DOI: https://doi.org/10.31686/ijier.vol4.iss12.57

The Enhancement of Interactive Whiteboard Integration in preschools: A Mathematic lesson implementation

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Abstract

The aim of this study is to verify the importance of using the interactive whiteboard (IWB) in the teaching process especially in Mathematics at the preschool level. Although the IWB software offers a huge number of tools and features, teachers are not benefiting from them efficiently. Instead, they are using the IWB as a projector most of the time. At AZM school, A study took place on 40 KG2 students aged between four and five; They were divided into two groups of 20, where only one of the two groups was exposed to activities on the IWB about number seven called the study group and the other the control group. The activities varied between recognizing, counting, sorting and tracing the number 7. All 40 students were assessed in the same manner. Results showed that the group of students that did the designed activities and used the IWB achieved higher scores on their assessments than those who did not participate in the activities. Results also showed that students got motivated, engaged and more encouraged when using the IWB.

Keywords: Interactive Whiteboard, Mathematics, preschool

1. Introduction

Information and communication technologies (ICT) haveintroduced a new tool in the educational process. A paper, discussing the effective use of ICT in education (Noor, 2013), states that many countries urge their students to master ICT skills besides their literature and numerical skills. The United Nations stated in a report (cited in Noor, 2013), that ICT include computers, LCD projectors, Interactive Whiteboards (IWBs), the internet, software and telecommunication, communication, documentation, media and other types of information and communication software. Many guides and tutorials were designed to aid teachers in integrating and using ICT in the teaching process, emphasizing the extremely crucial role and presence of the teacher. ICT serves as a tool that helps teachers and students to obtain better outcomes.

The educational process starts from preschool. The ICT facilitated the introduction of new technologies- such as the Interactive Whiteboard, touch- sensitive screens that work with a PC and a projector and function as facilitators to the educators (SMART,2006)- that made the educational process undergo a change. Alex Morgan (2010) states that the IWB is known for its interactivity, collaborative group working, and accessibility. IWB provides many tools that educators can use in their teaching process and especially in teaching Mathematics.

My project focuses on testing how the features available on the IWB software, serves as a tool in reaching better learning outcomes in a Mathematics lesson at preschool level.

1.1 Originality

IWBs are present nowadays in many Lebanese private schools from preschool to secondary. Before the development of the activities, a survey was conducted. The statistic involved twenty preschool teachers that have IWB in their classes; fourteen of them were homeroom teachers (teaching English, Mathematics, and Science), four Arabic teachers, and two second language teachers. When asked about how teachers use the IWB in their classes, 65% said they use it for presentations, 25% for interactive lessons and 10% for educational games. Fig. 1 shows the results obtained. Further inquiry on how they used the IWB returned responses including the introduction of numbers, letters, shapes, colors, and concepts more than sorting, tracing and writing for example.

The originality of my project lies in the use of the IWB in teaching disciplines. The results of the survey conducted in the preschool showed that the IWB was basically used more as a projector rather than for interactive activities. The challenge is to motivate teachers to use IWB to serve its original purpose of interaction with learners. One way to reach the goal of motivating of the teachers is by designing activities on number seven using appropriate tools found within the IWB software.

1.2 Problem

IWB software offers a huge pool of tools that both, teachers and students in the preschool, can enjoy using. Many of these tools make learning Mathematics easy and interesting.

The following questions will guide the study:

What are the appropriate tools found on the IWB that can be used in preschool?

Does the use of IWB trigger students for more engagement?

Does the implementation of IWB provoke students' capabilities to master specific skills?

1.3 Project Aim

The aim of this study is to examine the effectiveness of implementing the Interactive whiteboard to aid preschool teachers in delivering concepts and ideas on one hand, and helping preschool students grasp and master Mathematical skills on the other hand.

2. Literature review

2.1 Interactive Whiteboard in Teaching Learning process

In their article, Preston and Mowbray (2008) talked about the importance of the IWBs in grabbing the attention of preschoolers as well as using it in introducing, concluding, and assessing a science lesson. The authors also stated that the IWB is used to write, listen, watch, capture, save documents and design digital flipcharts. By the end of their article, they emphasized that the IWB is best used in the primary school rather than in the Kindergarten level. None of the ideas presented in this article showed the importance of using IWB in preschool nor in any of the disciplines in preschool.

Alex Morgan (2010) stated that the IWB is known for its interactivity, collaborative group working, accessibility and record ability. His article represented a study that was done on a number of schools that use the IWB in their classrooms. The results showed few ways in which the teachers are using the IWB with children. In his discussion on how to use the IWB in the classroom, Morgan represented several ways to implement IWB should be used to be effective for both teachers and learners. Some of these ways are: representing and organizing ideas, visualizing and reflecting ideas, communicating, collaborating, accessing additional resources, and much more… All the ideas presented neither mention the great importance that the IWB provides for the preschool learners, nor a clear sample concerning the same issue.

Existing literatures discuss the importance of IWB in the teaching and learning process throughout all the stages of education. For example, Linder (2012) states how IWB was used in early learning in Mathematics, shows how students use it, and defines several strategies for educators to use in primary learning- teaching process. Another paper prepared by SMART Technologies (2004) about IWB and learning describes what an IWB is, how can it be used in teaching especially in engaging students and motivating them, how it reaches all learning styles, and what are some tips for teachers to aid them while preparing a lesson.

A book written by Betcherand Lee(2009), entitled: "The Interactive Whiteboards Revolution", describes the IWB, how to design lessons on IWB, and many other features that help educators while using IWB. Neither of the above literatures talks directly about using IWB in early childhood education nor about using IWB in an interdisciplinary unit.

Bourbour and Bjorklund (2014) interviewed preschool teachers in Sweden that use IWB and was able to come up with several results. (1) IWB provides a variety of tools to share and solve problems; (2) IWB provides active learning environment; (3) the availability of tools, color, and the touch- sensitive board makes it easy for teachers to explain mathematical concepts and do a great number of activities. As a conclusion, the IWB helps teachers to create lessons, motivate the students, and encourage critical thinking. The authors at the end said: "preschool teachers' pedagogical knowledge, as well as their technical skills and attitudes, plays a critical role in how the IWB is and can be used in preschool" (Bourbour and Bjorklund, 2014, p. 12). Although the article mentioned that the use of the IWB is very essential in teaching Mathematics in preschool but the authors did not do any study to test it but rather based their theory on the teachers' experience in preschool.

Looking at the word interactive whiteboard, we can easily comprehend the importance of this technology and its function of creating interactivity. Many authors discussed the importance and benefits of using IWBs in the teaching- learning process. We should always take into consideration that the IWB does not only affect students, but it also affects teachers.

Turel and Johnson (2012) mentioned some benefits of using IWB; these benefits include developing social interaction, increasing motivation, involving, interacting and collaborating, grabbing students' attention, reaching all learning styles, experiencing the large screen, using the special features, and saving the created work.

Lisenbee (2009) discussed, generally, the use of technology in the classroom. The author encouraged the use of IWB stressing on its benefits in creating interactivity and engagement between students, reaching all learning styles of students, and increasing resources and materials through the IWB's features.

Smith et al. (2005) discussed six main benefits for using IWB in the classroom: Flexibility and versatility: the easy access and use of the IWB is much easier than using small laptops or desktops. The navigation and splitting the screen options added extra credit to learning.

Multimedia presentation: the wide range of resources, sounds, images, and videos can be added by following simple steps to a document or flipchart. The option of virtual reality and simulation made the IWB very beneficial. Another important option is the annotation of the IWB software, where we can use the tools on any document and not only the flipcharts. For example highlighting ideas and notes on a pdf file and saving it.

Efficiency: the ability to control the computer using the big touch sensitive screen made it possible to display and present the multimedia resources.

Supporting planning and development of resources: the problem of resources for some teachers is solved using IWB that allow saving, editing, and reusing and prepared material or activity.

Adding ICT skills: the development of these skills is easy when teachers first use the software, since students will observe and indirectly learn from them. By the time students get to using them on their own, they will have learned new skills and gained ICT skills.

Interactivity and participation: the extremely important benefit. Students' interactivity, motivation, and participation are affected by the use of the IWB. Students enjoy using the IWB and its features.

Northcote, et.al (2010) discussed other benefits of using IWB for both teachers and students. Benefits include the increase in many things such as social practices, special features found within the IWB software, integrative results on the curriculum, change in children's behavior and attitude and expectations. In a report, by SMART technology (2006), reporters state that IWBs enhance the interaction between learners, teach ICT skills through the hands on activities, engage a big number of learners, grab learners' attention, creates enjoyment, and motivates students.

Below are the special features that can be done with the IWB software: (Turel, Johnson, et.al. 2012) and (SMART, 2006).Fig. 1 shows an example of the ActivInspire tool box that contains the icons of the features below:

- Manipulate text and images
- Magic ink
- Display and use sites in a group
- Highlight, color and annotate
- Hide and reveal option
- Drag and drop option
- Matching option
- Observing different materials
- Camera options
- Spotting options
- Playing games
- Coloring
- Easy navigation
- Pens
- Wide variety of images and ready made flipcharts to use

Figure 1: Sample of toolbox found in Active Inspire Software.

2.2 Mathematics in Preschool

Learning starts from the moment a person is born. Month after month skills are acquired and accumulated. The learning process actually starts before the child enters school. One important thing they learn before school is Mathematics, especially in their daily basic life. For example asking for a cup of water or asking for two cookies and so on.

Mathematics is very important for all children in order to understand and analyze the world around them. Preschools play a major role in helping children acquire Mathematical concepts by teaching them the notions of numbers and geometry (Cross et.al, 2009).

Numbers: Counting and Ordering

According to Cross et.al (2009) a number is "a fundamental way of describing the world." Numbers are abstractions that become concrete when they describe images and objects from the real life – three apples, four cows, and six flowers. To explain this abstraction of numbers, representations must be created. The representations of numbers at the preschool level are mainly shown by first the symbol of the number, and then by counting, specifying quantities, comparing and doing simple operations.

According to Cross et.al (2009), children aged 2-3 years old learn the number core components which are: number word list, cardinality, one to one correspondence, and written symbols for numbers from one to six at most. At the age of four, they develop the same skills for numbers between six and ten, and few can reach up to higher numbers. In other words, children can count correctly and backwards from one to six, or one to ten, depending on their age; by using their fingers at first, and some objects later as soon as they master the counting. Then, they will be able to recognize that the last counted number shows the quantity of the set. Later on, they will mix the two concepts of number word list and cardinality to match one to one correspondence.

According to Clamants and Sarama (2008), the main focal point of teaching Mathematics in early childhood education is: "developing an understanding of whole numbers, including concepts of correspondence, counting, cardinality and comparison." (Clamants & Sarama, 2008, p.362).This focal point is applied by having children recognize numbers in sets, through counting them.

Accordingly, we can see that counting plays a great role in the acquisition of Mathematical skills of a preschooler. Clamants and Sarama (2008) stated that counting is developed by the following ways: children count verbally which helps them recognize the literal words and meaning of numbers, and then they order the number words. Baroody and Wilkins (n.d) say that oral counting is acquired even before the age of two.

Children then learn to use one to one correspondence in counting objects. They learn two concepts here, the one to one correspondence and the object counting. In order to successfully pass this level, Baroody and Wilkins (2008) state that a child needs to know the number thoroughly. In other words, the child should fully understand the word sequence of numbers, how to keep track of counted and uncounted objects, and the one to one labeling. Once they master this level, they will move on to the cardinal principal, which states that the last counted number is the number that shows the quantity of objects in the set. Counting sets needs the focus of the students because they need to remember the number asked for, stop when needed (on a specific number) and successfully count objects (Baroody& Wilkins, 2008).

Consequently, we conclude that a number is a symbol that is used to represent the quantity of a set. For students to be able to represent the quantity, they need to count in the correct order and recognize that the last said number is the correct number that represents the quantity. Fig. 2 below represents graphically the meaning of the number and how it is represented.

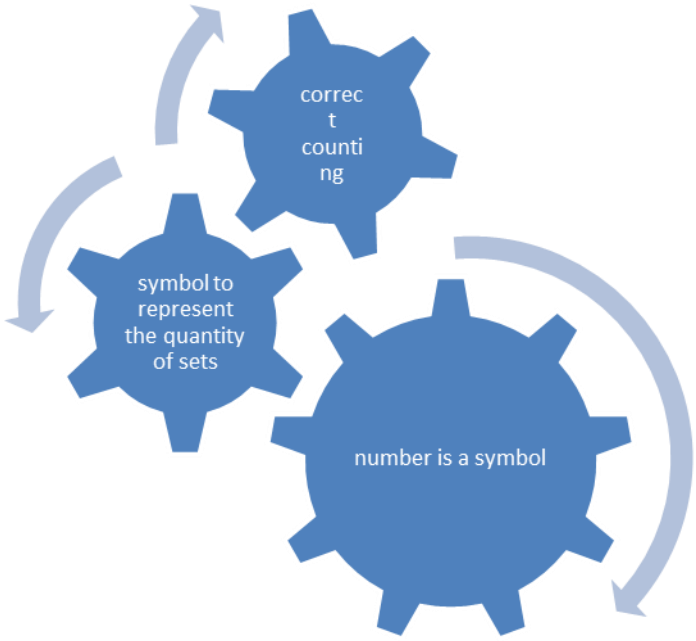

Figure 2: Graphical Presentation of Meaning of Number and how it is represented

Importance of using the IWB in the teaching of Mathematics

Previously, the importance and effects of using the IWB in the educational process were discussed briefly. In this part, the importance of using the IWB in teaching Mathematics will be explained thoroughly.

A research done in Swedish schools studied the use of IWB in mathematical learning. Results showed that children got more involved in problem solving situations, IWB supports collaborative learning, IWB made goal-oriented Mathematics learning easier and children were interested in the lessons (Bourbour & Bjoklund, 2014).

Drigas & Papanastasiou (2014) stated the importance of using the IWB in teaching Mathematics. They said that IWBs increased the interest of students and made learning easier. The IWB helped in solving more problems and questions. It also increased the communication between the students and the teacher on one hand, and between the students themselves on the other hand. Finally, the IWB motivated the students and lead to more engagement.

Linder (2012) stated: “the best way to use the IWB is before or after a small group task in which children use concrete materials”. She summed up that the IWB enhanced the thinking of the child and his motivation and encouragement. She gave an example of counting, where students had the opportunity to count objects, by dragging them from the right side to the left side of the board. This allowed students to count clearly without getting mixed up.

Mathematics is a very important discipline in our lives. It helps us throughout our lives by solving problems, performing calculations easily, making predictions, managing our time and money, and dealing with everyday situations that involve numbers (Mapp& Henderson, 2002).Counting is an important skill in Mathematics. Skills such as one to one correspondence, cardinality and ordering, and stating quantity are acquired when learning to count.

For a beneficial Mathematics lesson, the student-centered approaches are necessary. Moreover, we need to include activities that encourage communication, and integrate other disciplines with math. This will lead to the development of thinking level of the students. The use of IWBs showed positive effects on learners, including the increase of interest, motivation and better results. (Linder, 2012).

2.3 The constructivist Learning Theory

Constructivism is a theory that states that learning happens through the construction of information. Many theorists and psychologists discussed constructivism. Piaget discusses it through describing the cognitive development of a child, as well as the process of developing information based on schemas. Vygotsky describes it in the social interaction and use of language, as well as the zone of proximal development and the scaffolding process. Bruner also discusses the mode of representation that a child passes through, the spiral curriculum, the discovery learning, and most importantly the scaffolding process. Finally yet importantly, John Dewey describes learning through experiencing and hands-on activities. Each psychologist, discussed the constructivist theory each in his own way. Yet they all mentioned that knowledge is constructed and children build knowledge through symbols and language. A preschooler learn mathematical concepts through constructing knowledge, where he start to count , then match one to correspondent, then sort then categorize. The skills are build and constructed.In order to prepare well-designed and appropriate mathematics activities for preschoolers, an Instructional design model that guides the preparation is be followed. After studying several instructional design models and matching them with the theories and use of technology, ASSURE instructional model is the model to be followed.

2.4 ASSURE Instructional Design Model

ASSURE model is a classroom-oriented model designed by Heinich, Molends, Russell and Smaldino. It is a model to guide the instructors in developing a lesson using technology. ASSURE considers each student separately, looking into his learning style, and uses constructivism so learners can interact with each other and with the environment, in order to build information and knowledge based on previous ones (Han, 2015). The word ASSURE is the abbreviation of the six phrases stated in the Fig. 3 below and discussed later on.

Figure 3: ASSURE instructional Model Steps

Analyze Learners: learners are being analyzed by identifying the characteristics of each learner (age, grade, sex,…), specifying the competencies such as prior knowledge and skills, and detecting the learning styles which might include verbal, logical or visual styles. (Han, 2015 and Gustafson & Branch, 2002).Table3 gives examples of the questions that might be asked to analyze the learner.

State Objective: The second step is to state the objectives that should be reached.
Questions asked while stating the objectives can be: what will the learner be able to do by the end of the lesson? Are the objectives clear? How will the action be done and under what circumstances? Will all students be able to reach the same level of this objective?

Select media and materials: The third step is selecting media and materials. The instructor, by now, has gained a good idea of who is the learner and what is he going to learn. It is time to select the method and materials that are to be used throughout the lesson, in order to reach the stated objective. The content of the lesson is selected and designed, the technological resources are prepared, and the printed resources are also ready and selected.

Utilize media and materials: The next step is checking all the materials, tools, and learning environment, while making sure everything is ready to be used and working properly.

Require Learner Participation: The fifth step is to involve students in the process. Learners are involved and not only being lectured. The learner's participation makes learning active.

Evaluate and Revise: Many issues need to be evaluated and assessed. Students are being evaluated to check if the objectives reachedall students. They are also assessed to see how technology affected them.

Instructors are evaluated by the students and by themselves. Instructors will check how the lesson flowed, how the technology was used, and how the students engagement with them, in order to improve or change anything. Evaluating the materials and content of the lesson is also very important to check if it was enough using them or any should be edited.

3. Methodology

3.1 The process of developing the product

The final product consists of an introductory story followed by activities and exercises on the Interactive Whiteboard about the number seven.

The story

A summary of the story is as follows: One day at school, the teacher heard Sara telling her friends about her visit to the farm. Sara passed by seven stations where she saw all farm animals (cats, dogs, ducks, horses, cows…). By the end of the day she got a bag full of farm products and went back home happily.
After writing the story, the Anime Studio pro software, an animation software, with the aid of the sounds and recordings done by a nine years old child, I was able to draw the scenes, add sounds, and create a simple two- dimensional animation. Beside Anime Studio Pro, I used four main programs: Audacity, Photoshop, Illustrator and Premier. I used audacity to edit sounds and recordings, Photoshop to edit images, drawn using illustrator and used in the story, and Premier to finalize the animated scenes. I also used the Format Factory software to change the format of some sounds when needed. Below are the images of the story .Fig.4 shows the illustrations of the story.

Figure 4: Illustrations of the Story " A Day at thr Farm"

3.2 The Project design

The final product of my project was designed on the IWB software "activinspire". The wide variety of

features helped me a lot in designing it. Keeping in mind that the activities must grab attention, be interactive, be age appropriate, motivate children, and reach all learning styles, the activities were designed.

The project started with a link to a multimedia item, the video of the story "A Day at the Farm" which grabbed the students' attention. Then, navigation tools moved the students to the activities page. Instructions were given in each page of the flipchart on what to do and hints on what tool to use.

A variety of tools were used*: drag and drop, pen tool, selecting tool, paint bucket, magic ink tool, move along path tool, and the restrictors tool.* A paper, by Butcher and Lee (2009), states about the use of drag ability tool and how it is interactive. Using this tool in my project created an interactive motivation environment in the classroom. Another motivating tool was the magic ink where students used it to reveal hidden answers.

As for implementing and using the IWB in the classroom, the nine steps of Gagne events of instruction were followed.

- The IWB colors, activities and sounds gained the attention of the students and kept them motivated and aware of every move, sound, image or action they did. But what really grabbed their attention was the story before the activities.
- Before starting the session, I explained to the students about the plan and objectives, informed them about every single instruction, and provided them with information they need to know. I also informed them about the tools through an instructional page. *Fig. 5* shows the instructional page.

Figure 5: Instructional page in the flipchart

- After informing the students about what we will do, and watching the video, some questions were asked in order to recall their knowledge and let them focus on the numbers from 1 to 7.
- Then we went on to the stage were we started to work on the IWB software and solving our activities and games. *Fig. 6* shows few students in action.

Figure 6: Students in action

- Guidance was offered whenever needed. Special needs students were guided by the instructor and sometimes by their peers. Other students helped each other whenever they felt that someone did not know how to solve or what to do exactly.
- Applying using tools and activities was the center of the project. Students were applying what they know in every activity.
- Feedback was the funniest motivating part in the presentation. Every correct or wrong answer was followed by a specific sound. Correct answers by a "yes", "waw", or an animal sound which students laughed and giggled every time they heard it, and every wrong answer was also followed by a sound too.
- An assessment was performed on the second day of presenting the project to check how the IWB activities affected the perception of the students.
- The assessment was a part of the transfer stage in which students showed that they can apply what they learned in different situations and conditions.

The use of the IWB really grabbed the students' attention especially that the activities took a long time (50 minutes). Only two students did not stay focusing all the time, but all other 18 students waited anxiously to take turns and do an activity. The use of the IWB helped the special needs students by motivating them and by the feedback available, one student kept on repeating the activity just to hear the rewarding sound.

3.3 Project Implementation

Step1: Testing the product. I checked that all the links, containers, sound rewards and activities were functioning properly. Some editing took place like fixing a sound reward, adding a sound, editing an activity and editing few words in the instructions.

Step 2: A meeting was held with four teachers of KG2 A and KG2 B, where we discussed the steps that will be followed whether for implementing the project or for doing the assessment. Check *Appendix A* for

the Pages of the Flipchart and *Appendix B* for the assessment.

Step 3: The project implementation(1): the project was implemented first to the KG2 B teachers to become familiar with the content of the project and to check if the content/ activities were appropriate or need to edited.

Step 4: The assessment was distributed to both KG2 A and kG2 B teachers. KG2 A started the assessment with the students under one condition: do not help the students just tell them the instructions.

Step 5: Date and time were set to present the project for KG2 B students. The software, pen, laptop, electricity, lights and sounds were checked.

Step 6: Implementing the project (2). With the help of the two KG2 B teachers, students were asked to sit on the carpet in a circle. Students were given instructions to listen to the story and took turns in doing the activities. During the implementation of the activities, students were all motivated and wanted to participate

Step 7: The same assessment done for KG2 A was also done to KG2 B on the second day (3rd session) after presenting the exercises on the interactive whiteboard.

4. Results and discussions

Table 1: Results of the Assessment done for KG2 A and KG2 B

		Q1	Q2	Q3	Q4	Q5	Q6	Q7
KG2 A	Correct answers	100% 20	100% 20	95% 19	50% 10	15% 3	75% 15	45% 9
	Wrong answers	0	0	5% 1	50% 10	85% 17	25% 5	55% 11
KG2 B	Correct answers	100% 20	100% 20	100% 20	90% 18	90% 18	100% 20	90% 18
	Wrong answers	0	0	0	10% 2	10% 2	0	10% 2

If we observe the results and percentages of the assessments that are tabulated and presented in the Table 1 above, we can notice the difference in the levels of achievement between KG2 A students -that didn't use the IWB- and KG2 B -that used the IWB.

All 40 students (100%) answered questions one and two correctly. They were able to color and recognize number 7 by coloring the number, coloring seven balls, and drawing a circle around number 7. Moreover, only one student from both sections did not get the third question -coloring the hat that has the number 7 on- correct.

On the other hand, results for questions 4, 5, 6 and 7 showed the difference between those who used the IWB and those who did not use the IWB. When answering question number 4, count and circle the correct answer, 50% of KG2 A students got right answers and 50% got wrong answers, while 90% of the KG2 B students, who used the IWB, got right answers and only 10 %, which are two students, got wrong

answer.

Similarly, when answering questions number 5, circle only 7 objects, KG2 B -the class that used the IWB- showed better results than KG2 A where 90% of KG2 B students scored correct answers compared to a 15% correct answers in KG2 A.

100% of KG2 B students traced correctly number 7 where only 75% of KG2 A students traced it correctly. Correspondingly, 90% of KG 2B students answered correctly question 7, drawing seven objects, where only 9% of KG2 A students did it right.

In summary, the results showed how the activities done on the IWB helped the students in achieving better results than those who did not use the IWB. Although the activities felt more like extra practice for the students, but they were not exposed to them or to similar ones before. The charts of Fig. 7 show the percentage of correct answers and wrong answers in each class. KG2 B, who used the IWB, scored higher results, in about 33%, than KG2 A, who didn't use the IWB.

Figure 71: Chart showing the Assessment done for KG2 A and KG2 B

5. Conclusion

While observing the students many things were noticed. Two students only did not stay focused all the time, but the 18 students- including two special needs students- waited anxiously to take turn and so an activity. What was also recognizable is how the students were encouraged and engaged while they were doing the activities. Motivation also was present especially when feedback was provided, through the sound rewards or peer cheering. Learning communities were build between the students while solving the activities where some students helped each other. For example, one student forgot the place where the numbers were hidden so all the students started to say "take the number from the box". They were also happy to hear the different sound rewards like the "wow" or the "beep beep" and wanted to repeat the activities all over again just to hear some sounds.

The Interactive White Board that was introduced to the educational process, have many supporting, motivating and encouraging effect on the learners. The study done showed that the learners easily be

motivated when using the IWB features-drag and drop, pen tool, selecting tool, paint bucket, magic ink tool, move along path tool, and the restrictors tool. The study also showed that the students were attracted and focused for a longer time when using the IWB to solve the activities. The different kinds of activities and exercises that were solved by the students encouraged them to learn, help, and support each other.

The results of the study prove the importance of using the IWB in the educational process. Results drawn, showing the difference in the assessments between KG2 A and KG2 B, reflected how the IWB affect positively the preschoolers' understandings.

Although the IWB helped the students in improving their results and learn more effectively, there is a very important aspect to keep in mind that if the teacher is not willing to prepare attractive and wide variety of activities, the studentswon't benefit. The process of creating the lesson or activity on the IWB needs a lot of work and time. Besides, teachers need to take into consideration the learning styles of each student and adapt the activities to suit all learners. Are teachers ready to properly use the IWB and are they seeing the effects of using the IWB on their students?

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