The Role of Interactive Whiteboard on Motivating Learners in Mathematics Classes: A Case Study

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Abstract: The enhancement of motivation and enthusiasm by the use of interactive whiteboard has improved self-esteem, encouragement and success of many learners who have found mathematics difficult. This study aims to investigate whether the use of interactive whiteboard in mathematics classes promotes motivation of learners which facilitates learning process. 40 lecturers and 40 students were surveyed in the study and the results have been compared and it has been found that interactive whiteboard enhances interactivity, motivates learners and facilitates learning in mathematics classes.

Keywords: Motivation, Enthusiasm, Interactivity, Interactive Whiteboard, Learning Mathematics

1. Introduction

While the use of interactive whiteboard (IWB) contributes to the effectiveness of classroom instruction and the quality of education provided in the classroom, its influence on participation and motivation cannot be underestimated. The interactive atmosphere created by the use of IWB leads attention of learners and increase interaction in the classroom. In particular, the presentation of visual materials through IWB fosters interactivity and enables learners to learn in an engaging way. IWB has the potential to present a great variety of examples at the touch of a button.

It is important that learners should learn mathematical theory and critical thinking in problem solving process. Learners should know the link between mathematical knowledge and solving real world problems. While solving a problem learners need to formulate a concrete problem into an abstract one (Hwang et al., 2007). In classroom where traditional approaches are applied learners' creative thinking ability cannot be sufficiently enhanced because learners try to solve the problems simply applying the formulas without understanding the real concepts of the formula (Forbes, 1996). For that reason, in order to help learners develop their abstract thinking the role of visualized lectures has always been highlighted (Bishop, 1989). It is widely assumed that learners can solve problems with ease if they are visually presented.

2. Literature Review

Recently the level of interest in IWB has been growing at a fast rate. In particular, young learners of the century do not value traditional approaches because they are familiar with technological devices from birth. A wide range of resources via IWB facilitates presentations of lessons in lively ways. Attractive presentations yield to permanent motivation (McCormick & Scrimshaw, 2001). The features of IWB offer great potential for the development of effective teaching. IWB seems to promote whole-class

interactive teaching which is at the core of effective practice. In support of effective learning IWB enhances interactivity, motivates learners and facilitates learning.

Learners interact with the new learning materials which are demonstrated through IWB. The use of IWB enables lecturers to explain abstract concepts and ideas with ease. The use of visualization is essential in comprehension of mathematical terms because they develop abstract thinking of learners (Bishop, 1989). Pictures presented via IWB foster existing knowledge of learners and enable them to perceive further knowledge (Tall, 1991) so learning mathematics through IWB motivates learners to understand the existing knowledge and enlarge it. Imagining the picture of a problem is a hard task in mathematics yet the use of visual materials facilitates problem solving process

Dynamic and varied use of resources on IWB promotes motivation of learners and helps them comprehend the materials better. The versatility of IWB engenders accommodating different learning styles in the teaching and learning process. Lecturers can teach and interact with the learners simultaneously which helps them teaching with more focus. The use of variety of resources that suits the needs of learners develops enjoyment and motivation of learners; moreover, encourages learners for participation and collaboration (Levy, 2002). IWB is multifunctional so not only the efficient use of it influences learners' motivation but also its high contribution to student-centered learning increases learners' engagement.

When IWB is used in the classroom, the enthusiasm of learners for learning increases because they wonder what will appear next on the screen. Though Higgins, Smith, Wall, and Miller (2005) found that motivation is linked to ability and age, IWB has a positive influence on motivating learners to learn. Learner attentiveness increases if they interact physically with IWB. Moving objects, manipulating images on IWB promotes learners' motivation in the classroom. Moreover, classes become less teacher-centered if IWB is used as a result more time will be created for learners to interact with IWB. This opportunity will develop learners' motivation which will yield better learning. Learner engagement is key to increasing motivation. Therefore, IWB has the potential to provide an enjoyable learning environment for learners. Moreover, the use of visual materials and employing various effects such as sound, video clips allows learners to explore the topics they study through touching, seeing and hearing.

IWB enables lecturers to implement effective questioning in learning and teaching process. IWB allows lecturers to present a variety of content in the classroom which encourages learners to inquire about the topics (Hwang, 2003; Hung, Lin & Hwang, 2010). This will lead to impetus to posing questions in the classroom by students. Class discussions are a motivating pace for learners to enhance learning. This strategy is an effective way of involving learners in the learning process.

Research Questions:

a) Does the use of IWB in mathematics classes increase the learner engagement?
b) Does the use of IWB promote learners' motivation in mathematics classes?

3. Research Method

3.1 Design of the Study

This study uses both qualitative and quantitative methods. Qualitative research focuses on questions "that help us understand and explain the meaning of social phenomenon with as little disruption to the natural setting as possible (Merriam, 1998. p.5). Furthermore, "the qualitative researcher collects open-ended, emerging data with the primary intent of developing themes from the data" (Creswell, 2003, p.18). Qualitative approach in this study helps to draw meaningful results from the questionnaire surveys which have been carried out to find out whether the use of IWB motivates learners in mathematics classes or not. Moreover, quantitative method has enabled the collected data to be used to generate statistics.

3.2 Participants

The target population in this study is students and lecturers of mathematics department. Ishik University department of mathematics lecturers and students were selected in this research. Lecturers and students were chosen randomly, no criteria were followed in forming the participants. 40 lecturers and 40 students were surveyed in the study.

3.3 Data Analysis

This study is based on surveys by lecturers and students in mathematics department at Ishik University. The gathered data has been transformed into figures. Both lecturers and students had the same questions which provided a good opportunity to compare the results. It has been explored that both lecturers and students have stated positive attitudes towards the use of IWB in the classroom. The results of the surveys are presented below.

3.4 Findings

One of the main advantages of the IWB is that it motivates learners; in particular the use of visual images facilitates learning process (Glover & Miller, 2001; Levy, 2002; Richardson, 2002; BECTA, 2003). For instance in this study an overwhelming 85 % of the lecturers agree that the use of IWB motivates learners to learn in mathematics classes, and again an overwhelming 82 % of the students agree on motivating role of IWB. 79 % of the lecturers state that IWB increases enthusiasm of learners in the classroom, and 77 % of the students state that their enthusiasm has promoted when IWB is used in the classroom. Many researchers highlight that IWB improve attention and engagement in the learning process (Kennewell, 2001; Burden, 2002; Miller & Glover, 2002; BECTA, 2003). In this study 80 % of the lecturers state that IWB enables learners to learn in an engaging way, and 78 % of the learners state that IWB creates an engaging learning environment. % 81 of the lecturers are of the opinion that the use of IWB fosters creative thinking; in the same vein % 79 of the students are of the opinion that IWB increases creative thinking. Finally % 82 of the lecturers state that learning mathematics through IWB facilitates comprehension of materials and affects learner achievement and % 81 of the learners state that the use of IWB in mathematics classes influences learner achievement and comprehension of mathematics materials since IWB provides a great variety of examples to ease understanding process.

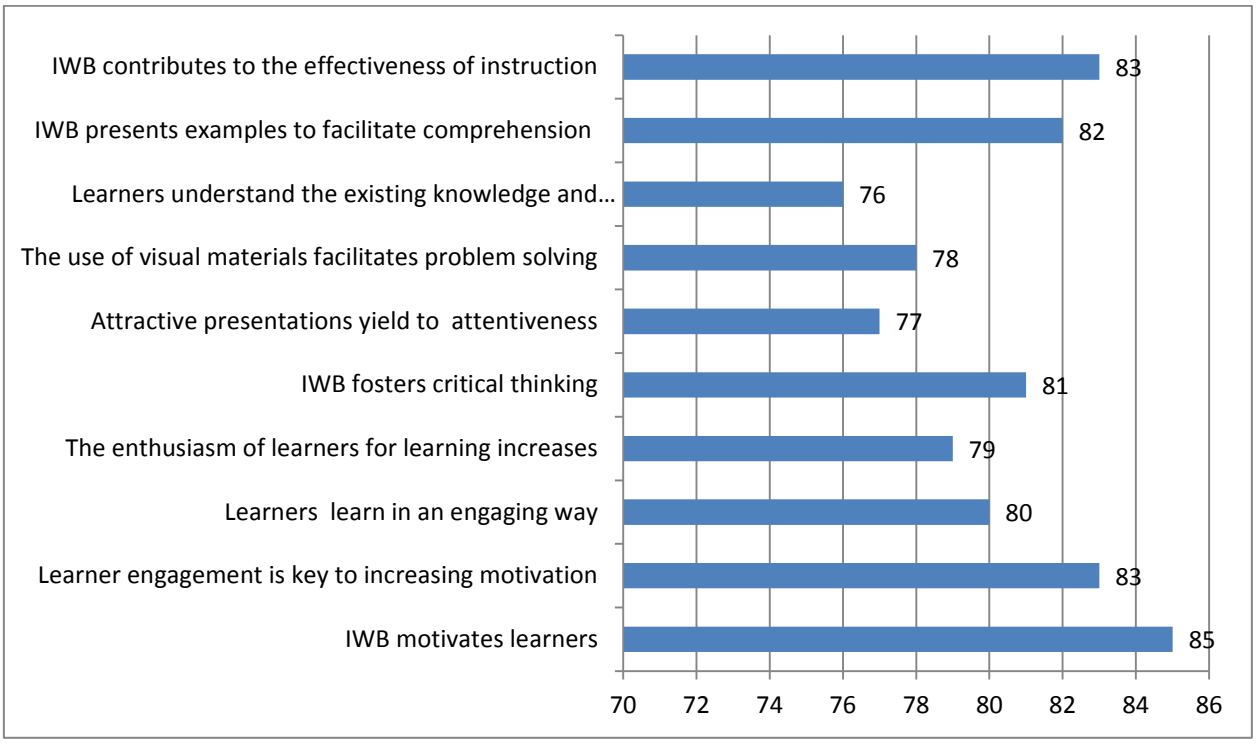

Figure 1: The survey results of lecturers

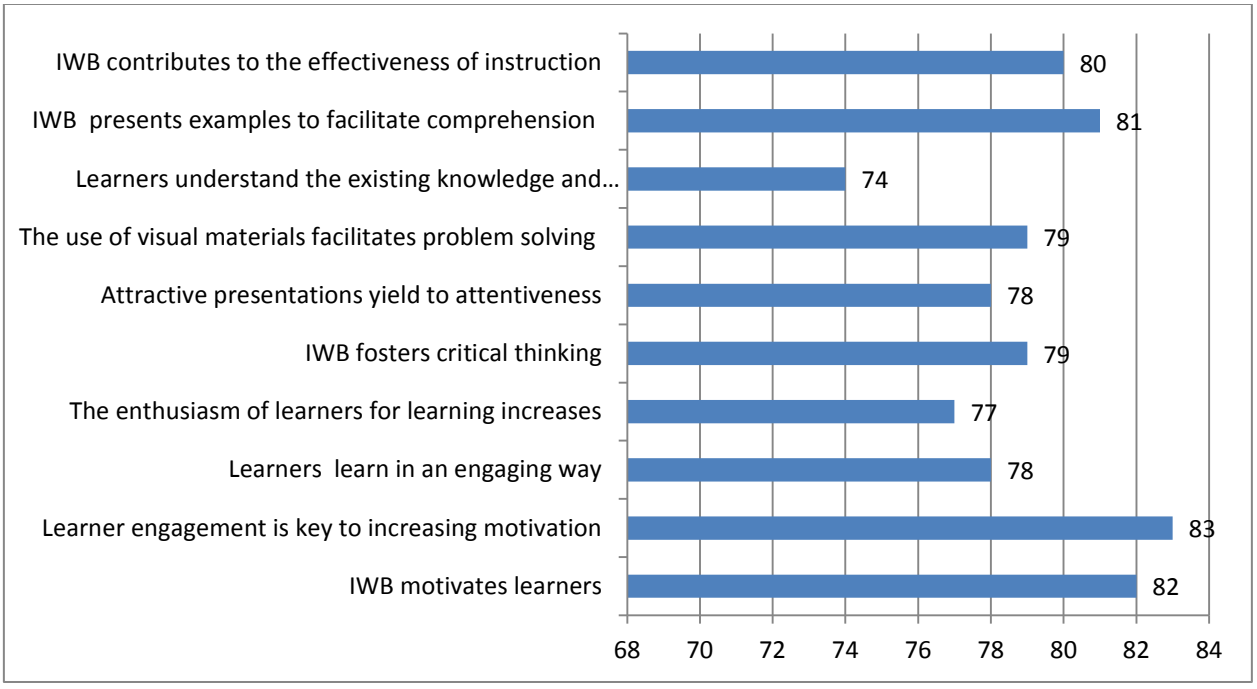

Figure 2: The survey results of students

4. Discussion and Conclusion

Effectiveness of classroom instruction increases when IWB is used in the classroom. Classroom participation and interactivity promotes learners' achievement; particularly motivation enhances learning pace. IWB promotes motivation of learners and helps them understand better. Motivation has a key factor which will yield better learning. Motivated learners stand a better chance of achieving. IWB has the potential to motivate learners in the classroom. IWB can provide a learning environment where interactivity is enhanced and motivation is promoted.

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