



## Neo Strategy to Use Fixed-Whiteboard Based on Student's Thinking Process and Cultural Ethicaly in Learning Physics

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### Abstract

Old guidelines to use the whiteboard stated that teachers were not allowed to write on the whiteboard while talking, because unethical if speak while back facing students. Findings about thinking process profile in information processing were presented with a whiteboard showed that the assimilation process is going to be supported, and audio-visual stimulants. This paper aims to describe the implementation of the latest strategies to use fixed-whiteboard based on student's thinking process in learning physics with maximum the optimal thought processes and also maintain cultural ethics. This research was conducted through the use of guideline development assessment implementation fixed-slates based on the findings of the process of thinking and ethical culture in physics learning. The results showed that the latest strategy the use of fixed-whiteboard based on the thought process students and ethical culture in learning physics are (1) the assimilation process so that the display contents whiteboard is a material that is correct and does not cause cognitive conflict, (2) they are mutually reinforcing a combination of visual and audio so that the need to write while spelling, and (3) the thinking process to the stage of internalization that stage of the emergence of good information text / image / formula can be seen intact by all students by writing not cover impressions. The implementation results show the subject has been able to implement the latest strategies use fixed-whiteboard with both categories. The conclusions of this study that the use of the latest strategies fixed-whiteboard can be used for the presentation of information which is more than usual for students according to their thinking process and also maintain cultural ethics. The implication of this research is for Workforce Education Institutions need to equip student teachers with the skills to use the whiteboard based on the latest strategy.

### How to Cite

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## INTRODUCTION

Old guidelines to use the whiteboard stated that teachers were not allowed to write on the whiteboard while talking. Strategic to use of the whiteboard that this was caused by the ethical culture of unethical if speak with back facing to the students (Saputro, 2009). It happened because most of the teacher writes on the whiteboard body position to the board and turned students. Whiteboard as a medium of learning were already in common use (Arsyad, 2010; Daryanto, 2010; Mayer, 2009; Munadi; 2012; Sadiman 2009; Santyasa 2007; Sudjana, 2005; Sumantri & Permana, 2001).

Findings about profile thought process of the information presented with a chalkboard showing the assimilation process is going to be supported, and audio-visual stimulants. Support indicated by visual observation access students to visual texts or images that are presented on the board. Audio support shown by the access hearing students who mentions the verbal content of texts or images that are presented on the board (Kristiyanto, 2013; Kristiyanto et al., 2015a; Kristiyanto et al., 2015b; Azevedo et al., 2010; Barlett, 1995, Piaget, 1965).

Support to access visual observation students need in their entirety. Texts or images are affixed by a teacher on the board needs to be seen intact by students without any hindrance. Generally, the process of writing or depiction on the board is blocked by a faculty body itself or by the body or head students who were in the front other students. The process of writing to or depictions of early scratches chalk or markers until the end render text or images required students to be arrested and was followed by a sense of vision intact. It takes some strategy in the present, good posture when writing and engineering combination of settings whiteboard and seating students.

Audio support to serve information on the board to do with spell / pronounce things that are being written or drawn. Although according Saputro (2009) was not recommended, but the qualitative findings suggested the thought process. The strategy needs to be done is to

optimize the process of thinking with spell / pronounce when write / draw on the board and also maintain cultural ethics with no backs students. This strategy needs to be trained on the position of the body when the teacher writes on the whiteboard.

Physics teaching materials which according to some students only create confusion, dizziness, it was hard to understand will increase to more severe if not better utilization of instructional media. Hope utilization of instructional media in the form of a whiteboard make receiving information intended for students can even result when utilization whiteboard otherwise not in accordance with the process of thinking students themselves (Lopes, 2011).

Based on the above, the necessary guidelines that educators can use to take advantage of the whiteboard in accordance with the process of thinking students. Preparation and legibility test module to guide the use of slates have been generated. Modules that have been produced have good reading level by the subject, and have been tested at grade level on its appropriateness (Kristiyanto et al., 2016).

The purpose of this study is to describe the latest strategy guide Physics-based learning media use fixed-slates based on the thought process students who maintain cultural ethics.

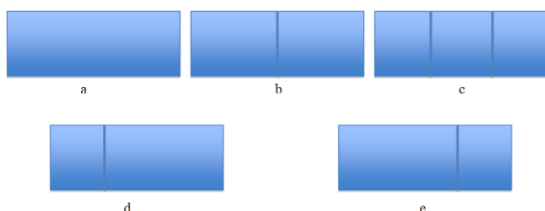
## METHOD

This research was conducted through qualitative assessment (Lincoln & Guba, 1985; Miles & Huberman, 1984; Prabowo, 2011) on the process of thinking and development module design based on the findings of the process of thinking and ethical culture. Data were collected by observation instruments based on the contents of the modules that already have a good level of legibility (Kristiyanto et al, 2016) on the implementation of the module by the subjects in the classroom. The subjects of this study are lecturers and students of the course Introduction to Mechanics in Physics and Physics Education Department on Satya Wacana Christian University (UKSW) Salatiga.

The data analysis is carried out on the implementation of the observations, the results of the record students in the record books, and interviews.

Assessment of the implementation of the latest strategies use fixed-whiteboard is based on the research that has been done before with the following stages (Kristiyanto et al., 2016):

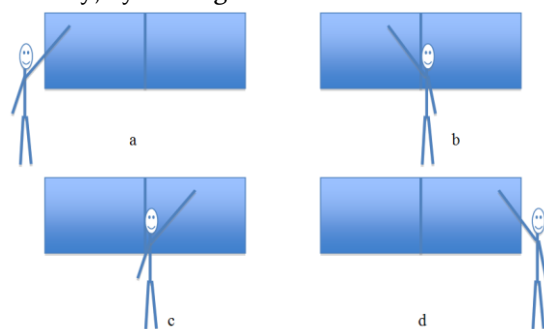
1. Writing the content of the material on the chalkboard done after the briefing / discussion material. Need to conduct a discussion / explanation of the material before them on the board.
2. The depiction / writing done gradually to ensure students consider / able to access any ink streaks on the board (by always looking towards students to maintain cultural ethics).
3. Determination of the size of the text / image to fit the class.
4. Do not rewrite or redrawing unison with other similar impressions.
5. Distribution of the cluster to the whiteboard wide. Need to define a line for to make the clusters on the board.



**Figure 1.** The boundary line corresponding cluster contents of the writing / drawing on the whiteboard

Figure 1 shows the distribution of cluster by taking into account the contents of the text / image that will be appended on the board. If the plans are no images compounds that can not be divided, the whiteboard does not need to be a line for the cluster (Figure 1a), or if it is not too long can be dividers clusters most wide and most narrow (Figure 1 d, e), whereas if there is no big picture and the contents of the sentence / formula was not too long can be divided into 2 or 3 equal parts (Figure 1 b, c).

The position of the body when writing. Need to practice to a standing position, facing the way, by moving the hand.



**Figure 2.** The position of standing on the boundary line of cluster whiteboard when writing

Figure 2 shows the position of the body when the teacher wrote on the whiteboard to write your vision intact access students to the presentation of the text / image on the whiteboard. With the position of the body around the cluster boundary lines whiteboard prevent access barrier body into the vision. The position of the body when writing some what oblique to the whiteboard in order to minimize the back position to students.

Spelling aloud what is written on the whiteboard.

## RESULTS AND DISCUSSION

The results of a qualitative study of the thought process in processing the information presented by the fixed-whiteboard can be formulated using the latest strategies fixed-chalkboard by the thinking of students in learning physics, namely:

1. Facilitate the thought process of assimilation so that the contents to see the whiteboard is the correct material and does not cause cognitive conflict.
2. Facilitating dual coding mutually reinforcing combination of visual and audio so that the need to write while spelling.
3. To facilitate the process of thinking according to stages of internalization that stage of the emergence of good information

text / image / formula can be seen intact by all students in a way writing does not cover impressions.

Study ethical culture through literature studies found that unethical when speaking to the position not facing (back) interlocutors, "... the reason for the ban to write while talking is a courtesy or ethics after eastern culture that prohibits speaking without facing the audience, because most teachers wrote the position of the body to the board and turned the audience (Saputra, 2009)". Based on this it is important also adjust the position of the body when writing on the whiteboard. The position of the body set up by the body and face oblique faces students, thereby further facilitate the writing while staring spell students. Implementations of the latest strategies that have been formulated based on these findings are explained in detail on the description and discussion of the use of fixed-whiteboard, the results portrayed notes students, and interviews students.

**Description and Discussion Use of Whiteboard**

The observation of the use of the whiteboard is described based on the components stages suggested by the module. Observation to the subject as teacher to perform when writing on the fixed-whiteboard was presented in Table 1.

**Table 1.** Assessment of Recent Strategic Use of fixed-Whiteboard

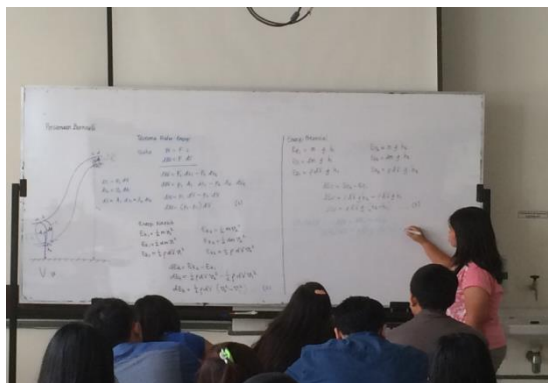
| Rated aspect  | Observation result |
|---|--------------------|
| Distribution of cluster whiteboard                        | Good               |
| The position of the body when writing                     | Good               |
| Explanation / discussion before writing on the whiteboard | Very Good          |
| Do not rewrite the same visual impression more            | Very Good          |
| The contents of the whiteboard fit the concept of         | Very Good          |

|  |           |
|--|-----------|
| Physics  |           |
| The size of the text / image to the size class | Very Good |
| Writing while straining                        | Very Good |

Table 1 has shown that the results of the latest assessment of adherence to the implementation strategy of learning media use the whiteboard in the learning process has shown good results and there are even very good.

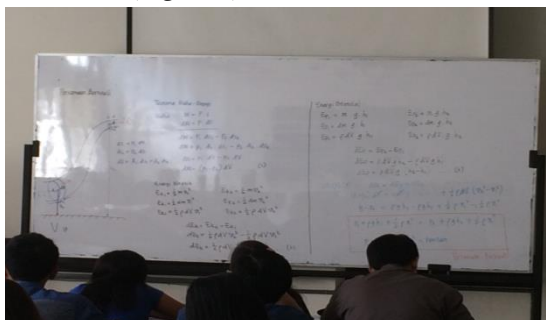
Here is an activity based on the latest strategies that do use the chalkboard as a teaching subject, namely:

- a. Writing on the whiteboard content of the material has been performed after the subjects provide an explanation / discussion material. Subjects had done the briefing / discussion of the material covered and a summary of the discussion / explanation written on the whiteboard.
- b. Subjects drawing / writing gradually and commercialize see students to ensure that each scratch markers on the board can be accessed students well.
- c. The size of the text / image is already good enough to be accessed by all students.
- d. The author was not conditioned students to see another show when the subject of writing on the whiteboard.
- e. Subjects had made a line for the cluster according to the contents of the board, the division is done is lines are inclined slightly to the right (Figure 3).
- f. The subjects had been standing on the edge of the board or in the line for the cluster to seek unhindered access students of the content of the board (Figure 3).
- g. Subjects had stood askew body positions and advance as much as possible facing the students (Figure 3).



**Figure 3.** Subjects Medium Writing in the fixed-Whiteboard

- h. Subjects had to spell clearly and loudly every write on the whiteboard.
- i. Subjects given the opportunity student record. (Figure 4)



**Figure 4.** Display fixed-Whiteboard Generated by Subjects

The observations above show the level of adherence to the new strategy the use of fixed-board in both categories. Subjects have been able to use physics-based learning media fixed-whiteboard with an outline for the cluster whiteboard properly, does not preclude the standing position students, the contents of the whiteboard in accordance with the concept of Physics, spelling aloud during the process of writing or drawing.

The depiction of fluid flow Bernoulli scheme seems to take a broad clusters and related mathematical equation created in the same cluster. Writing a mathematical equation can be made in 1 line intact and there is no need to be continued on the next line. The division of clusters like this was suitable for materials physics described through images and mathematical equations.

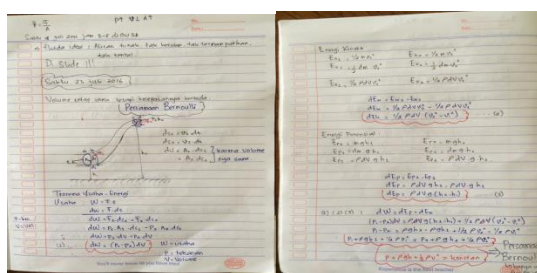
### Description and Discussion of Student's Overview Note

The performance of the subjects in applying the guidance module-based learning media use fixed-whiteboard is appropriate and good.



**Figure 5.** Students use the camera to get the same record with the contents of the whiteboard

The impact of the use of the whiteboard well to the thinking process students through checking of results records students found that all students make full and complete copy the contents of the whiteboard in his notes.



**Figure 6.** Display of Student's Note

Figure 6 shown that student records already contain the same images and text with the contents of images and text on the whiteboard (figure 4). It appears that students have to process information on impressions

whiteboard in his thinking process is the basis of assimilation. There are even some students, in order to have a record that is absolutely identical to the contents to see the chalkboard have done duplication by using the camera on the smartphone (Figure 5). This is another finding some form of activity students who capture images with the camera to duplicate the contents of media impressions whiteboard learning.

### **Description and Discussion of Results of Interview to Students**

Interviews were conducted on subjects students after the learning process is completed. Results of interviews on the subject students showed that subjects felt more fully in the process information it receives from the dual code writing and loud spelling by teachers. Here is a transcript of an interview with the subject students.

Researcher (P-001): Can you tell me the things that happened on the last lecture?

Students (M-001): This course discusses the dynamic of fluid which continuation of previous meetings Sir

P-002 : Can follow or understand well?

M-002 : Yes sir ... Ms D in explaining and describing the material is very coherent and clear.

P-003 : This was Miss D uses a whiteboard yes ... how?

M-003 : Ms D when teaching in addition to other media such as impressions Powerpoint's software, laboratory's instruments, objects, always use a whiteboard. Posts Ms D neat and easy to read ... also pictures.

P-004 : If I am not wrong ... usually Ms D when writing on the whiteboard did not spell it? This was accomplished while writing spelling out what was written. It bothers you or not?

M-004 : Do not disturb the pack ... in fact I even became clearer. Because although sometimes the words were not clear or unobstructed head. .... My friend could still to

listen. At least learn the double pack ... heard while looking.

Based on the transcript of the interview above, it appears that the subject teachers have been accustomed to using instructional media. Chalkboard has been used according to the guide modules tested with a positive effect on the processing of information on students. Changes in teaching the subject when writing as he spelled it had made a positive effect, namely students become more receptive to the information.

### **CONCLUSIONS**

The latest strategies to use fixed-whiteboard based on the thought process students in learning physics and ethical culture is (1) the assimilation process so that the display contents whiteboard is a material that is correct and does not cause cognitive conflict, (2) a mutually reinforcing combination of visual and audio so that the need to write while spelling, and (3) the thinking process to the stage of internalization that stage of the emergence of good information text / image / formula can be seen intact by all students in a way writing does not cover impressions.

The conclusions of this study were generated the most strategic use of fixed-whiteboard by the thinking of students in learning physics. The neo strategy guide provides a way of presenting information through whiteboard more than usual. Presentation of a written text or image or equation must be true, do write with while spelling, and parts of the body not covered views being aired.

The implication of this research is for Workforce Education Institutions (LPTK) need to equip student teachers with the skills to use the whiteboard based on the latest strategy. Skill needs to have one student teachers use whiteboard. Provisioning can be performed on Microteaching program before teaching practice in schools.

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