. The strategy chosen is a puzzle. Active learning is also carried out when the teacher facilitates group discussions. The discussion group became very enthusiastic, all group members were actively involved in the group.

Based on observations on Action 1 in Cycle 1, the following data were obtained. Student activeness reached 100% in the three observed behaviors. The three behaviors are 1. paying attention, 3. not chatting, and 9. arriving late. Meanwhile, the two behaviors reached more than 90%. The rest in the other four behaviors reached more than 80%. In Action 2, the student's activeness increases in all behaviors. 6 behaviors were observed to reach 100%.

All other things: the readability of the media is not optimal so it needs improvement in the visual PowerPoint in the next cycle. Students are given time to take notes because they do not receive a copy of the group discussion results. Students also do not understand the content of learning optimally, even though it is visible in the PowerPoint slide. They require an explanation and completion of the essential material. This becomes material for reflection in Cycle1. The results of reflection in Cycle 1 are then used as the basis for planning revisions in the next cycle.

Data of Cycle 2

Cycle 2 consists of two actions. Each action lasts 2 hours of lessons. In the first action, learning about the interaction among environmental components was carried out. Students are divided into small groups of 4-5 students. The formation of this group is carried out by paying attention to the rules for forming a good discussion group. Each group consists of students with heterogeneous abilities and characteristics. Each group conducts discussions for different materials. There are six materials discussed by the six groups. At the second meeting, a presentation was held on the results of group discussions on various forms of interaction among biotic components. Complete data is presented in Table 2 below.



In Cycle 2 learning is carried out by implementing active learning as in Cycle 1. Active learning is applied in the stage of group formation, core activities, and closing

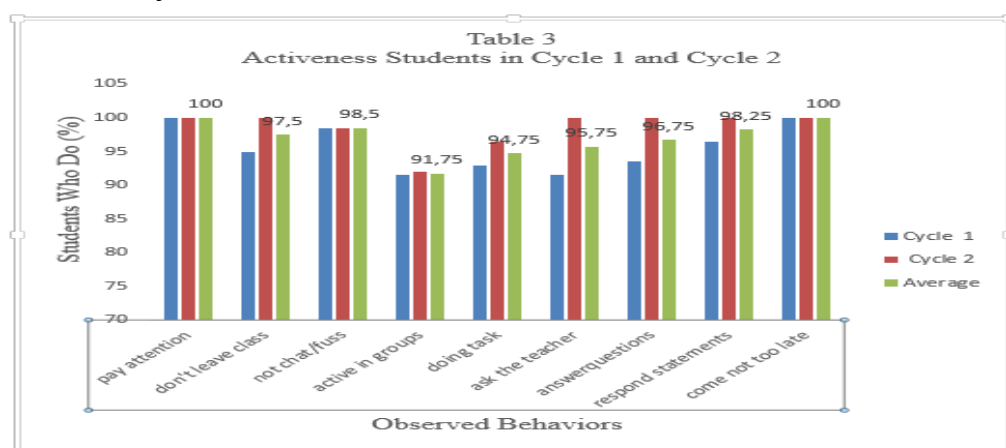
activities. Group labeling is the same as in Cycle 1. This group labeling is one strategy for forming groups in active learning. Active learning strategies are also applied to puzzles and group presentations. Active learning also continues when the teacher facilitates group discussions. The discussion group became very enthusiastic, all group members were actively involved in the group. Some students even actively took photos of the material displayed on PowerPoint slides.

Learning in Cycle 2 is carried out by continuing to apply active learning assisted by information technology. Active learning in Cycle 2 using puzzles and completing tables. Information technology is mainly used in presenting material on examples of population imbalance. In Action 1, there are 7 out of 9 behaviors that are observed with the level of student activity reaching 100%. In Action 2 there was one behavior that was observed to have decreased, even though it was still in a fairly high level of activity, namely 97%. In Action 2 there was also an increase in student activeness in observed behavior, namely doing assignments from the teacher.

Data analysis

In Cycle 1, student activeness reached more than 85% in 9 observed behaviors. This has even happened since Action 1. In Action 2 students' activeness has increased in 8 observed behaviors. One behavior observed, not chatting, experienced a slight decrease but was still at a high level of activity, namely 97%. The lowest average student activeness in Cycle 1 was 92%, in the active aspects of the group. In Cycle 2 the students' activeness reached 100% in 6 behaviors, both in Action 1 and in Action 2. There was a decrease in the two observed behaviors, although they were still at a high level of activity (87%). In Action 2 the activeness of students in this aspect increased again to 97%.

During this Classroom Action Research, student attendance was 100% in both cycles. This indicates that students are interested in participating in the Biology learning process. Based on the analysis of the results of the pretest and posttest, students can answer questions only if the material is emphasized and written in a PowerPoint presentation. Students have not been able to take or extract the contents of the learning material that is displayed directly from the presentation file. This is an important finding for the researcher to always or at least often to ensure students' analytical skills. The teacher still has to emphasize the core points of learning in the form of a summary and conclusion, even though the material is already in the animation. Another important thing is, students apparently need time to take small notes individually because the results of their group work are collected and no notes are taken home. This can be overcome by providing a print-out of the results of the discussion and a summary of the results of the activity at that time. The following is a comparison of students' activeness in both cycles.



Based on table 3, the activeness of students in both of the cycle reached 85% for all observed behaviors. Student activeness reaches an average of 100%. This means that students' activeness reached the maximum of all actions, both in Cycle 1 and Cycle 2. The lowest average activity in both cycles was 91.75%. In the conditions before the action, students who learn with high enough motivation are only 27.14%. After the improvement of learning with active learning, the activeness of students increased to 100%. All students followed the lesson with great enthusiasm.

The increase in student enthusiasm was seen since the group division. The researcher divided the groups according to the signs of group doubt according to the rules of active learning. Groups are also given names or labels as suggested in active learning. The two steps in forming this group are very influential in increasing student motivation.

Another important thing is the presentation of material using interesting information technology. The learning material is also interesting, it is proven that students respond a lot and ask questions about the material. Moreover, the material about the population imbalance in one country is very unbalanced. This had never occurred to them. The teacher also facilitates discussions according to the rules of active learning. Classes are also arranged in such a way as to support interaction between groups. All these things allow for a significant increase in student motivation.

Based on the above discussion, it can be stated here that the application of active learning can increase students' learning motivation towards biology. Cycle 1 and Cycle 2 data show that the implementation of active learning increases activeness of the predetermined students, namely 85%. Thus it can be decided that the objectives of this Classroom Action Research have been completed and it will be enough.

CONCLUSIONS

The implementation of information technology-assisted active learning models can increase the learning motivation of XI APP students in Biology subjects. Considering that the implementation of this research has only been running for 2 cycles, it is hoped that other researchers/teachers can continue to obtain more significant findings. Suggestions for the application of research results. Considering the use of information technology-based cooperative learning models can increase student learning motivation towards Biology, schools with relatively the same characteristics can apply similar strategies to increase student motivation in learning Biology.

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