

IMPACT OF IPAD ENABLED INSTRUCTIONAL DESIGN ON BEHAVIOR DYNAMICS IN MATHEMATICS AMONG SECONDARY LEVEL STUDENTS AT FUJAIRAH – UAE

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ABSTRACT

Math is often called a skill rather than a subject. Globally it has emerged as the most important subject. Today's learning landscapes includes an almost dizzying array of tools, from inexpensive personal computers and handheld devices to interactive whiteboards, digital video cameras, and a constantly expanding suite of Web 2.0 tools. Although almost all educators agree that we should adopt technology intensively in the classroom, the way in which teachers and learners use it varies significantly. The educators have been pondering two main ideas for the technology in the classroom. One is to adopt the technology to improve the traditional lecture based teaching and learning. Use of technology helps students to visualize, stimulate, solve real world problems, collaborate, research, and design whenever possible (Jong. H. Chung, 2007).

This experimental study compared the performance of students enrolled in Grade 10 in Fujairah – UAE in Mathematics Problem Solving Behavior with traditional instruction and with instruction supplemented with iPad enabled instructional design. There is statistically a significant difference in the posttest scores between the students receiving traditional instruction and instruction supplemented with iPad enabled instructional design in their Mathematics Problem Solving ability.

Keywords: iPad enabled instructional design, Behavior dynamics.

INTRODUCTION

Research into integrating technology such as iPads in Math problem solving for the secondary level students is still new. Since the technology is inevitable today in classroom, the uses of relevant iPad apps are essential. Ideally, iPads work best in a one-to-one setting and provide evidence of enhanced learning almost instantly. iPads not only run in contrast to our more systematic ways of planning for technology integration but they also offer new way of interacting with

content. In the 21st century, teachers must know not only how to use technology but also when and where to use it.

Literature on Problem Solving in Mathematics has discussed extensively the need to teach students to reason mathematically. This train of thought led to an emergent theme in Mathematics education in mid-80's wherein researchers propounded that teaching Mathematics via problem solving was the correct way to foster students problem solving and hence reasoning skills. Cockcroft (1982) advocated problem solving as a means of developing mathematical thinking as a tool for daily living, saying that problem-solving ability lies 'at the heart of Mathematics', it was the means by which Mathematics can be applied to a variety of unfamiliar situations. Problem Solving was thus seen as a means of developing students reasoning skills. Researchers have encouraged the integration of technology in the mathematics classroom (Amin, 2010; Banister, 2010).

Incorporating technology effectively involves (a) engaging students in active learning (b) relying less on whole-group instruction, and (c) encouraging more independent and self-motivational learning (Hadley & Sheingold, 1993). Williams and Williams (1997) note that effective technology use should incorporate a variety of applications that focus on problem solving and help development of creativity, adaptability and collaborative problem-solving skills. Technology exists in classrooms not just for the sake of its presence, but also to enhance the learning process. Scheffler and Logan (1999) emphasize that integrating technology not only involves the attainment of computer skills but also consists of process in which learners try, fail, access, evaluate, analyze and apply meaningful tasks including but not limited to researching, analyzing data, applying and representing knowledge, communication and collaborating. Thus integration of technology into education means using it as a tool to teach subject matter, and to promote problem-solving and higher-order thinking skills.

Becker (1994) notes that a social network of computer-using teachers and organizational support from the school are important factors that contribute to the successful technology integration. Hadley and Sheingold (1993) suggest that technology is most valuable to teaching and learning once teachers integrate it as a tool into everyday classroom practice and into subject-matter curricula. It is only through integrated practices that they can realize the hopeful and idealistic claims for technology (Collins, 1991). This requires readily and flexibly incorporating technologies into their everyday life in relation to the subject they teach.

Technology can be used not only as an information management tool, but also as a means of reaching students of diverse backgrounds (Sianjina, 2000). Use of technology can help teachers relate to today's students who are very media aware, prompt new approaches to curriculum, encourage developments in teaching skills (Schwarz, 2000). Through the iPad enabled instructional design, the students can spend more time in their work. The learning system is available 24 hours a day from any iPad with Internet access.

THE DEVELOPMENT OF IPAD ENABLED INSTRUCTIONAL DESIGN

The present study deals with the impact of iPad enabled instructional design in developing Problem Solving Behavior over the existing conventional method of teaching among the secondary level of students in Mathematics. With the help of iPad enabled instructional design the learner can easily recall the mathematical concepts and the sense organs actively involved in their learning. Using computer-based technology to teach Math is still considered a non-mainstream practice in schools. Teachers often view computers as an "add-on" or complementary material, and not as the core of learning. Computers are often seen as time-consuming and irrelevant in content. Furthermore Math classes have limited time allocation and an exam-based curriculum; using computers or other ICT technology seemed a burden to the teachers. The past two decades have brought to Math teaching and learning a wide range of audio-visual technologies. From among these, no single tool for teaching and learning has had greater impact than the iPad. Today, individual learners can, in addition to interacting with computer generated text and graphics, control combinations of analog and digital sound images. Arranging these combined media into intelligent, pedagogically driven material is a challenge to materials developers.

Nowadays, technology plays an important role in continuing the communication of education from known to unknown persons. In today's trend, Math as the Queen of science, as part of the information technology, is fast growing and conquering all the human affairs. The bank of knowledge and information is now available on the fingertip.

The iPad enabled instruction is an alternative tool for understanding Math that could be applied by the teacher using educational technology in learning that had text, sound, picture, animation, video, and interaction aspects. By giving interactive additional aspect, the students were active to choose one of them and search information in following those stages on their need. The

students could observe, study, and ask the lecturer about the materials presented in the projector. Since technology is not reaching its potential in classrooms, it is imperative to develop an appropriate instructional design based on the needs and the requirements of the students. The technology alone cannot help the students to achieve better results. Hence the present study has been related to enhance the behavior dynamics in Mathematics, as the conventional method of teaching with iPad did not yield a positive result. In that way, the present study attempts to develop a technology so called 'iPad enabled teaching' in which a suitable instructional design was integrated.

OBJECTIVES OF THE STUDY

The following objectives are formulated for the present investigation.

- ✓ To study the impact of iPad enabled instructional design on the achievement of Secondary level students in Mathematics.
- ✓ To study the impact of traditional method on the achievement of Secondary level students in Mathematics.
- ✓ To compare the achievement of Secondary level students learning in Mathematics through iPad enabled instructional design method and traditional method.

METHODOLOGY

Problem under investigation is an experimental study, which aims to find out the impact of iPad enabled instructional design on the behavior dynamics of High school students of Fujairah in UAE. For the present study, the investigator has taken one of the Government High School of Fujairah – UAE. Out of 87 students were drawn, 47 students were in the experimental group and 40 were in the Control group. The Experimental group students were taught through iPad enabled instructional design. The control group students were taught through existing traditional method of teaching. For the analysis the investigator used descriptive statistics like Mean, Median, Mode, Standard Deviation and Mean Difference Analysis. The study reveals that the students in the Experimental group achieved more clear understanding of Mathematical Concepts than the students in the Control group.

STATISTICAL TECHNIQUES USED FOR ANALYSIS

- ❖ The data obtained from the pre-test and post-test among the control group and experimental groups were analyzed. Two types of analysis were made in this study. The first one is Descriptive analysis and the second one is inferential analysis.
- ❖ In descriptive analysis, Mean and Standard deviation were used to determine the central tendencies and description variables on the achievement in pre-tests and post-tests among the control group and the experimental group. This type of analysis highlights the nature of a particular group of individuals.
- ❖ Under the inferential analysis, "t" test was used to find out the level of significance of difference in pre-tests and the post-tests on the achievement of the control group and the experimental group. Significant correlation among the control group and the experimental group was found using "t" – values.

RESULTS AND DISCUSSION

The analysis of the study led to the following findings. Summary of Mean Difference analysis among the Control group and the Experimental group in Problem Solving Behavior in Mathematics.

TABLE 1

Sl.No	Variables	Group	N	Mean	SD	't'-value	Level of Significance (at 0.01 level)
1	Pre-Test	CG	40	50.03	13.17	-0.27	Not Significant
		EG	47	50.83	14.45		
2	Pre-Test	CG	40	50.03	13.17	-0.1	Not Significant
	Post-Test			50.33	13.46		
3	Pre-Test	EG	47	50.83	14.45	-4.62	Significant
	Post-Test			64.46	13.32		
4	Post-Test	CG	40	50.33	13.46	-4.77	Significant
		EG	47	64.46	13.32		

From table 1, it is observed that:

1. The obtained value of 't' is -0.27 in the pre-test among the Control group and the Experimental group. Hence it can be concluded that there is no significant difference between pretest scores of the experimental group and the control group. Both the groups are comparable since the level of performance of the participants found to have no significant.

2. The obtained 't' value of the Control group between the pre-test and post-test is -0.1 . Hence it can be concluded that there is no significant difference in the pretest and posttest scores of the Control group.
3. The obtained 't' value of the Experimental group between the pre-test and the post-test is -4.62 and found significant. Hence it can be concluded that there is a significant difference between pretest and posttest scores of the experimental group.

From mean value analysis we can understand that posttest scores of experimental group show significantly better than that of its pre-test scores. This means that the iPad enabled instructional design is really an effective intervention to develop Problem Solving Behavior in Mathematics among Secondary level students.

4. The obtained 't' value is -4.77 in the post-test among the control group and the experimental group. Hence it can be concluded that there is a significant difference between posttest scores of the experimental group and the control group.

From the mean difference analysis it is understood that the students in the experimental group show significantly better performance in terms of Problem Solving Behavior in Mathematics than students in the control group as higher mean scores are attached with them. This means that students who were intervened with iPad enabled instructional design differ significantly than students who receive traditional method of teaching in Mathematics. This shows the impact of iPad enabled instructional design among the secondary level students in Mathematics.

MAJOR FINDINGS

1. The iPad enabled instructional design on behavioral dynamics of High school students in Mathematics was found effective in enhancing their Mathematical skill.
2. There was no significant difference between the pretest scores of the experimental and the control group in Mathematical skill.
3. There exists significant difference between the posttest scores of the experimental and the control group in terms of Mathematical skills.
4. There exists significant difference in the pretest and posttest scores of the Experimental group in terms Mathematical skills before and after intervention.

5. There exists no significant difference in the pretest and posttest scores of the Control group in terms of Mathematical skills before and after intervention.

SUGGESTIONS AND CONCLUSION

The present investigation has revealed that iPad enabled instructional design provides more salient and comprehensively learning environment for enhancing Problem Solving Behavior of the secondary level students in Mathematics. Nowadays, the advancement of technology has influenced the field of education. In iPad enabled instructional design, the teacher should make use of appropriate iPad apps integrated with an instructional design in a meaningful way to develop the students Problem Solving Behavior in Mathematics.

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