PEDAGOGICAL APPROACH TO USE INTERACTIVE BOARD IN MATH AND SCIENCE CLASSES FOR 6TH GRADE IN PALESTINIAN SCHOOLS

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ABSTRACT: Interactive boards in school's classrooms considered as an important and valuable educational technology tool in the education process. It becomes famous in the educational system in Palestine. It has been installed in many public and private schools for different classes' level. Several training courses were conducted to train teachers in how to use interactive boards in their classes. Unfortunately, most of the teachers understood how to use the interactive boards as a technology tool without having a good understanding how to use it as a pedagogical tool. Therefore, teachers start to avoid using this tool since they believe it does not have any pedagogical perspective benefits. In this research the researcher will address a pedagogical technology approach to integrate and implement the interactive board in Math and Science classes for the grade 6th. The approach integrates between normal boards and interactive boards. It shows how teachers may combine between the two boards in delivering the class's subjects to the students, which covers the pedagogical aspects and the correct usages of the interactive boards. Qualitative research approach is used to create and develop an effective plan to implement the interactive boards in delivering classes' subjects to the students and integrates them with the traditional boards. The plan was developed from several global and Arabic researches and experiences which matches the Palestinian education needs.

Keywords: pedagogical, interactive boards, math, science 6th grade

INTRODUCTION

There has been a considerable investment in the implemention of the interactive boards in classrooms schools in Palestine. The Palestinian Ministry of Education has installed two to three interactive boards in different schools and private schools as well. Their major goal was to enhance the teaching effectiveness in classrooms for all school's subjects. Several training hours were conducted to train teachers how to use the interactive boards in their classes and get advantages of this technology tool to increase their teaching skills and professionalism.

Effective teaching is a requirement nowadays in the education process in Palestine and the world as well. Traditionally, teachers were the focal point for information at schools and their role was to impart their knowledge and skills to their students. The Internet myth has changed that as information are available anywhere and anytime. Thus, the roll of teachers become in the 21th century to develop the skills and tools to assist their students in understanding the plethora of information available and to simplify the school subjects' contents.

In math and science education, it is commonly claimed that the use of multiple representations and the flexibility to switch among them is a crucial component in math and science thinking, learning and problem solving. (Heinze et al., 2009) addressed how "instructional environments wherein learners are confronted with multiple representations of a given mathematical concept, principle or situation, and wherein they learn to switch fluently and flexibly between these various representations, are considered as more effective in enabling learners to understand and apprehend mathematical notions and to develop a genuine mathematical disposition than environments that do not emphasize multiple representations".

The 6th grade in the Palestinian education system considered as a ground based principles knowledge for students. They have to gain and clearly understand subjects' contents in all subjects specially math and science. Teachers need at this stage to modeling mathematical and science ideas and strategies, explaining concepts, demonstrating theorems, stimulation discussion and challenging students to apply their knowledge and skills to solve problems (Miller & Glover, 2007). Math and science learning are constructive activities. Students need to engage in the processes of thinking, solving, making conjecture and so forth (Schoenfeld, 1992).

Interactive boards provide high quality graphics illustrations, variety types of multimedia presentations, animation, collaborative opportunities, hypothesis testing and interpretation. There are several types of Interactive boards in the Palestinian market such as Hitachi, Qomo, promethean, etc. and each brand provides different type and usages of the Interactive boards. Each Interactive board provides special tools for teaching math and science in addition to related interactive software application.

Palestinian schools lack high technology infrastructure specially the Internet connection. Therefore, they are suffering the implementation of high quality educational tools which depend on the Internet connection. They are not totally getting advantages of the installed Interactive boards. Thus, most of teachers are avoiding using the Interactive boards in their classes since it might affect their lessons pedagogical wise.

This research provides a pedagogical approach to use the Interactive boards in the Palestinian schools which is proportional to the infrastructure situation and the schools culture. The researcher has a deeply experience in integrating interactive boards in school classrooms for different subjects and has conducted several training courses for teachers in using the interactive boards as a technology tools in pedagogy perspective.

Aims of the Research

The fundamental aim of the research was to provide an approach that helps math and science teachers to integrate interactive boards in their classrooms in a proper and effective way. The approach combines between both the traditional board and the interactive board in the same lesson class. It provides two plans; the first plan focuses on teachers training and the second one provides a typical math lesson plan.

The initial plan considered as a fundamental for teachers to implement and integrate the interactive boards correctly taking into consideration the pedagogy and technology as a tool of the interactive boards. The plan consists of 30 practical training hours on a Hitachi touch board projector which makes the traditional board becomes interactive board.

The second proposed plan illustrates a typical math lesson class in integrating traditional board and interactive board together. It consists of two parts: part one is the pedagogical terms and methodologies; the second part is the actual lesson structure.

METHODS

The quantitative research method was adapted in this research. To ascertain the added value of integrating interactive boards in classrooms to teach math and science; several related researches were analyzed. Those researches showed the advantages of using the interactive boards in schools' classrooms. The researcher focused on the Arabic related researches and several international researches.

Several training courses in the last five years were conducted to train teachers from different schools and teach different subjects to use interactive boards in their classes. The training provided best practices of interactive boards to their subjects and provided them with software applications which best fit their lessons needs. Lessons observations and follow-up interviews were carried out with group of math and science teachers to comment on which aspects of the lessons they had delivered and found helpful to their pupils.

The related researches and the researcher experience were combined and integrated to propose this research approach. The researcher has 10 years' experience in train and supervises teachers on using interactive boards in their teaching classes. Several research papers were published by the researcher on best fit approaches to use interactive boards in schools' classrooms and the important of integrating traditional board with interactive board in math and science classes.

RESULTS AND FINDINGS

The research proposed a pedagogical approach to use interactive boards in math and science class for 6^{th} grade in the Palestinian schools. The study considered the Palestinian school curricula for both math and science subjects for 6^{th} grade to propose this approach. Several interactive boards' models were used in this study in different schools to clarify the best fit model taking into consideration the schools environment and circumstance.

The approach consists of four fundamental stages: stage one focus on training math and science teachers on using and integrating interactive boards and traditional board in their classes as a pedagogical and technology tools. A 30 hours training plan was developed and well-structured pedagogically to allow teachers to understand the interactive boards as an educational tool and to integrate it correctly. The second stage is the lesson plan which consists of two main parts: the pedagogical part and the actual lesson structure. The plan proposes an integration strategy of using interactive board and white board (traditional board) in delivering the lesson for students.In stage

three, observation sessions must be conducted for teachers who completed their training by an expert in order to enhance teachers' usages of interactive boards in their classes and get the necessarily feedback.
Stage four encourages teachers to develop interactive lessons related to their subjects to improve their lessons quality.

Teacher Training Stage

The training plan was developed compatible with the Palestinian schools' teachers' needs and its environment. The plan consists of two parts: Technology part and the pedagogical part, which both parts well transfer a typical usage of the interactive board in classes. The plan is enriched with simulation application to enhance pupils understanding of the topics.

	Meeting No.	Duration	Content	Assignment

Technology Part	1	3 hours	• Introduction to interactive board(IB)
			  ○ Parts
			  ○ Operations
			  ○ Maintenance
			  ○ Safety
			  ○ Traditional board Vs. IB
			  ○ IB's advantages in class rooms
			  ○ Best practices and usages
			  ○ Installation and configuration
			• IB software
			  ○ Main tools
			  ○ Practical training on main tools
			  ○ Smart pen
				Create one slide on shapes

	2	4 hours	• Teaching tools
			  ○ Zooming
			  ○ Backgrounds
			  ○ Spotlight
			  ○ Text
			  ○ Recorder
			  ○ Stopwatch
			• Practical training on IB
			• Math tools
			  ○ Ruler
			  ○ Protractor
			  ○ Compass
			• Science Tools
			  ○ Thermometer
			  ○ Scale
			  ○ Measuring cups
			• Practical training on IB
				Create a plan lesson and illustrate the tools to be used.

	3	4 hours	• Merge images
			  ○ Images library
			  ○ Import image
			  ○ Image processing
			  ○ Internet images
			  ○ Screen shots
			  ○ Matching game
			• Merge word files
			  ○ Working on worksheets
			• Merge power point files
			  ○ Import slides
			  ○ Interact with slides
			  ○ Slides snipping
			• Merge PDF files
			  ○ Import student book
				Create 4 slides, select a topic and use different tools.

			○ Import other files	
	4	5 hours	• Building lessons ○ Identifying lessons ○ Lesson's component ○ Lesson implementation ○ Lesson section and time • Educational videos Integration • Educational flash files integration • Educational games ○ Math game ○ Science game • Create complete lesson	Create lessons folder and build your first lesson(you have to use different techniques on each slid)
Pedagogical part	5	5 hours	• Educational web application 1 ○ Kahoot.it ○ Linoit.com ○ Popplet.com • Web application integration • Create an interactive lesson	Create your second interactive lesson
	6	5 hours	• Educational web application 2 ○ Phet.Colorado.edu ○ Desmos.com ○ Areej.org • Practical training	Create your third interactive lesson
	7	4 hours	• Practical training (students on board) • Trainees presentation • Create follow up plan	

Lesson Stage

Following is the proposed lesson plan structure. The plan structured consist of two parts: the first part presents the pedagogical perspective contents of a class lesson; the second part presents the actual lesson plan.

Pedagogical Part:

	Target group(class level)		**duration**	
	Lesson title			
	Group ages			
	Lesson objectives			
	Terms			
	Critical thinking			
	21th century education tools			
	Instruments			
	Computers			
	Internet resources			
	Assessment			
	Intended learning outcomes			

Lesson part:

The abbreviation IB means: Interactive boards and WB means: White board (Traditional board).

	Lesson's section	Activity	Computer application	Board used (IB,WB)	duration
	Ice-breaking and Introduction		Multimedia app	IB	3ms
lesson structure	Explanation (understanding principles)	Theoretical part		WB	10ms
		Practical Part1		WB + IB	10ms
		Practical Part2	Web app	WB + IB	10ms
	Exercises		worksheet	IB	8ms
	Enrichment		Desmos.com	IB	3ms
	Conclusion			WB + IB	2ms
	Assignment				

The research ascertains that replacement the traditional white board with the interactive board in the Palestinian schools will affect the students' basics mandatory skills such as writing skills, spelling skills and memorizing skills. In addition, continuing using the white board only will affect students' academic enhancement, their concentration, their understanding and might affect their psychological feeling to their schools and education live as well.

The research presents a typical approach to integrate interactive board among with traditional board at the same lesson to insure high quality teaching and to be in line with the technology evolution in education process. The approach illustrates the best fit technology tool is a projector which connected to a white board and switch it to an interactive board as in figure1.

Figure 1. Typical integration between IB and WB

CONCLUSION

Most research publications illustrated the importance of using interactive boards in school classes without presenting typical pedagogical approaches to use it. In this research, I presented a typical approach to use interactive boards in math and science classes for 6th grade in the Palestinian schools. An approach which encourages teachers to integrates white board and interactive board among each other in the same lesson class by installing a special technology tool which makes any white board to be interactive. The projector is hooked above the whit board and as teacher needs, teacher can turn on the feature which switches the white board to an interactive one.

The approach combines between traditional tools and technology tools. Booth tools are needed in the Palestinian schools to insure high quality education and basics necessary education skills. Teachers must understand how to integrate interactive boards and merge it with the traditional white board as well.

The approach consists of four fundamental stages: teacher training, lesson structure plan, teacher's observations and interactive lessons development.

RECOMMENDATIONS

1. I encourage the Palestinian ministry of education to adapt the proposed approach to insure high quality in their schools education system.
2. Teachers must be well trained before they start integrating interactive boards in their classes.
3. The Palestinian ministry of education must provide guidance and supervision to their schools for implanting interactive lessons for all school levels and subjects.
4. Teachers must consider the interactive board as a pedagogical tool as well as a technology tool. Therefore they must understand the pedagogical aspects.
5. I encourage related researchers to research on merging between traditional white board and interactive boards in schools classrooms especially in elementary level.

ACKNOWLEDGEMENTS

This approach was developed from deeply experince in teaching practial Math and Science classes using the Interactive Board in parraller with traditional white board. İt combines teachers traning sessions feedbacks conducted in schools, local and global related researches and the researcher experinces in educational technology classes. In the next phase, the approach will be immplemented in 10 different schools in order to test it and improve it. In addition, the approach will reformalted to justified special needs schools.

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