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Whiteboard in Classroom; Which Tool is the Most Preferred to Clean the Surface?

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Abstract:- Whiteboard is the powerful educational tool. This research was aimed at comparing the effectiveness of using multiple tools to wipe clean the marker stain on whiteboard. Eight different cleansing tools which are vinegar, baking soda, isopropyl alcohol, toothpaste, dishwashing liquid, commercial whiteboard cleaner, shoe polish and car wax has undergone three treatments which are to remove whiteboard marker stain, permanent marker stain and colorful whiteboard marker stain. Results showed that both dishwashing liquid and commercial whiteboard cleaner abled to wipe off all stains on the whiteboard.

Keywords:- *Whiteboard; Marker; Cleansing Tools.*

I. INTRODUCTION

One of the most fundamental aspects of a classroom is a writing surface that can be used by both the teachers and students. A whiteboard is a non-electronic board which used in classrooms, meeting rooms and boardrooms. It is white and usually made from melamine that can be written on with colored markers. Whiteboards are the variation of the traditional chalkboard and become a great choice to display information in a quick and efficient manner. The presenter, teacher or professor who uses the whiteboard has the ease of jotting down anything. Once something is written, it is quick and easy to erase the marks. Users also may use the whiteboard in conjunction with a projector for better presentation to attract the audiences.

Whiteboards can also be a participatory medium where the students can perform activities on the whiteboard and entire class being able to view each student's solution. Additionally, students can work on activities collaboratively, to produce solutions they might not be capable of coming up with individually, and the relatively large size of the whiteboard aids in collaboration. Unlike printed media, prerecorded content, or other prepared classroom materials, whiteboards are more practical where teachers can change or adapt the material being presented on them during the actual presentation. If a group of students is having difficulty with a particular topic, teachers can easily modify the lesson to accommodate students' need. If the teacher finds that prepared materials are insufficient to convey the topic at hand, the whiteboard can be employed to flesh out the presentation.

II. BACKGROUND

As mentioned previously, whiteboard is an educational tool which aid in teaching and learning in classroom can be used to quickly and effectively convey material and facilitate learning for a wide range of students. Typically, teachers are well-trained to use whiteboards effectively and properly to ensure the good condition of whiteboard is maintained and conserved for long-term of period. However, there are numbers of practical concerns when using a whiteboard for teaching as teaching with a whiteboard can place more responsibility on students to take high quality notes. The leftover stains on whiteboard causes all the notes written on the board cannot be read by students. Students may have difficulties to copying down the notes and students may make errors in copying equation, formula or code due to the uncleared surface of whiteboard. For further use of the whiteboard, teachers need to wipe or clean the board, and this must be done in a rapid time to ensure the teaching and learning session happens smoothly and undisrupted. The hard stains however make this task become harder and more time will be consumed to clean up the whiteboard after every single use. Much like any other tool, whiteboards are only as useful as the person who uses them. Their deceptive simplicity means they can even be counterproductive if a particularly inept instructor attempts to make use of one.

III. PROBLEM STATEMENTS

Marker stains on whiteboard from previous lesson leads to interruptions in teaching and learning (TnL) process. Whiteboard surface will be heavily stained and ghosting. Isopropyl alcohol is the most common item used to solve this problem but somehow, it's corrosive property gives the long-term effect to the board surface. Moreover, it is requiring a proper storage and cannot be simply leave the bottle inside the classroom due to safety issue. While the application of commercial whiteboard cleanser is preferable but due to its high price make teachers think twice of having and keeping that item in the case.

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IV. OBJECTIVES

General objective for this research is to study the effectiveness of whiteboard cleansing using various tools including the commercial and household items. The specific objectives are as follows:

- To clean old whiteboard marker stain / permanent marker stain on whiteboard
- To compare the effect of various cleanser to whiteboard
- To identify the most effective tool to clean the stain on whiteboard

V. LITERATURE REVIEW

Various household items can be used to clean up whiteboard surface. They have own properties that leads to their ability in removing marker stains.

Acidity in vinegar that mainly consists of acetic acid [1] at pH 2.8 gives its ability to clean up whiteboard surface. Baking soda however is alkali that gives its gentle scouring ability. Toothpaste is a mild abrasive [2] as it contains the same main ingredient as baking soda, which is sodium bicarbonate.

Isopropyl alcohol and commercial whiteboard cleanser consist of alcohol that can dissolve marker ink. Carnauba wax that can be found in car wax also has alcohol side chain [3] in its molecule hence giving the same property.

One of the components in shoe polish is solvent [4], that also able to dissolve the stains. In dishwashing liquid, there are surfactants [5] that can remove grease, a compound that can be found in markers.

VI. METHODOLOGY

Eight cleansing tools including the commercial whiteboard cleanser and household items namely as in Table 1 were used to be examined on the effectiveness in cleansing the marker stain on whiteboard.

T1	Vinegar + H_2O
T2	$NaHCO_3$ + H_2O
T3	Isopropyl alcohol (70%)
T4	Toothpaste
T5	Dishwashing liquid + H_2O
T6	Commercial whiteboard cleanser
T7	Natural shoe polish
T8	Car wax

Table 1:- Eight Cleansing Tools used in Experiment

Vinegar, sodium hydrogen carbonate and dishwashing liquid were initially diluted with different ratio. One teaspoon of vinegar was diluted with 235 ml of H_2O. Sodium hydrogen carbonate and dishwashing liquid were diluted with the ratio 1: 1 with H_2O. Three treatments have been experimented on those cleansing tools. First treatment is using whiteboard marker (M1). Second treatment is using permanent marker (M2). Third treatment is using colorful whiteboard marker (M3).

Eight columns were drawn on a whiteboard to create a space for each cleansing tool. They were then being labelled from T1 until T8. First, a balloon was drawn in each space using black whiteboard marker. It will then be cleaned using its respective tool. Secondly, the balloons were drawn using permanent marker before being rub off. Thirdly, three lines were drawn using three different color of whiteboard marker which are blue, green and red. All eight tools were used to clean the stain. In order to compare how much effort needed to wipe off the board, we used a piece of cotton square puff to rub each cleansing tools on the stain.

VII. RESULT AND DISCUSSION

Treatment	M1	M2	M3
T1			
T2			
T3			
T4			
T5			
T6			
T7			
T8			

Table 2:- Summary on Level of Satisfaction when Using Eight Cleansing Tools in Each Treatment. Emoticon is Strongly Satisfied, is Satisfied, is Neutral, is Dissatisfied While is Strongly Dissatisfied.

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Table 2 indicates overall satisfaction level when all cleansing tools underwent three different treatments. Specific result is discussed as below.

Fig 1:- Effect of eight cleansing tools on first treatment; whiteboard marker stains. The cleansing tools is as follows; (a) vinegar (T1), (b) baking soda (T2), (c) isopropyl alcohol (T3), (d) toothpaste (T4), (e) dishwashing liquid (T5), (f) commercial whiteboard cleanser (T6), (g) natural shoe polish (T7) and (h) car wax (T8).

As shown in Fig 1, almost all cleansing tools were able to remove whiteboard marker stains. Only natural shoe polish smeared the ink, leaving a ghosting effect. At the same time vinegar lets the whiteboard becomes wet as we need to allow the vinegar to dry before using it back. Soda paste, toothpaste and car wax left some residue on the board. Thorough rubbing using dry puff is needed for better result. Both dishwashing liquid and commercial whiteboard cleaner gives extra effect on the board by removed the dull sheen on whiteboard surface that caused by frequent marker usage. They are effectively let the board sparkle again.

It looks like unique properties of each cleansing tools helped in removing whiteboard marker ink. Some left their residue on the board due to their solid form.

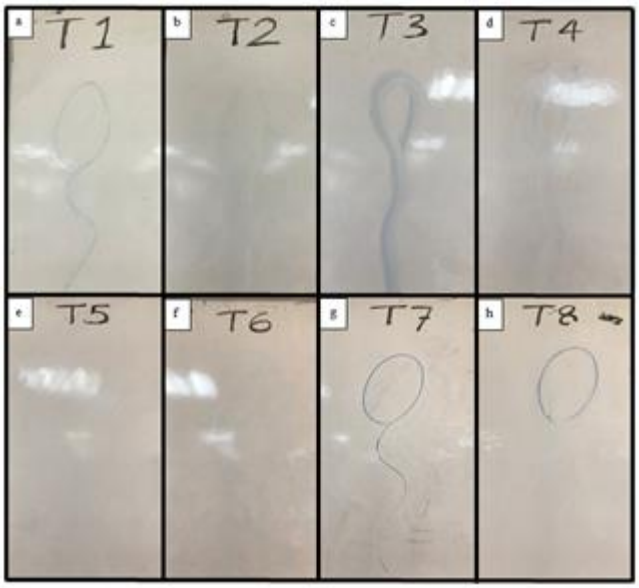

Fig 2:- Effect of eight cleansing tools on second treatment; permanent marker stains. The cleansing tools is as follows; (a) vinegar (T1), (b) baking soda (T2), (c) isopropyl alcohol (T3), (d) toothpaste (T4), (e) dishwashing liquid (T5), (f) commercial whiteboard cleanser (T6), (g) natural shoe polish (T7) and (h) car wax (T8).

Only dishwashing liquid and commercial whiteboard cleanser wiped off the stain in total. Soda, isopropyl alcohol and toothpaste showed a great potential in cleansing the surface, but need more rubbing for better result. Vinegar, shoe polish and car wax barely lighten the marks by permanent marker. Large amount of cleansing tools needed in order to remove the stain completely. Soda, toothpaste and car wax leaves some residue too on the whiteboard surface.

Permanent marker ink has different composition compared to whiteboard marker ink. Hence not all cleansing tools are able to wipe off this tough stain.

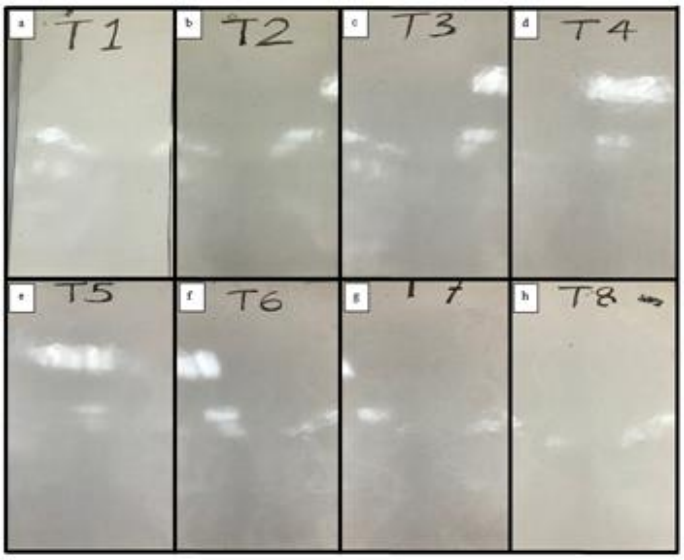

Fig 3:- Effect of eight cleansing tools on third treatment; colorful marker stains. The cleansing tools is as follows; (a) vinegar (T1), (b) baking soda (T2), (c) isopropyl alcohol (T3), (d) toothpaste (T4), (e) dishwashing liquid (T5), (f) commercial whiteboard cleanser (T6), (g) natural shoe polish (T7) and (h) car wax (T8).

The results come out the same as using the whiteboard marker although colorful markers have different dyes to give them variety of colors. Almost all cleansing tools are able to wipe off marks on whiteboard surface.

This is due to various components that can be found in each cleansing tools that gives them capability to clean off whiteboard surface.

VIII. CONCLUSION

Commercial whiteboard cleaner served well in cleansing the whiteboard. Surprisingly, diluted dishwashing liquid also gave the same result. They not only work best in getting everything off the board, they also able to restore the board surface like new.

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