

**INCREASING STUDENT'S ATTENTION IN PHYSICS LEARNING WITH
COMPUTER INTERACTIVE ENHANCING ATTENTION OF PHYSICS
STUDENT LEARNING OF INTERACTIVE COMPUTER HELP WITH
INSTRUCTION-ASSISTED**

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ABSTRACT

This study examines the increasing attention of student in learning using three variations of Physics Assisted Learning Interactive Computer Program (PFBPKI) as Self Operated Instrument (SOI) , and PFBPKI as a medium, as well as learning without PFBPKI on three superior class-1, class-2 and regular class, through a quasi- experimental study factorial. The attention significantly increased from the three variations of learning , the three classes of treatment [F (2, 253) = 183.92 , p < 0.05] with the effect size of 59%, the difference class in attention was significant [F (2,253) = 8.39, p < 0.05] with effect size by 6 % , while the effect of the interaction between learning with classroom variation was also significant [F (2,253) = 8.39, p < 0.05] with effect size by 7 % . The analysis showed increased interest in learning variations contribution is much larger than the class differences and interactions. So the authors speculation that attention affects the learning process empirical can be proved. This study found the junior high school students are more interested in studying physics with PFBPKI operated by their selves, and giving much attention to the relatively high contribution to the regular classes, its mean that computer-assisted learning contribute to increase the learning attention of all junior high school students.

Keywords : Attention , Computer Assisted Instruction .

INTRODUCTION

Impaired attention in learning not only due to the difficulty of physics subjects (Hamdi, Festiyed: 2001), also due to the periodicity in the lives of students. Junior high school students is in their pra- puberty or last childhood era with the characteristics are: the child is unable to settle down; thoughts, feelings and desires are always changing and quickly get bored; often take the liberty to do things without thinking; doubted his own knowledge and abilities; attention towards the environment and towards learning in school is reduced; and are very easy to be influenced by their friends who are not good enough. During the junior high school, their task becomes more severe , the teacher needed to be able to understand the stages of child maturity are quickly bored and less attention to the lesson (Susilowindradini, 1993). In accordance with the theory of information processing learning , attention is the process that determines whether control information can be moved and settled in the memory. Stimulus (information) is received and processed through preceded by a series of memory ikonok memory (sensory storage) , short-term memory, and long-term memory (Gagne, 1986; K.Reed, 1982). Recent developments in information processing model (Restyandito , 2007), as Figure 1

below:

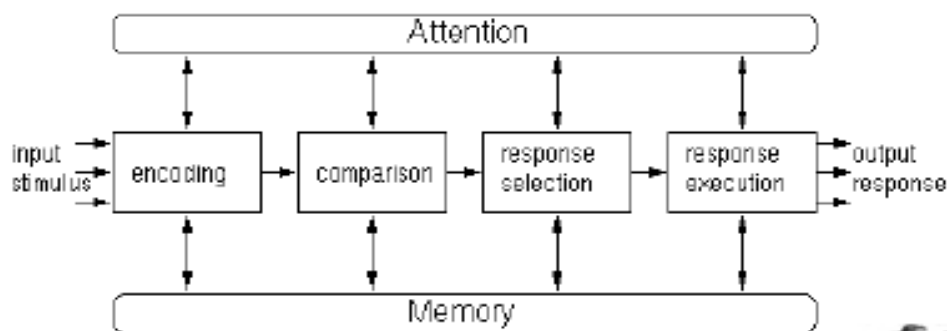


Figure 1 . Stage of Information Processing (Barber, 1988 ; Restyandito , 2007)

Information (input, stimulus) is assumed to be processed in systematic series of stages starting from the encoding, encoding is the process of how information is entered into the memory. Only important information encoded into the memory, other information is ignored. Children need to practice in order to have an effective encoding capabilities. Comparison, is the ability to compare information. With rise the age and experience of developing the ability to automate many tasks. It allows individuals to see clearly the relationship between ideas with other ideas. It happened because experience occurred generalization. Response selection (the ability of selecting the response). To solve the problem, the child must coordinate all the relevant information. Therefore, previous knowledge needs to be applied to solve new problems. While response execution is the ability to execute and apply knowledge from previous experience to new situations.

If the information is not reflected to the student's memory, that information is lost from memory . Therefore, according to Tarpy (1978 attention is the control process that determines whether the information can be transferred . Kurfiss (1981), found that external stimuli can become an active motivator, if the stimulus was momentous for students, by forming relationships with student's internal condition. So the internal state of the students affected by the external input stimulus student. For this reason, a learning that according with students characteristic that can attract their attention.

Stages of information processing described above encourages the development trend of software for learning in accordance with students' characteristics. In addition, note the simplicity and imperativeness of adaptation to the user in running the program , or application that is referred to as " user friendly". Physics Learning Design Interactive Computer Assisted Program (PFBPKI) depends on attention and user satisfaction. Because PFBPKI depends on attention and user satisfaction is subjective, so basically there is no an ideal design , but there is an attractive design and useful for the user. PFBPKI's design emphasis on how to attract the attention of students as the main user.

Principles of computer learning physics should be fun and be able to present a series of interactive teaching programs to students (Cepy Ryana, 2006), both in the form of information and practice questions for a particular teaching goals (Grady, 1983) . To make learning more fun

takes three things, first: a computer -assisted program that is challenging to provide several levels of difficulty either automatically or the student 's own choice. Second, fantasy is a computer program interesting and emotionally touching. For example offerings examples and a complete picture of the topics being studied. Third, want to know which computer-assisted program evokes the senses of want to know with effects of combining audio, visual, music and graphics (Azhar Arsyad, 2004; Schramm, 1977).

Interactive means that there must be at least two parties involved in the learning process. The first user is learning materials, and second their own learning materials. The learning material should be able to respond to 'act' or steps taken by the user. Responses or 'response' should be able to understand the steps taken by the user, and that responses are educational (B.Soeprapto, 1987) . To be able to produce education responses, teaching materials are needed, and that the teaching materials save some 'intelligence'. Computers interpreted as learning materials and as tools for computer-based control of a competence.

Patrick Suppes is known as an expert, pioneer, and teaching developers who use computers to deliver course material, with the name " Computer Assisted Instruction " or CAI. He was the first that introduce the CAI program for all disciplines (Taylor, 1980). CAI in the opinion of Grady (1983:133) is: The term Computer Assisted Instruction describes an activity whereby the computer is used as the "means" of problem solving, drill and practice, simulation, or tutorial experience " Teaching computer programs known as courseware in terms of diverse, such as: Computer Assisted Instructional (CAI) or Computer Based Education (CBE) or Assisted Instructional Learning (IAL) or Instructional Application of Computer (IAC) or Computer Based Instruction (CBI) (Alessi and Trollif, 1991). Writing next used the term " Computer Assisted Instructional " or abbreviated CAI and in Indonesian means " Computer Aided Learning " .

Designing computer learning programs that need to be considered according to (Wahono, 2006; Risky, 2007) is: good design is to look at effective and efficient use of computer resources; program runs well and is not easily stopped while running; structured of program is simple and easy to understand even complex function; users can easily estimate even determine the relation between actions and results, between the controls and the effects; compatibility with the purpose of application development tools designed; users with easily to use without a hitch of hardware and software specifications required; easy installation process; complete program documentation and program can be run easily on other programs .

Computer Assisted Learning has been developed for the education in the world, from the literature review, the following are a few research results that are relevant to the research conducted: Dick Hansen and Lippert (1968) compared three groups of students of Physics. Group (a) received a large number of teaching materials put on the computer (CAI); Group (b) Part of the computer and some with classroom teaching; medium group (c) received only classroom teaching. The group concluded that they were higher at mid-semester test. Other groups showed no significant difference. Other computer-assisted learning study researched by : Bangert - Drowns , et al . 1985; Becker 1990; Bracey 1987; Ehman and Glen 1987; Hasselbring 1984; Okey 1985; Stennet 1985; and Mitrani , 1989, they found : Learning with CAI is better for younger students . The study is based on the ability of children by : Bangert - Drowns , et al . 1985; Edwards , et al . 1975; Kinnaman 1990; Martin 1973; Roblyer , 1988, they found : Learning with CAI is more effective for low-ability students in the group of high- ability students .

This research will revealed an increased attention to computer -aided student learning : (1) the effects of treatment , (2) compare the effects of variations in the treatment of learning , (3) compare the effects of treatment of class distinctions .

METHODS

The design in this study is a quasi experimental design (Quasi- Experimental Design). The variables are :

- a. Independent variables: Variations learning using PFBPKI as SOI (self- operated instrument) , and variations learning using PFBPKI as a medium of learning , and variation of Non PFBPKI learning .
- b. Dependent variable (the dependent variable) is the students' attention .
- c. The variable control is done by: a population Election, Electoral class, lesson schedule. For no interaction between the three classes performed cross-system, do all three learning methods to the class. Approaching the same socio-economic status , age approximately equal.

Not all variables in this study can be controlled directly, such as students' initial ability. Initial ability students are theoretically factor influencing students' attention, but it is difficult to control (known and not controlled). So the primary ability becoming covariate or concomitant that recommend by Roger E. Kirk (1982) , to eliminate or neutralize the effects of the primary capabilities of student's attention is use the techniques of analysis of covariance (ANCOVA or ANACOVA), 3x3x1. Manage data using application program package computer SPSS (Statistical program for Social Science) for Windows , and with the help of the computer program excel .

RESULTS AND DISCUSSION

Results and discussion the increasing of student learning in computer-assisted can views by three : (1) the effects of treatment, (2) compare the effects of variations in the treatment of learning, (3) compare the effects of treatment of class distinctions of the three variations of learning, namely: (1) PFBPKI as SOI, (2) PFBPKI as media, (3) Non-PFBPKI , and of the three grade levels, namely: (1) superior-1, (2) superior-2, (3) regular ,

1 . Effects of Treatment

To summarize the results of hypothesis testing in Table 1 .

Table 1. Summary of Test Results for Attention F with covariable Initial Capabilities

| Source of variation | Sum of Squares | df | Mean Kuadrat | F | P (Sig.) | η^2 |
|---------------------|----------------|-----|--------------|--------|----------|----------|
| Treatment corrected | 79,27(b) | 9 | 8,81 | 53,66 | 0,000 | 0,67 |
| Class Difference | 2,76 | 2 | 1,38 | 8,39 | 0,000 | 0,06 |
| Method Difference | 60,38 | 2 | 30,19 | 183,92 | 0,000 | 0,59 |
| Class* Method | 3,07 | 4 | 0,77 | 4,67 | 0,001 | 0,07 |
| Error | 41,53 | 253 | 0,16 | | | |
| Total | 3795,65 | 263 | | | | |
| Corrected Total | 120,80 | 262 | | | | |

In Table 1 that the main effect of the different varieties of learning to students' attention very significant [$F(2, 253) = 183.92$. $p < 0.05$] with the effect size of 59% , and the main effect of the class difference is also highly significant attention [$F(2,253) = 8.39$. $p < 0.05$] with effect size by 6 % , while the effect of the interaction between learning with classroom variation was also significant [$F(2,253) = 8.39$. $p < 0.05$] with the effect size of 7% . From the results of this analysis show the contribution of variation is much greater than class difference and interaction, 59 % compared with 7 % and 6 % . Accordingly the researchers speculation that attention affects the learning process with this empirical provable . Beside, to see how the three variations of the study is showed in Figure 2 .

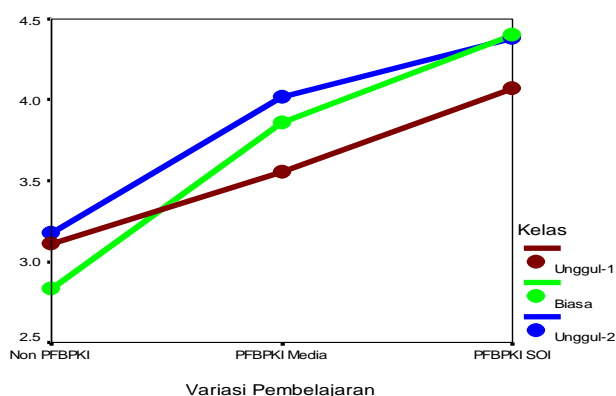


Figure 2 . Mean Attention to Different Variety of Learning and Student Groups

From Figure 2, the score gain from mean of students attention for learning non-PFBPK variations in grade superior class-2 and superior class-1 was not different, but occurs relatively more difference in regular classes, means that in addition to the initial capabilities as penralisisir covariates, there were other factors suspected of causing these differences affect. Although there are other factors suspected, aided learning outcomes of interactive computer programs give contribute relatively higher in regular classes, followed by the superior class- 2 and class- 1 is superior .

2 . Comparing the Effects of Treatment Against Variation Learning

The next hypothesis is to answer variation questions which gives the effect that relatively most advantageous to the students attention , for this proposed three hypotheses of variation in learning :

- The first hypothesis: There are differences in students' learning of significant concern among PFBPKI as SOI and PFBPKI as a medium. Analysis of yield [$F(1,266) = 45.47$. $p < 0.05$] , means that students had relatively high attention when learning to use PFBPKI as SOI (a computer set for 2 students) rather than as a medium of PFBPKI method (use traditional teacher PFBPKI that display with LCD Projector) .
- The second hypothesis: There are differences in students' learning of significant concern among PFBPKI as SOI with non PFBPKI . The test results are [$F(1,266) = 311.91$. $p < 0.05$] , means that students learn to use PFBPKI attention as SOI can improve students' attention is relatively higher than non PFBPKI (teachers do not use PFBPKI).
- The third hypothesis: There are differences in students' learning of significant concern among PFBPKI as a medium with non PFBPKI . The test results are [$F(1,266) = 119.21$. $p < 0.05$] , means that students learn to use PFBPKI attention as the media (broadcast

PFBPKI use traditional teacher with LCD Projector) can increase student attention than PFBPKI method (teachers do not use PFBPKI) . The differences concern of student happens to all couples learning variations , and relatively large differences occur for the use of varied instructional PFBPKI as SOI. In this case the students prefer to learn by operating its own PFBPKI . Because students are free to interact with the computer , feedback obtained immediately, and students can do their own controls in the study.

3 . Comparing the Effects of Treatment on Class Differences

The next hypothesis testing to answer questions which class that gives the best effect on the student 's attention , for this proposed three hypotheses :

- a. The first hypothesis : There are differences in students' learning of significant concern among the superior class- 1 with superior- 2 . The test results are $[F (1,266) = 1.30 . p > 0.05]$, means that the proposed hypothesis is rejected , attention to student learning in both classroom use PFBPKI no different .
- b. The second hypothesis: There are differences in students' learning of significant concern among the superior class- 1 with the usual . The test results are $[F (1,266) = 6.31 . p < 0.05]$, means that the proposed hypothesis is accepted there is no significant difference between the study of attention superior grade- 1 with the usual class ..
- c. The third hypothesis: There are differences in students' learning of significant concern among the superior class- 2 with the Ordinary. The test results are $[F (1,260) = 2.23 . p > 0.05]$, means that the proposed hypothesis is rejected there is no difference between classroom learning attention excel- 1 with the usual class . Testing the hypothesis in pairs for three groups of classes , providing information that there is a relatively high difference of attention among the three classes , although the school seeks to group students with similar abilities for each class , but it turns out all of these classes are not much different .

These research are supported from several studies supported that use computer media such as: Alcalde , Navarro , Marchena & Ruiz , (1998) . Schacter 1999; Kartini 2004; Nana Suwondo 2002; Agus Budi Hartono , 2007; Festiyed 2002; Festiyed and Syakbaniah 2005. All of this suggests that the use of computers to improve attention and learning. However, this research has not been able to prove the relationship of learning variation with attention yet , and the higher concern that caused to high learning results. This study discovered the differences and variations contribute to the learning of attention , where more higher the concern or attention is more fun learning atmosphere (A Styles.Elizabeth, 2005). More fun the atmosphere to learn more students take time to learn, directed to increased learning results . These sentences are relevant to Luzyawati Lesy (2008), more high precipitation time students to learn proven to improve learning outcomes. Discoveries of Goodwin (1986) prove that the provision of computer commands that varies can improve child's learning ability. Through attention, the stimulus will be selected and will be recorded in the form of schemata (K.Reed , Stephen. 1982) which then would facilitate the acceptance of a new stimulus. It is the same with what Bandura, Krathwohl and Bloom said (1971) which indicates that the ability of students will increase. Similar results were found by Aljufri B.Syarif (2007), the ability of students increases, more sensitive, and more receptive response . Thus will tend to increase student learning scores . This event is known in psychology with the ability (the ability of children to learn to grow) .

CONCLUSIONS AND RECOMMENDATIONS

Computer-assisted learning can minimize the time in the class, it is easy to show the examples in daily life, can be packed more interactive and attract attention because of the shape

and color can be played in accordance tendency shapes and colors are preferred, students will have the time to repeat or proceed to a higher one, its mean that students can be creative and finally find new ways of learning. Thus attention can enhance student creativity proven in research as SOI PFBPKI gain scores are relatively high compared to non-PFBPKI .

Students generally pay attention to an interesting model, successful, and generate interest. This study try to create an atmosphere using computer-assisted learning interest, so that students are fully focused on learning, high precipitation of time to learning proven to improve learning results . All of this explains that through attention, the stimulus will be selected, and will be recorded in the form of schemata which then would facilitate acceptance of a new stimulus. This indicates that the ability of students increases, students will be more sensitive, and more receptive response and after all the score will increase too. So this study suggest that the role of the teacher can control and manage the attention of student learning . They had to modify the image to show the other common study method, unique interesting, make a difficult subject become easy.

Students prefer to find their own, students will have time to repeat or continue into the higher because students are given the opportunity to choose , means that student can be creative and finally find new ways of learning. Thus attention can enhance student creativity , proven in research that differences in students' learning attention on PFBPKI comparatively higher learning than non - SOI PFBPKI.

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