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The Benefits and Drawbacks of Interactive Whiteboard in Preschools: A Review of the Literature

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Abstract: The integration of interactive whiteboards in the education system has created a huge impact on classroom instruction, with preschool education also affected by the emergence of this technology. This paper provides a systematic literature review based on published evidences about the benefits and drawbacks of the interactive whiteboard in preschool settings. The findings of this study show that the interactive whiteboard is beneficial to children as it enhances their motivation to learn, assists in the development of their conceptual understanding, provides variety in the learning environment, and supports collaborative learning. Teachers also benefit from the use of this innovation. Besides improvement in the quality of pedagogy, administrative tasks are also made easier. Nevertheless, the integration of the interactive whiteboard comes with some drawbacks. The whiteboard is not child-friendly and children are often allowed only limited access to this costly equipment.

Keywords: Interactive whiteboard, technology integration, preschool education, education system, benefits, drawbacks

1. Introduction

The emergence of state of the art technology in recent decades has revolutionized classroom settings worldwide. One of the most popular technologies that is currently making its way into the education system is the interactive whiteboard, an electronic whiteboard that displays content projected by a computer, tablet, or another source. This technology combines touch (pen or finger) control of the screen with computerized input from a variety of devices operated by teachers or students (Md. Khambari, Hassett, Thomas, & Wong, 2014; Karsenti, 2016). It can also function as a multi-tasking equipment (Twiner, Coffin, Littleton, & Whitelock, 2010). This technology is considered very useful from a pedagogical perspective as its features allow interactivity, collaborative group working, accessibility, and recordability (Morgan, 2010). It is not surprising, therefore, that the interactive whiteboard has become a popular educational tool for more than a decade (Littleton, Twiner, & Gillen, 2010). The features of the interactive whiteboard are such that they enable ease of integration at all levels of instruction, from preschool to higher education settings.

Preschool is the first level of formal education for children. They need to be prepared mentally, emotionally, spiritually, and physically for the rest of their educational career (Barnett, 2008). In this challenging 21st century, children, as potential future world leaders, need to be trained from an early stage to be more confident and independent (Malaysian Education Ministry, 2013). This is because children are considered as future human resource to develop a nation in the coming time. For that, we have to make sure they are provided with sufficient exposure and infrastructure that can be used as learning tools in the 21st century education. At this educational level, they also need to be prepared for the next stage of their education, the elementary school. As preschool is one of the early experiences in child's school career, the setting should be stimulating and conducive to learning. Hence, the use of the interactive whiteboard as one of the instructional delivery tools is seen as a step in the right direction because of the

various advantages offered by the technology (Harlow, Cowie, & Heazlewood, 2010; Wong, Goh, & Osman, 2013).

2. Background of the Study

The interactive whiteboard is recognized as a very useful tool that can help teachers enhance their effectiveness in the classroom (Gillen, Littleton, Twiner, Staarman, & Mercer, 2008; Coyle, Yañez, & Verdú, 2010; Blue & Tirotta, 2011; Md. Khambari et al., 2014), as well as improve students' achievement (Smith, Gentry & Blake, 2012; Bourbour & Björklund, 2014). Since its introduction, this innovation has been widely distributed and adopted at different levels of education (Twiner et al., 2010; Bahadur & Oogarah, 2013). Scholars are of the consensus that the interactive whiteboard has a number of positive effects on teaching and learning at the primary school level (Yanez & Coyle, 2011; Turel, 2012, Bahadur & Oogarah, 2013; Chen & Tsai, 2013), secondary school (Aytekin, AbdulAziz, Barakat, & Abdelrahman, 2012; Kocak & Gulcu, 2013), and even at the tertiary level (Kilic, Guler, Celik, & Tatli, 2015). As preschool or childhood early education is the most important stage in children's growth, it is vital to examine how the integration of technology affects children's learning and social development. In this study, a systematic review of the literature was carried out to gain insight into the benefits and drawbacks of the interactive whiteboard integration in preschool settings.

3. Research Question

The purpose of this study was to examine the advantages and disadvantages of integrating the interactive whiteboard in the preschool context.
This study aimed to answer two research questions:
(i) What are the benefits of the interactive whiteboard integration at the preschool level? and
(ii) What are the drawbacks of the interactive whiteboard integration at the preschool level?

4. Methodology

4.1 Background

The systematic review method adopted to gather the necessary information was designed to be comprehensive, transparent, and replicable while minimizing information bias in selection (Woods, Agarwal, Jones, Young, & Sutton, 2005). With these requirements in mind, a qualitative content analysis was employed.

4.2 Criteria for considering studies for the review of literature

To answer the research questions, the researchers collected relevant information from recent journal articles and reports and even those published as far back as 2010. Studies related to the integration of the interactive whiteboard in preschool settings were the main focus. The information was gathered over a three-month period from the academic database subscribed by the university's library and also from free databases such as Google Scholar and Research Gate.

4.3 Data Analysis

A systematic grounded theory analysis was employed whereby the data extracted from the journal articles and reports were analyzed. The articles were read and re-read at least twice in order to have a better understanding of the content before the coding and process memo procedures were initiated. A thematic analysis was carried out to sort the data into categories and to make connections among them, as suggested by Charmaz (2006).

5. Findings

The benefits of the interactive whiteboard integration in preschool settings

Two themes that emerged from the analysis enabled the first research question to be answered: What are the benefits of the interactive whiteboard integration at the preschool level? Four benefits to children and two benefits to teachers were identified. According to the studies reviewed, the interactive whiteboard is beneficial to children as it (i) enhances their motivation, (ii) develops their conceptual understanding, (iii) provides variety to the learning environment, and (iv) supports collaborative learning. As for the teachers, the interactive whiteboard helps them (i) improve the quality of pedagogy and (ii) carry out administrative tasks more easily.

5.1.1 The benefits of the interactive whiteboard to children

(i) Enhances Children's Motivation

Research finding found that the ability of the interactive whiteboard to increase children's motivation to learn is one of the special features of this innovation. These findings are congruent with other studies on the interactive whiteboard that can be used to support all levels of education (Kershner, Mercer, Warwick, & Staarman, 2010; Smith et al., 2012). According to Sweeney (2013), the interactive whiteboard's ability to provide space for teachers to diversify activities and learning styles makes the innovative tool a dynamic medium for instruction. Apart from that, the use of the interactive whiteboard as a teaching tool can improve the student's attention (Kershner, Mercer, Warwick & Staarman, 2010) as well as stimulate interaction among students and between teachers and students. In such an environment, students are more motivated to learn (Smith et al., 2012; Bourbour & Bjorklund, 2014). Thus the integration of the interactive whiteboard lays a solid foundation to the culture and learning style of the future. Motivation is the internal energy that controls one's emotions. If a person is motivated, he or she will act in a positive way (Baker & Wigfield, 1999; Reeve & Jang, 2006). Hence, the use of the interactive whiteboard in the preschool classroom is believed to yield positive results for the student in the long run.

(ii) Develops Children's Conceptual Understanding

One of the benefits of the interactive whiteboard is its ability to help build conceptual understanding in children. In a study conducted by Linder (2012), the researcher showed how the various functionalities that exist in the interactive whiteboard can be used to explain complex mathematical concepts to children. According to Wong, Russo and McDowall (2013), use of the interactive whiteboard in the classroom facilitates the demonstration of concepts. It makes instructional delivery clearer and more easily understood. The interactive whiteboard is able to build understanding in children because there is stimulation of the various senses (Warwick, Tercera, Kershner, & Staarman, 2010; Bourbour, Vigmo, & Samuelsson, 2015). This educational tool can be used not only as an audio, video, or multimedia teaching aid, but it can also serve as an excellent book for training writing skills. The interactive whiteboard is hence a tool that can be exploited for multisensory approaches to learning (Warwick et al., 2010;

Bourbour et al., 2015). Stimulation of the different senses would enhance learning in children, especially in their early phases of development (Bourbour & Bjorklund, 2014).

(iii) Provides Variety to the Learning Environments

Previous research studies have found that the interactive whiteboard is able to provide users with a variety of learning environments. In other words, with the aid of the interactive whiteboard, the teacher is able to bring in a variety of situations and atmosphere from the outside world into the classroom (Bourbour & Björklund, 2014; Bourbour, et al., 2015; Epstein, 2015; Masoumi, 2015). Such a state of the art technology enables children to "experience" even high risk situations in the real world. For example, the teacher might want to teach about the process of volcanic eruptions. By using a video on the interactive whiteboard, children are able to witness a volcanic eruption without being exposed to any risk.

The use of the interactive whiteboard in the classroom also improves the quality of the teaching process (Barak, Nissim, & Ben-Zvi, 2011; Yang, Wang, & Kai, 2012). Masoumi (2015) in his research reported how preschool teachers used the interactive whiteboard to introduce multicultural issues in their classrooms. His study showed how the teachers integrated several technologies to encourage children to share their cultures. Subsequently, Masoumi (2015) found that understanding cultural diversity made the children more positive and sensitive to their environment. Such a positive development is very much needed for many of today's children who are brought up in a digital environment.

(iv) Supports collaborative learning

This literature review of relevant studies also found that the interactive whiteboard has the potential to promote collaborative learning (Linder, 2010; Smith et al., 2012). One of the useful features of the interactive whiteboard is its large touch-sensitive screen that can be manipulated. This characteristic allows teachers and students to write, draw, and move objects on the screen by using their fingers or a special stylus pen. As such, the interactive whiteboard can be shared by many users at any one time. Its large size allows students to collaborate and present their respective views (Higgins, 2010; Warwick, Mercer, Kershner, & Staarman, 2010). Facilitating the sharing of information and allowing a two-way interaction would increase children's confidence as well as make them more appreciative of the ideas and views of other learners. Moreover, such collaborative activities help improve communication skills (Linder, 2012). Bourbour et al. (2015) explain that a learning environment that encourages collaboration would also shape a tolerant personality in a child. In other words, use of the interactive whiteboard not only helps to make learning more effective but it also enhances communication skills and fosters tolerance as well as other positive personality traits.

5.1.2 The benefits to teachers

Besides children, teachers also benefit from having the interactive whiteboard in their classrooms (Morgan, 2010; Swan & Marshall, 2010; McDowall, 2012). Among the benefits reported by various related studies are: (i) the improvement of the quality of pedagogy and (ii) facilitating of classroom management and administrative tasks.

(i) Improves the quality of pedagogy

Scholars have found that the interactive whiteboard is one of the best enablers for teachers to improve teaching (Morgan, 2010; Murcia & Sheffield, 2010; Wong et al., 2013; Bourbour & Björklund, 2014). As teaching is the teachers' core business, they are always searching for ways to make their effort more effective. The invention of the interactive whiteboard as a pedagogical tool is a boost to teachers' endeavor to teach more successfully. Integration of the interactive whiteboard in the educational system enables teachers to manage their class activities according to the ability of their students. Wong et al.

(2013) are of the view that the interactive whiteboard helps teachers give clearer explanations as well as capture the attention of their students.

Interestingly, the interactive whiteboard can be utilized also for more specific needs. Research conducted by Murcia and Sheffield (2010) and Swan and Marshall (2010) indicated that use of the interactive whiteboard helped to improve learners' skills in mathematics and science. In these two subjects, the interactive teaching style enabled children to control the pace of their learning. Murshia and Sheffield (2010) observed that by using hands-on pedagogical methods, students were exposed visually to the concepts being taught. Accordingly, these researchers suggested that the use of graphics on the interactive whiteboard would encourage learner participation. In another study, Drigas and Papanastasiou (2014) noted that the interactive whiteboard improved the quality of literacy. They found that combining a variety of learning methods helped improve the performance of children in reading and writing.

The interactive whiteboard has also been found to help diversify language education pedagogy (Kitson, 2011; Kersher, 2010). A study conducted by Kitson (2011) described how this innovation was used by teachers to diversify the model text in English learning to teach students with different levels of language proficiency. According to Kersher et al. (2010), use of the interactive whiteboard provides space for teachers to focus more on the content of the lesson as well as the appropriateness of the pedagogical practice to impart understanding. This is because the interactive whiteboard can be combined with a variety of technologies, thus allowing teachers to manipulate its use. As such, it is not only a time-saver for teachers but it also assists in lesson planning using other auxiliary materials (Kersher et al., 2010).

(ii) Facilitates classroom management and administrative tasks

Other than improving the pedagogical aspects of delivery, the interactive whiteboard also supports teachers in managing classroom activities such as carrying out course assessments. According to Morgan (2010), this technology enables teachers to manage all assessment activities of their students in the classroom and record all the data obtained. In a more recent study, Masoumi (2015) found that teachers used this technology to share relevant materials with their counterparts. This is made possible by the Internet facility which is connected to the interactive whiteboard. Such measures stimulate the professional development of teachers.

Studies also show that the interactive whiteboard eases administrative work by teachers. Management is part of the daily work of teachers and it is fundamental to the effectiveness of teaching and learning in the classroom. Among the tasks are the preparation of lesson plans, designing appropriate teaching aids and planning classroom activities. Scholars agree that standardized policies in schools regarding the use of the interactive whiteboard would serve as a catalyst to exploit this equipment in facilitating teachers' administrative tasks (Morgan, 2010; Masoumi, 2015).

The drawbacks of using interactive whiteboard in early education

While it cannot be denied that the interactive whiteboard is an innovation that offers numerous benefits, one should also consider the negative aspects of its use. Hence, in this study, the second research question is: "What are the drawbacks of the interactive whiteboard integration at the preschool level?" Some scholars have highlighted the adverse effects of integrating the interactive whiteboard in early education (Morgan, 2010; Wong et al., 2013). The two major drawbacks of such a move are: (i) it is not child friendly and (ii) pupils have limited access to the interactive whiteboard.

5.1.3 Lacks child-friendliness

Some researchers are of the view that it is inappropriate to use the interactive whiteboard in the classroom as it could distract children. A study conducted by Wong et al. (2013) found that teachers complained about problems arising from its use in the classroom. For example, there was the need to put the interactive whiteboard near an electrical socket. This often resulted in the interactive whiteboard being

placed in a position that distracted the children. Moreover, in certain positions, the interactive whiteboard position limited the field of view of the children. As a result, they were not able to focus on their lesson and learning activities were disrupted. This is a major concern since children have a relatively short attention span (Healy, 2004). Inattentive learners would result in ineffective participation in learning activities.

Another issue that is also linked to the position of the interactive whiteboard is its height. A study conducted by Wong et al. (2013) found that when the whiteboard was placed high relative to the child's height and physical size, its use became limited. The interactive whiteboard is meant to facilitate interactive learning (Karsenti, 2016). However, a relatively short child would not be able to utilize fully all the functions of the interactive whiteboard.

5.1.4 Pupils have access to the interactive whiteboard

The development of a child is affected by play and discovery activities (Samuelsson & Carlsson, 2008; Hsiao & Chen, 2016). Having an interactive whiteboard in the preschool classroom provides a space for children to enjoy learning while playing (Wong et al., 2013). However, children's needs may not always be met. A study conducted by Morgan (2010) found that excessive teacher control often resulted in children having limited access to the interactive whiteboard. The teachers were afraid that children might vandalize the interactive whiteboard, and so they controlled and limited its use. Hence the children were denied free access to explore and learn from the interactive whiteboard. Excessive control by the teacher also made activities more teacher-centered (Morgan, 2010). Therefore, if teachers are too cautious, pupils will have limited interaction with the interactive whiteboard. This would in turn interfere with their learning process.

6. Conclusion and Recommendations

This study was aimed at providing an understanding of the impact of the interactive whiteboard on pupils and teachers in the preschool classroom. Its benefits and drawbacks were examined. The information gathered for this study was from theoretical and empirical studies conducted in preschools or schools of a similar context, mostly in developed countries. From the literature review, the researchers found that there were strong reasons to provide the interactive whiteboard in the preschool classroom. Four benefits for children were identified. The interactive whiteboard enhances children's motivation to learn, develops children's conceptual understanding, provides variety in the learning environment, and supports collaborative learning. However, there are also major drawbacks, including the size and positioning of the interactive whiteboard in the classroom, and children having limited access to the interactive whiteboard. Although the cost of this technology might be one of the main factors contributing to its limited integration in preschools nationwide, investment in this innovative technological tool would pay off in the long run. As the preschool is the first stage of a child's school career, it is a vital stage during which the child is exposed to new concepts. Ideally, a multisensory approach to learning should be adopted. Nevertheless, more studies need to be carried out in developing countries where limited funds and prevailing pedagogical styles might influence the acceptance of an innovation such as the interactive whiteboard.

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