

Full Length Research paper

Study of efficiency of intelligent instruction methods in promoting mathematical learning management

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Since traditional instruction methods do not response to all needs of students in mathematics, using of modern instructional methods will be essential. The aim of this research was to study the efficiency of intelligent instruction methods in promoting mathematical learning management in elementary. In this research considered promoting mathematical learning management with using of intelligent instruction method, casual-comparative method and cluster sampling in six (6) usual and smart schools in three (3) cities from Iran. In regard to results of independent samples T-tests and Mann-whitney test ($P < 0.05$) had shown that intelligent instruction method is affective on promoting mathematical learning management than traditional instruction methods in elementary students in meaningful level of 0.05.

Keywords: Mathematics education, traditional instruction, intelligent instruction, learning management.

INTRODUCTION

Today, importance of education cannot be over-emphasized. It makes sense that it propel the needs of person and society more and more, because global network which connect to information networks together, makes us understand how the use of technology as instrument for increasing creativity, beneficiary and learning. In the past, contexts which used traditional schools were included of collected and organized information that provided to students for success in final exams. Now, real life is other thing that need to include instruction of complicate roles of life (Jalali, 2005). In traditional learning system, relationship between teacher and students was relationship between wise and unwise. Now, in modern education system, they rely on technology, common relationship and cooperative instruction which led to production of knowledge (Karamipour, 2002). In technological method, context, book and teacher are the main source of information (Karamipour, 2002). In this path, by modern instructional achievement based on information technology consider to student-centered than teacher-centered and role

change as mentor, guide and student-centered instead of teacher only and changing role of teacher make to increase motivation of learning and students convert to active, creative and effective people and increase their interests in giving information and knowledge and set context in factual path normally (Afzalniya, 2005). Learning, teaching in intelligent learning circumferences (computer-assisted) is situational method for dominance on limitations of instruction in usual classes and removing instructional and learning problems in students and teachers. Intelligent learning is crossword location of learning, networks and modern technology (Ryan and Hall, 2004). Concept of smart schools or intelligent schools was accepted via Malaysia education in 1996. In early 1997, inventive working forces had formed sessions for designing smart schools. Members of this team had studied collection of performances of foreign technological schools. Finally, this team designed scene of smart school in 1997. Ninety smart schools are established in 1999 experimentally that was as core of widespread improvement and probable spread of smart schools with educational contexts along related proficiency in technology (Foongme, 2002). Smart school is location which coordinate to students automatically and intelligently and student can use of introduced context

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with ever capacity rate. In this instructional system, the highest utilization rate of information technology observes and its control and management is based on computer network and evaluation method of students and its providing context is electronic (Karamipour, 2002). Smart school constitute of mixed elements that is designed to motivation of pry sense in students and their active cooperative until launch to create of all instructional needs of people thereby coordinating efforts of students, teachers and managers in universal circumferences. One of the important features of technological circumferences is needless of physical presence of teacher and learner in class. Therefore, the important distinct mode between intelligent and technological circumferences is presence and needless presence in class (Foongme, 2002). Technology requires in changing form of traditional schools to intelligent schools. Multimedia contexts were provided needful facilities and also, library/media centers and perfect libraries connected to internet are such as resources which ease learning and teaching in class (Daffi et al, 1992; Gerabinger et al, 1996). Ramberg (1998) believed that nobody deal computing with pencil and paper today. Calculations and computers had been replaced to compute in vocation and industry. In addition, these electronic instruments can compute in mass and speed presenting information in various ways and so on. They have changed respected skills in mathematical context. Computers are speed instrument which can do some tired calculations easily and unique effect of it on mathematics is similar to effect of press on writing and reading. Press abolishes special skills. Also, books exist to people and requirement of people increased in writing and reading vastly. As in curriculum standards, national council teachers of mathematics (1991) emphasize that many mathematical contexts are more important because technology need to them. Many mathematical contexts are less important because technology replace to it. Some mathematical contexts are possible because technology provide it. In other hands, teachers have faced to groups of students who have personal differences, different academic literature, different intelligence and capacities and domain of motivation for learning. Maybe, most important obligation's teacher in class is learning management for spread spectrum of students (Saif, 1997). In Malaysia smart schools is designed management system which decreased official and traffic problems and also made to increase and promote capacity and skills in users in 2003. This management system is provided chat rooms and used of assistive instruments such as projectors and software and so on. Learning management in smart school implements as system titled "Learning Management System (LMS)". The term LMS is letterheads of above phrase. LMS is software for facilitating instruction. In other words, LMS is software that registers and pursues instructional activity of receiver or this system manages learning and teaching process automatically. A powerful

learning management system facilitate executive management of instructional program in organization and also, this system enable learners that consider coordinating and cooperating with justified learners. This system is instruction that can facilitate electronic learning process bodily (Designing Malaysia smart school, 2003). This system in electronic schools is spacing that provide instructional programs in it. Using of learners of this software when presence to learn on network in same time, it is similar that students enter to class. Students select their units and receive their context with using of LMS. This system uses to complete practices and presenting in exam and communicate to professors and other students. This system registers lists of users and learners, list instructional strands and record information's learners and special reports provide to manager (Designing Malaysia smart school, 2003). Realization of learning goals need to effort of teacher for justifying knowledge and information, capacity and propensity of learners with new subjects and creating meaningful learning along learning management in any matter.

Literature

Among many researches which have be done in using of computer in teaching, learning and online instruction specially, mathematics education fields, three researches were considered; I) Fatih Gürsul and Hafize Keser (2009) in research titled "the effects of online and face to face problem based learning environments in mathematics education on student's academic achievement" believed that according to the results, the ranked mean scores of achievement level of the students at the online problem-based learning group had higher than the students in the face-to-face problem based learning group. In other words, using of online system is more effective than face-to-face terms in mathematical problem solving, II) Douglas H. Clements (2000) in his article titled "from exercises and tasks to problems and projects unique contributions of computers to innovative mathematics education "concluded that educators face these turning points with directions from classroom-based research. This research corpus is reviewed. Implications are drawn from it, centering on the need to move computer use in mathematics education from the domains of exercises and tasks to engagement with problems and projects. Unique contributions of computers to problem and project-oriented pedagogical approaches are described and unique challenges that must be faced when implementing these approaches discussed and III) Cumali Öksüza, Sanem Uça, Galip Genç (2009) had done research titled "designing multimedia video cases to improve mathematics teaching with technology: 'technology integration into mathematics education' project". In this research, they concluded that access to our video cases allows pre service and in service

teachers to project more and deeper plans for integration in their mathematics lesson plans and other course assignments. Thus pre service and in service teachers are expected to demonstrate an increase in both quality and frequency of technology integrated into their teaching. They will have a chance to see technology integration practices in innovative ways using a full range of technologies. Today, our society and ever students have face to change and universalize factors in technology. Therefore, we shall revise in context, learning and teaching methods in schools. Therefore, intelligent instructions is important in promoting management learning that this necessity may appear in mathematics in regard to importance in mathematics and weak in our students in mathematics more and more. Since there are lack of research about smart schools and learning management system (LMS), we tried that shown efficiency of intelligent instruction method in promoting mathematical learning management in this research.

Hypothesis

There are meaningful differences between marks' mean of intelligent instruction method and traditional instruction method.

METHODOLOGY

This research method is causal-comparative. In this method, we tried to find relationship among variables and determine the reasons for or the causes of the current status of the phenomenon under investigation. In fact, it is tried that investigate possible cause-effect relationships by observing existing consequences and searching back through the data for plausible causal factors. We consider two groups and comparison between it. Because in causal-comparative method, researchers tried to find out what factor has led to the observed difference on some dependent variables. Independent variable (intelligent instruction method) has already occurred and independent variable cannot manipulate. Two groups (traditional and intelligent instruction groups) are already formed in this research. Researchers haven't control over the events in other words, researchers appears on the scene after all events have occurred. To above reasons, researchers used of this method, because all events; traditional and intelligent instructions had occurred already.

Participants

Statistical society of research is included of all elementary students in smart and usual schools at four zone of Tehran, one zone of Amol and one zone of Sari

who were studying in 2010-2011. Since this research is done in three cities of whole country, it is tried that had used smart school which has more agencies in country. Therefore, it is used of Iran computer vanguards smart school which have branches in Tehran, Sari, Amol and Kerman and of these four branches, it is selected three branches; Tehran, Amol and Sari as samples. In this method, it is used of cluster sampling. Statistical samples were usual and smart schools at four zone of Tehran, one zone of Amol and one zone of Sari. For controlling factors related to social-economic level, schools are selected of one distinct and one zone binary. Also, because all students in elementary fourth grade in smart school were studying in usual school long ago, samples of research are selected of elementary fourth grade which are included of 180 students in 6 schools such as 3 usual schools and 3 smart schools that are selected of Tehran, Amol and Sari binary so that 60 students are selected of any cities generally; 30 students of usual schools and 30 students of smart schools.

Instruments

In this research is used of three instruments; math exam, LMS system and mathematical software.

Math exam

One of the instruments of present research is math exam. This exam (ten questions) was included of a series of questions of mathematics in elementary fourth grade. These ten questions are designed such that all mathematical context cover in elementary fourth grade and four questions of these exams were designed so that deep learning rate of students evaluate. Content reliability of these questions had emphasized in regard to opinion of teachers in elementary and its validity proved thereby using of Split-half test with Cronbakh's alpha value;75 percent.

LMS system

Learning management system (LMS) is second instrument which is used in this research. This system is smart schools in Iran especially in respected schools in this research has capacities such as 1) decreasing instructional costs, coming and going to schools and providing instructional workrooms, decrease dawdle of users, 2) decreasing official affaires such as register of students and presence of teacher and students continually, 3) using of kind of instructional software such as mathematics, reading, writing and online instruction in any moment even in home, 4) online evaluation of students' performance in mathematics and others

Table 1. Descriptive statistic of students' marks in groups of traditional and intelligent instructions

Tehran		N	Mean	Variance
Traditional		30	17.19	3.97
Intelligent		30	19.27	0.92
Amol		N	Mean	Variance
Traditional		30	16.71	2.45
Intelligent		30	19.56	0.35
Sari		N	Mean	Variance
Traditional		30	17.61	2.88
Intelligent		30	19.54	0.33

lessons, 5) using of assistive instructional instruments such as digitally library, chat rooms, practical software and so on. Here, we consider all above items relate to mathematics lessons in fourth grade in elementary. Also, experts of this system controlled of above items in particular rooms with presence of researcher. This system is validated under opinions of mathematics professors, others teachers and managers of smart schools.

Mathematical software

Mathematical software is third instrument which is used in this research. In Iranian smart schools have used of kind of software such as writing, reading, speaking and mathematics. Here we consider to math software. Mathematical software which is used in elementary fourth grade has mathematics capacities in parts of concept of number, computation, review of previous grades, quadruplet operation on numbers (addition, subtraction, multiplication and division), quadruplet operation on two and three numbers with transmission and without transmission, location value in two and three numbers through game and competition along feedback of students' performance. This software is designed and validated under mathematics specialists and teachers.

Collecting Data

In usual school, it is taught to student with same usual method and in smart school, learning and instruction perform thereby computer and electronic instructional instrument-assisted. In time of research, researcher cooperates to experts of LMS systems and mathematics teacher for implementing respected system and mathematical software. All information of students' performances and evaluation in mathematics thereby LMS system and mathematical software had gotten via experts and managers in smart and usual schools. Then, in end of instruction's mathematical context in elementary

fourth grade in usual and smart schools, math exam is implemented in class and with presence of researcher in exam session. Researcher stated aim of this research and its result through explanations. After providing ever question, it is announced that the questions have not negative mark and information related to ever student recognize without name of students and with code only. It is allocated 45 times for this exam. Because decreasing error percent and timing distance of three cities, researcher implemented math exam in 3 alternative days in these three cities. After collecting papers of exam, all papers of exam is rectified with one answer and identified mark and data of resulted hypothesis is provided of three cities.

Data Analysis

For descriptive and studying of resulted data, it used of descriptive statistics; mean and variance and for studying of respected hypothesis is used of One-Sample Kolmogorov-Smirnov test for normality of marks, Leven's test for evaluating equivalence of variances, independent Samples T-test and Mann-Whitney test for study of difference of means in meaningful level of 0.05.

RESULTS

In regard to results of Table 1, it is observed that marks' mean of intelligent instruction method ($M_{\text{Tehran}} = 19.27$, $M_{\text{Amol}} = 19.56$ and $M_{\text{Sari}} = 19.54$) are higher than marks' mean of traditional instruction method ($M_{\text{Tehran}} = 17.19$, $M_{\text{Amol}} = 16.71$ and $M_{\text{Sari}} = 17.61$) in three cities.

In Figures 1, 2 and 3, marks in intelligent instruction group are higher than traditional instruction group in three cities; Tehran, Amol and Sari. In these Figures, we shown that numbers of intelligent instruction methods' bars are higher and more than numbers of traditional instruction methods' bars.

In Table 2, marks of students in traditional and intelligent instruction groups are studied thereby

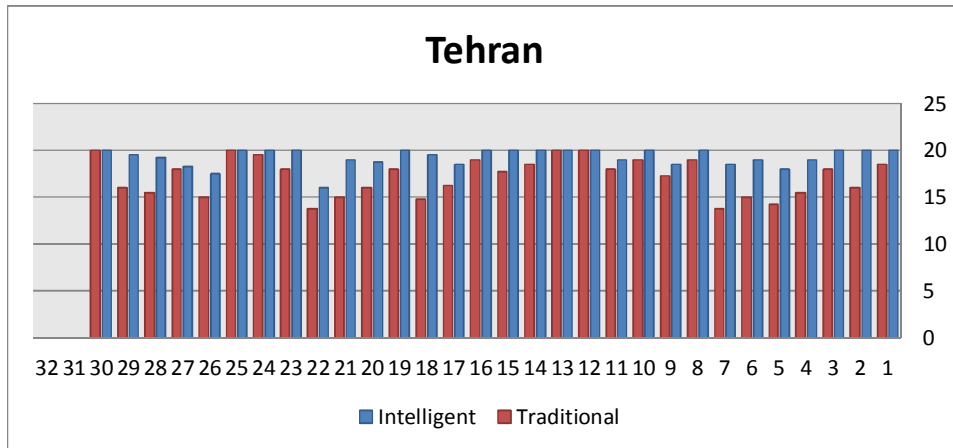


Figure 1. Marks of students in groups of traditional and intelligent instruction in Tehran city

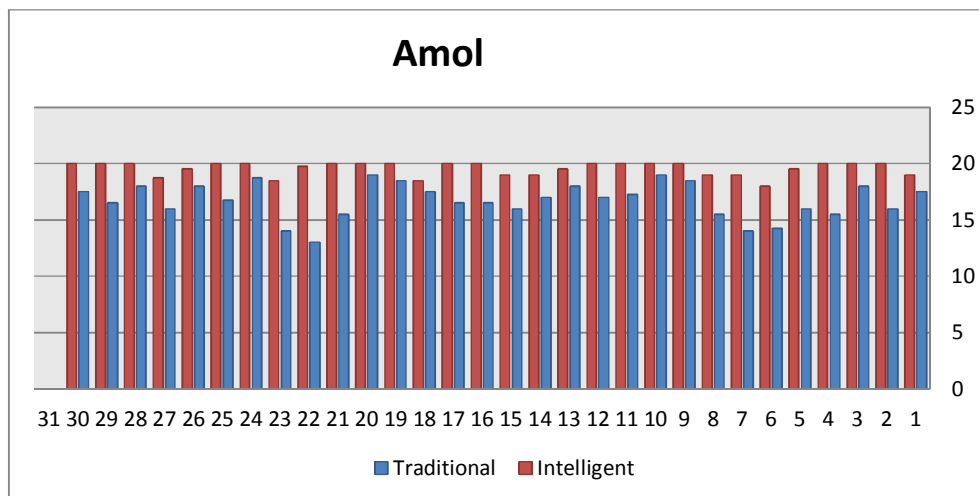


Figure 2. Marks of students in groups of traditional and intelligent instruction in Amol city

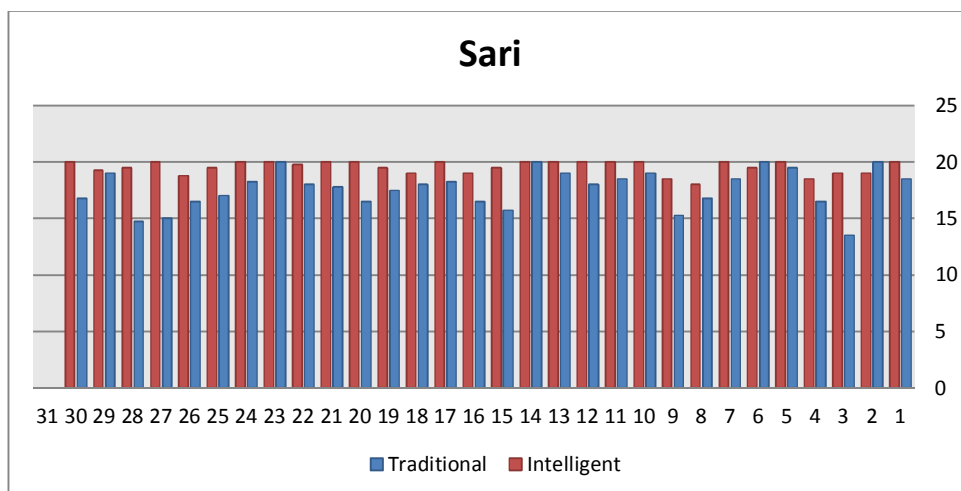


Figure 3. Marks of students in groups of traditional and intelligent instruction in Sari city

Table 2. Normality of students' marks in groups of traditional and intelligent instruction

Tehran		total
N		60
Asymp. Sig (2-tailed)		0.06
Amol		total
N		60
Asymp. Sig (2-tailed)		0.09
Sari		total
N		60
Asymp. Sig (2-tailed)		0.03

Table 3. Comparison of groups' marks of traditional and intelligent instruction in Tehran and Amol

Tehran	Levene's Test for Equality of Variances		t-test for Equality of Means						
	F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
								Lower	Upper
Equal variances assumed	25.8	0.000	-5.15	58	0.000	-2.08	0.4	-2.89	-1.27
Equal variances not assumed			-5.15	41	0.000	-2.08	0.4	-2.89	-1.26
Amol	Levene's Test for Equality of Variances		t-test for Equality of Means						
	F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
								Lower	Upper
Equal variances assumed	18.2	0.000	-9.32	58	0.000	-2.85	0.3	-3.46	-2.23
Equal variances not assumed			-9.32	37	0.000	-2.85	0.3	-3.46	-2.23

One-Sample Kolmogorov-Smirnov test for selecting proper test in three cities. In meaningful level of 0.05, results show that marks of two groups (traditional and intelligent instruction methods) in Tehran and Amol are normal ($P > 0.05$). In other words, we can use of parametric test; independent samples test but marks of two groups (traditional and intelligent instruction methods) in Sari are not normal ($P < 0.05$). That is, we can use of nonparametric test; Mann-Whitney U. Because, in Sari city marks in two groups do not follow particular distribution.

First, suppose; mean of marks in traditional group and mean of marks in intelligent instruction. In Table 3, results of Leven's tests show that variances of marks are not equal ($F = 25.8, 18.2$ and $P < 0.05$). Therefore, in regard to results of independent samples T-tests are shown that marks' means of intelligent instruction group are higher than marks' means of traditional instruction group in same cities ($T = -5.15, -9.32$ and $P < 0.05$) in meaningful level of 0.05. Because these values of t is negative, in other words, in confidence interval of differences and mean differences in Table 3. Therefore, related to

Table 4. Comparison of groups' marks of traditional and intelligent instruction in Sari

Sari	Traditional	Intelligent
Mean rank	19.8	41.2
Sum of ranks	594	1236
	Total	
Mann-Whitney U	129	
Z	-4.83	
Asymp. Sig (2-tailed)	0.000	

intelligent instruction is higher than traditional instruction in Tehran and Amol cities.

In Table 4, in regard to results of Mann-Whitney test is shown that marks' mean of intelligent instruction group are higher than marks' mean of traditional instruction group in Sari ($Z = -4.83$, $P < 0.05$) in meaningful level of 0.05. Because mean rank of intelligent instruction group (mean rank = 41.2) is higher than mean rank of traditional instruction group (mean rank = 19.8).

DISCUSSION

Present research had shown that use of computer and online instruction via LMS (learning management system) help to comprehend of students in mathematics and other lessons. Usage of smart network in schools is led to facilitate in cooperative communications, increasing motivation and promoting management in programs of mathematics. In LMS systems, students can consider to create of relationships among them, cooperative in difficult mathematical problem solving and increasing self-esteem and motivation to solve in different textbooks' problems in school or even in home. This system will promote capacity of programming and managing in lifetime and even in mathematics learning. Online systems and mathematical software will promote and improve students' academic achievement in elementary level or even higher level. In intelligent system, teachers and parents will able to control and evaluate mathematical performance of their students or in other lessons. Since traditional instruction is most common kind of instruction which implement in society and cover on most people, this method had problems. Instance, in mathematics, because teacher has main obligation process in learning-teaching, class face tired and lethargy then these deficiency will effect on learning rate. Now, because it provides instruction with higher quality in spread level, this importance occurs through modern method and traditional method together in instruction. In fact, usage of personal classes and experiences of teacher promote to rate of learning besides modern

instruction possibilities (instructional methods which implement in smart school). In regard to results of this research in three cities (Tehran, Amol and Sari) seem that intelligent instruction is affective on promoting mathematical learning management and teachers can use of this instructional method and LMS system to receive to this aim. Suggestions which are affective on better implementing intelligent instruction methods such as suggest to researchers that consider to other fields of this subject because this present research had done in mathematics, in regard to present research is in elementary, suggest to researchers that consider other grade also and implement in-service classes for teachers' acquaintance to instrument and software in modern instruction method. This research is limited to girly smart schools and elementary grade in particular in fourth grade and also is limited to mathematics textbooks.

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