Journal of Education and Practice (JEP)
ISSN 2222-1719 (Paper) ISSN 2222-2863 (Online)
Vol 5, No.5, 2014

Educational Math Game Software: A Supporting Tool for First Grade Students' Achievement

Ibtesam Al-Mashaqbeh[1] * and Ahmad Al Dweri[2]

1. Department of Computer Science, Al al-Bayt University, Mafraq-Jordan, Jordan
2. Department of Curricula and Instruction, Al al-Bayt University, Mafraq-Jordan, Jordan

* E-mail of the corresponding author: ibtesamirbid@yahoo.com

Abstract

Learning at a young age is a critical factor in the development of the mind. In this paper, we aim to clarify the effects of using computer-based mathematical games to improve students' performance in mathematics. We investigate the difference between using traditional teaching methods and traditional teaching methods supported educational mathematical game software (EMGS).This study was conducted at an elementary school in Jordan. We used a quasi-experimental control group design. A mathematics test was conducted before and after the implementation of the EMGS to evaluate the software. The results of the study show that learning supported with the EMGS has a positive effect on the1st-grade students' performance in mathematics tests. The study showed a significant improvement in the progress of the experimental group which used traditional teaching instruction supported with EMGS.

Keywords: mathematical game, educational computer game, educational technology, teaching math, computer and instruction

1. Introduction

Learning is essential increasing knowledge and gaining the experience apply the knowledge (Steinkuehler, 2010).The traditional way of teaching involves ideas being presented in a theoretical manner without sufficient opportunities for students to engage in class activities such as problem solving, games, and lab experiments (Euler, 2011). Students have associated the feeling of success in school with fun because it motivates them. At the same time having fun during learning process varies based on the type of class activity (Sullivan, 1993). Using such activities make students feel skilled in mathematics and more confident in learning, and motivated to learn (Kloosterman & Gorman, 1990).

Technology has become an essential tool for teaching mathematics in today's world. It can be used in a variety of ways to enhance the learning process. The use of computers in teaching mathematics is becoming increasingly prevalent. Computers provide new ways to represent mathematical information and offer more choices in terms of learning content. Computer games as a choice to introduce new mathematical content, viewed as a strategy to motivate students and is proving to be successful in introducing new lessons (Koc, 2005).Researchers have found that using technology to introduce new ideas can help teachers build upon students' prior knowledge and skills, emphasize the connections among mathematical concepts, connect abstractions to real-world settings, and introduce more advanced ideas (Bransford, Brown, & Cocking, 1999). The new era of technology provides more opportunities to create a good learning environment to teach mathematics. Technology supports education by providing teachers and students with tools that create opportunities to enhance mathematics learning and by having more learning activities. On the other hand, the traditional way of teaching mathematics that focuses on teacher-centered learning still dominates in classrooms instruction (European Commission, 2007).Teaching mathematical using technology as a learning tool has specific standards such as: technology can facilitate mathematical problem solving and communication skills and it can provide students with opportunities to explore different presentations of mathematical ideas(NCTM,2000).Computers can be used to teach many mathematical topics, for example shapes that can be introduce to students by using computer environment that can generate multiple

representations of a shape to help students generalize their conceptual image of that shape in any size or orientation (Damarin, S. &Shelton, M., 1985).

Educational games promote learning and reduce the teaching time for new ideas or topics (Van Eck, 2006). It helps students improve their cognitive, social, and moral attitudes. It also helps students to be more creative and independent (Zavaleta andothers, 2005). This strategy can build valuable students skills such as strategic thinking, planning, communication, negotiating skills, and data-handling (Kirriemuir&Mcfarlane,2004).Games have been presented by many educators as a good learning tool that supports classroom instruction in mathematical learning (Gough, 1999). Mathematical games are an 'activity' that involve a challenge for students, have a set of rules to follow, have different choices, and have a set of cognitive objectives (Oldfield, 1992).

To maximize the benefits of using computer games, teachers must do the following: encourage competition. Target an important academic subject, provide opportunities for students to examine their improvements and enjoy playing (Robert, 2010).

Educational computer games motivate students to spend more time on a task to master the required skills. The literature reveals that the educational games design should include different elements, such as narrative context, rules, goals, rewards, and interactivity game design should have procedures to assess the students' progress and should be capable of accepting feedback (Dondlinger, 2007). Using educational computer games as an educational software method consider as an important tool in understanding new concepts, which make it easy and motivated to learn (Akpinar, 2005). It is a good learning method when it is built to incorporate with learning principles and goals(Gee,2005).For computer games to be more efficient in improving the learning process, the game must be "culturally" appropriate and content that understood by the students(Roach,2003).Educational computer games help students learn science by exploring chemical processes and simulating materials that are difficult to work with in real life (Ronan&Eliahu,2000). There are many educational benefits of using computer games in teaching such as: provide a meaningful learning situations, support students to build positive attitude such as providing opportunities for students, motivate students to learn, building a self-concept and developing positive attitudes towards mathematics, increase learning by adding more formal activities, creating more interaction between students, giving students opportunities to make self-assessments, and improving students problem solving skills Educational game is an interactive learning tasks for both school and home, it allow students to operate at different levels, an make students can work independently (Davies, 1995).

Computer games need to be sufficiently challenging by having different game levels to engage students in the learning process. These levels should be flexible, changing as students become more proficient in one level. Teachers should monitor students' use of these tools to make sure that they follow the structure and rules of the game. This is because students need guidance and opportunities to reflect on their work. Using educational games in the classroom is associated with the improvements in the student's achievements (Haystead & Marzano, 2009). Educational games that designed by using different multimedia tools are highly motivating and interactive with many user-controlled features. Computer games have different levels of difficulty. The importance of these levels is to create a challenge in the game suitable to a student's skill. It helps students by starting with a subset of skills and adding additional skills as the earlier previous skills are mastered (Rieber, 2005). Educational software divided into five types: tutorial, drill and practice, simulation, educational games, and hypermedia type (Ozman, 2004). There are different computer games to perform a specific mathematical task and train students to solve mathematical problems such as: Treasure Hunt, Puzzles, and Tic-Tac-Toe Board. Using a computer game to teach mathematics helped the educator to reinforce academic mathematic standards (Gee, 2003).

2. Research in Computer Game

In order to present the research problem, the researcher reviewed relevant research in the field of using computer mathematical games on teaching and learning process. Blazenka and Damir (2011) examined 27 works of research that looked into the impact of computer games on math educational they found that most research papers indicated a positive effect of using computer games to teach math. Computer games also

creates students positive attitude toward mathematical and it should be part teaching strategy of mathematical topics for all students' levels. Kim and Chang (2010) examined the effects of playing mathematical computer games on the achievement of 4th graders, focusing on gender and language minority groups. The study used the 2005 National Assessment of Educational Progress (NAEP), a nationally representative database from the USA. The study performed a regression analysis using more than 170,000 4th-grade students in the U.S... The study introduced three models for analysis: ELL- Model, Gender Model, and Interaction Model. The results showed that students who used computer mathematical games every day showed significantly lower achievement than those who never used mathematical game to learn math. On the other hand, male students who used computer games have positive effects on their achievements. Al-Mashaqbeh & Al Khawaldeh (2009) investigated the effects of traditional teaching instruction (TI) versus computer-assisted instruction (CAI) using educational software in an educational software design course. The findings of the study indicated that the students in the experimental group demonstrated better performance over the students in the control group.

Papastergios (2009) found in his research that teaching with computer games is more efficient in motivating students to learn and increase their knowledge. Cengiz (2009) studied the effect of using computer games to support traditional teaching strategies on students' teachers' achievements in chemistry and their attitude and motivation toward learning. The study found that teaching environments that were supported with computer games had a positive effect on students' achievements and attitude toward leaning.

Ke (2008) conducted a study during a mathematical summer camp. Students (4th and 5th graders) play educational mathematical computer games during camp activities. At the end of the camp period, their mathematical ability was tested. After the test, no significant effect on students' achievement was observed but students were very motivated using the process. Fengfeng (2008) examined the effect of using educational games on4th and 5th grade students' mathematical achievements. The findings of his study indicated that students develop a positive attitude toward using computer games to learn mathematics; however, no significant effect was observed on the students' performance. Chritakis, Ebel, Revara, and Zimmerman (2004) studied the purpose using educational games. They found that the use of the educational games is to support students learning by using these activities as a drill and practice format. The students either practice repetitive skills or rehearse memorized facts. Lee, Michaeland Soloway (2004) found that a mathematical computer game encouraged students to complete a greater number of problems at higher levels of difficulty. Students who use mathematiccal computer games solved nearly three times as many problems when compared to students using paper worksheets.

Salenand Zimmerman (2004) found on their research that elementary and secondary students used computer games. Female students used it for five hours a week. On the other hand, male students used computer games for thirteen hours a week. Laffey, Espinosa, Moore, and Lodree (2003) studied the effect of computer mathematical games on at-risk pre-school children and 1st-grade students. They found significant improvements in students' mathematical performances. Additionally, it was found that the students paid more attention as well. Rosas, Nussbaum, Cumsille, Marianov, Correa, and Flores.(2003) studied the effect of educational computer games on students' motivation to learn. They found that it had a positive effect on the motivation of 1st and2ndgrade students. Roschelle, Pea, Hoadley, Gordin, and Means(2000)studied the benefits of the using computer-based mathematical classrooms. Their findings indicate that computer-based mathematical classrooms support the learning process, and that it could also be useful in developing students' higher-order skills of critical thinking and analysis. Computer-based mathematical games can be used to improve students understand of core concepts in mathematics, science, and literaturey. This tool help student's build confidence in learning and it is a great tool for slower learners. Amory, Naicker, Vincent, and Adams (1999) studied different computer game types and the important elements that motivate students to play. They found that students were more motivated to play computer games with objectives that require higher-order thinking skills to improve their creative problem solving and decision-making skills.

Many works of research (Prinsky, 2001, Mitchel and Savill-Smith, 2004, Van Deventer and White, 2002, and BECTA, 2001) focused on the advantages of using computer games in teaching process. They found that there are many advantages such as: improving students' learning skills, motivating students to learn,

improving their cognitive ability, improving their problem-solving skills, and improving their collaboration skills

3. The purpose of the study

Educational games are highly motivating and engaging, and are effective in supporting learning.

Researchers have studied educational games to determine how they can effectively support learning. This research emphasizes that computer games can be used to support learning and to improve1st-gradestudents' performances in mathematics. The purpose of this study was to investigate the difference between using traditional teaching instruction (TTI) alone and using TTI supported by computer math game(CMG) softwareon1st-gradestudents' performance in mathematics. This study focuses on answering the following question:

- Is there a significant difference between the performances of the control group that used TTI and the experimental group that used TTI with CMG?

-Is the reasignificantdifferenceinstudents'achievementsoftheexperimentalgroupwho used traditional teaching instruction supported with CMG?

The following hypotheses were tested at 0.05 significance levels

1. There are significant differences($\alpha \leq 0.05$) in students' performances between the control group that used TTI and the experimental group that used TTI supported with CMG .

2. There are statistically significant differences ($\alpha \leq 0.05$) in students' performances (experimental group) that used TTI supported with CMG.

4. Method

This study is an experimental research design taken from pre-test and post-test group model. This is a two-group design, where one group is exposed to a treatment and the results are tested while a control group is not exposed to the treatment and similarly tested in order to compare the effects of treatment (Campbell and Stanley, 1963).

4.1 Sample

The present study was conducted in the second semester of the school year 2012-2013. The sample of the study consisted of 1st- grade students at an elementary school in Jordan. There was a total of 50 1st grade students in the study; 25 in the control group and 25 in the experimental group. The control group used only TTI and the experimental group used TTI supported with CMG. The experiment was conducted over a period of two months.

4.2 Instrumentation

We designed Computer mathematical Game Software(CMGS) and a performance test

4.2.1 Computer mathematical Game Software

When the EMGS was designed a several components were taken into consideration such as:

-The computer games were appropriate to meet 1st- grade students' learning needs

-A game manual was made available to assist the students.

-Different kinds of media were used to motivate students.

-The software included many different games to motivate students

-The feedback after each game was consistent and clear.

-It consists of games that focused on 1st-grade skills such as counting, additions, shapes, subtraction, and sequencing numbers.

4.2.2 The Achievement Test

The researchers used achievement performance test to measure the students' performance in mathematics. The test consisted of 25 questions. The pre-test was given to ensure that the skills of control group were similar to the experimental group.

To ensure the validity and the reliability of the performance test, a panel of five experienced mathematics teachers reviewed the test items and offered some suggestions to enhance the test validity. To assess the reliability of the test, a pilot study was implemented. A performance test was conducted once more after three weeks. The results were correlated using Pearson's formula and the score was 0.81 which indicated a good reliability.

4.3 Treatment

The researchers, with the support of the teachers, planned and conducted the study .CMGS was designed using different computer programs such as Flash, PowerPoint, Photoshop, and Autherware. It included different multimedia tools to support learning such as: pictures, video clips, animation, and sounds. The main objective of the software was to improve students' basic skills in mathematics such as: counting, additions, subtraction, shapes, and ordering numbers. The researchers designed the performance tests to evaluate students' performance. The research participants were chosen at random selection and divided into two groups: the control group used TTI and the experimental group that used TTI supported with CMG. The research process used the pre-test/post-test control group design. A pre-test was administered to the control group and to the experimental group. The control group was taught using the traditional way of teaching mathematics for 1st- grade students for two months. The experimental group was taught using traditional way of teaching mathematical with the support of CMG for two months. The students in the experimental group were instructed to use the CMGS three times a week at home or during their computer lab. A post-test was administered to the control group and to the experimental group. The data was analyzed to answer the research questions.

5. Results

The mean and standard deviation values for the pre-test scores for both groups in the performance test relistedinTable1.The analysis shows that thep-valuewaslessthan0.05for the Mann-Whitney Test and CI that was used for this study using the pre-test scores as a covariate. Statistically, no significant difference was found between the mean scores of the experimental group and the control group in their pre-test scores (p= 0.5936) as listed in Table 1.

Table 1. Means and Standard Deviations (SD) for Pre-test for Control and Experimental Group Scores (Pre-test)

Group	N	Mean	SD	Median	P-Value
Control Group	25	81.880	8.927	85.00	0.5936
Experimental Group	25	81.960	11.286	88.00	0.5936

The mean and standard deviation values for the post-test scores for the experimental group and the control group in the performance test are listed in Table 2. A pre-test/post-test control group design was used in the analysis of covariance. A Whitney Test and CI were used for this study. The independent variable was the treatment and the dependent variable was performance in mathematics. A statistically significant difference was found between the mean scores of the experimental group and the control groups in their post-test scores (p= 0.0101, $p < 0.05$).

Table 2. Means and Standard Deviations (SD) for Post-test Scores for Control and Experimental Group (Post-test)

Group	N	Mean	SD	Median	P-Value

Control Group	25	89.44	10.211	94	0.0101
Experimental Group	25	95.24	8.283	100	0.0101

The mean and standard deviation values for pre-test and post-test scores for the experimental group in the performance test are listed in Table 3. A Whitney Test and CI were used for this study. The independent variable was the treatment and the dependent variable was the performance in mathematics. A statistically significant difference was found between the mean scores of the pre-test and post-test of the experimental group ($p=0.0101$, $p > 0.05$).

Table 3. Means and Standard Deviations (SD) for Pre- test and Post-test Scores for Experimental Group

Group	**N**	**Mean**	**SD**	**Median**	**P-Value**
Pre-experimental	25	81.960	11.286	88	0.0000
Post-experimental	25	95.240	8.283	100	0.0000

These findings suggest that using TTI supported with CMG software to improve the performance of 1st-grade students in mathematics is effective. The CMG introduced a learning environment where students could find equal opportunities to practice mathematics and be given feedback on their progress.

6. Conclusion and Discussion

The purpose of this study was to investigate the difference between using TTI and using TTI supported with an educational mathematics game. CMG software was used to improve 1st-grade students' performance in mathematics.

A pre-test/post-test design was employed in this study to collect data. A pre-test was conducted to collect the data before applying the treatments to establish that both groups had similar skills in mathematics. The data was treated statistically. The following hypotheses were tested at 0.05 significance level or better in this descriptive study.

The following hypotheses were tested at 0.05 significance levels

1. There are significant differences ($\alpha \leq 0.05$) in students' performances between the control group that used TTI and the experimental group that used TTI supported with CMG.

2. There are statistically significant differences ($\alpha \leq 0.05$) in students' performances (experimental group) that used TTI supported with CMG.

The results of the study were:

-A statistically significant difference was found between the mean scores of the experimental group and the control groups in their pre-test scores ($p= 0.5936$),

-A statistically significant difference has been found between the mean scores of the experimental and control groups in their post test scores ($p= 0.0101$, $p < 0.05$),

-A statistically significant difference was found between the mean scores of the pre-test and post-test of the experimental group ($p=0.0101$, $p > 0.05$).

The study showed that the experiment group made significant progress in improving their mathematical skills. The significant difference in the performance can be attributed to the use of the computer game that motivated them and allowed them to practice. The results show that the CMG helped students enjoy mathematics on the computer and receive regular feedback on their performance. The use of the CMG as a supporting tool has been a positive addition to regular classroom mathematics. Kebritch & *et* other (2010) studied the effects of a computer game on students'mathematicalperformance.Theresultsindicatedsignificantimprovementin the performance of the experimental group when compared to the control group. Students who used computer game reported

greater motivation when compared to the ones who studied mathematics in the literature traditional way. The research findings are consistent with the finding of other studies such as: Fengfeng (2008), Cengiz (2009), and Blazenka and Damir (2011).

References

Akpinar, Y. (2005). *Computer Supported Applications in Education.* Turkey: Am Publishing, Ankara.

AL-Mashaqbeh, I.F., & AlKhawaldeh, S.(2009),"The Effects of Using Educational Software in the Computer-Assisted Instruction (CAI) Method to Increase Adult Learners' Achievement", *Malaysian Journal of Distance Education* 11(2), 87-97.

Amory, A., Naicker, K., Vincent, J., & Adams, C. (1999), "The use of computer games as an educational tool: Identification of appropriate game types and game elements", *British Journal of Educational Technology* 30(4),
311- 321.

BECTA, (2001). Computer games in education project. British Educational Communications and Technology. http://www.becta.org.uk/pagedocuments/research/cge/report.pdf.

Blazenka, D. &Damir, T.(2011), "The Impact of Game-Based Learning on the Achievement of Learning Goals and Motivation for Learning Mathematic-Literature Review *" Journal of Information and Organizational Sciences (JIOS)* 35(1), 15-30.

Bransford, J.D., Brown, A.L. & Cocking, R.R. (Eds) (1999).*How people learn: Brain, mind, experience and school*. Washington, DC: National Academy Press.

Campbell, DT., Stanley, J. C. (1963).*Experimental and Quasi-Experimental Designs for Research.* Chicago: Rand McNally & Company.

Cengiz, T.(2009,"Effect of the computer based game on pre-service teachers' achievements, attitudes, meta-cognition and motivation in chemistry", *Scientific Research and Essay* 4 (8), 780-790.

Chritakis, D., Ebel, B., Revara, F. & Zimmerman, F. (2004), " Television, Video, and computer game usage in children under 11 years of age "*The Journal of Pediatrics* 145(5), 652-656.

Damarin,S .& Shelton,M.(1985),"Geometry, Spatial Development and Computers: Young Children and Triangle Concept Development " Proceedings of the Seventh Annual Meeting of the North American Branch of the (International Group for the Psychology of Mathematics Education) Conference, Ohio State University, Columbus, OH.

Davies, B. (1995), "The role of games in mathematics", Square *One* 5(2).

Denis,G.,&Jouvelot,P.(2005),"Motivation-DrivenEducationalGameDesign:ApplyingBestPracticesto MusicEducation",ProceedingsoftheACMSIGCHIInternationalConference,AdvancesinComputer Entertainment Technology, Valencia, Spain.

Dondlinger, M. J., (2007), "Educational Video Game Design: A Review of the Literature", Journal of Applied Educational Technology4(1), 21-31.

Education Now. (2012). A renewed Pedagogy for the Future of Europe: Report of ICICTE,Proceedings: the High-Level Group on Science Education. Brussels. http://ec.europa.eu/research/science society/documentlibrary/pdf_06/ report-rocard-on-science-education_en.pdf.

Euler.(2011).The PRIMAS project: Promoting inquiry-based learning (IBL in mathematics and science education across Europe. http://www.primasproject.eu/servlet.

European Commission, Directorate -General for Research (2007). Science

Education Now.(2012). A renewed Pedagogy for the Future of Europe: Report of ICICTE, Proceedings 464 the High-Level Group on Science Education. Brussels. http://ec.europa.eu/research/sciencesociety/ document_library/pdf_06/ report-rocard-on-science-education_en.pdf .

Fengfeng,K.(2008),"A Case Study of computer gaming for math: Engaged learning from game play?",
Computer & Eucation, 51, 1609-1620.

Gee,J.P.(2005).Why are video games good for learning? www.academiccolab.org/resources/documents/ MacArthur.pdf

Gee,J.P.(2003).*What Video Games Have to Teach us About Learning and Literacy.* New York: Palgrave Macmillan.

Gough, J.(1999),"Playing mathematical games: When is a game not a game?",*Australian Primary*
Mathematics Classroom 4(2), 12-15.

Haystead, M.W., Marzano,R. J. (2009).*Meta-Analytic Synthesis of Studies Conducted at Marzano Research*
Laboratory on Instructional Strategies. CO : Englewood, Marzano Research Laboratory.

Kebritchi,M.,Hirumi,A.,&Bai,H.(2010),"The effects of modern mathematics computer games on mathematics achievement and class motivation", *Computers & Education* 55(2), 427-443.

Ke, F. (2008). "A case study of computer gaming for math: Engaged learning from game play?", *Computers & Education*51(4), 1609-1620.

Kim, S., & Chang, M. (2010), "Computer Games for the mathematical Achievement of Diverse Students", *Educational Technology & Society*13 (3), 224–232.

Kirriemuir, J., & Mcfarlane, A. (2004). Literature Review in Games and Learning. http://hal.archivesouvertes. fr/docs/00/19/04/53/PDF/kirriemuir-j-2004-r8.pdf .

Kloosterman, P. & Gorman, J. (1990), "Building motivation in the elementary mathematics classroom", School *Science and Mathematics* 90(5), 375-382.

Koç,M.(2005),"ImplicationsofLearningTheoriesforEffectiveTechnologyIntegrationandPre-service

Teacher Training ",*A Critical Journal of Turkish Science Education* 2(1), 1-17.

Laffey, J. M., Espinosa, L., Moore, J. & Lodree, A. (2003), "Supporting learning and behavior of at-risk young children: computer in urban education " *Research on technology in education*35(4), 423-440.

Lee, J., Luchini, K., Michael, B., Norris, C., & Soloway, E. (2004), "More Than Just Fun and Games: Assessing theValue of Educational Video Games in the Classroom ",Proceedings of the CHI'04 Extended Abstracts, Human Factors in Computing Systems, Vienna, Austria.

Marzano, R.(2010),"The Art and Science of Teaching/ Using Games to Enhance Student Achievement EL EducationalLeadership",*MeetingStudentsWhereTheyAre*67(5),71-72

Mitchel, A., Savill-Smith, C. (2004).*The use of computer and video games for learning: A review of literature.*

London: Learning and Skills Development Agency.

NCTM: National Council of Teachers of Mathematics. (2000). *Principles and standards for school mathematics.* VA: Reston, NCTM.

Oldfield, B.(1992),"Games in the learning of mathematics,Part5:Games for reinforcement of Skills",

Mathematics in School, 21(1), 7-13.

Ozman,H.(2004),"Learning theories in science instruction and technology-assisted constructivist learning". *The Turkish Online Journal of educational Technology (TOJET)* 3(1)

Papastergiou, M., (2009), " Digital Game-Based Learning in high school computer science education: Impact on educational effectiveness and students' motivation", *Computers & Education* 52(1), 1-12.

Prinsky.M.(2001).Fun, play and games: what makes games engaging. From digital game-based learning. http://www.marcprensky.com/writing/Prensky%20-20Digital%Game-based%20Learning-Ch5.pdf>(28.04.

Rieber, L.Multimedia learningin games,simulations,and micro worlds.In R.E.Mayer(Ed.),(2005). *The*

Cambridge Handbook of Multimedia Learning. New York:Cambridge University Press.

Roach,R.,(2003), "Research schools work to improve classroom use of computer games ",*Black Issue in Higher Education* 21(20), 42-53.

Ronen,M.&Eliahu,M.(2000),"Simulation—a bridge between theory and reality: The case of electric circuits",*Journal of Computer Assisted Learning* 16 (1), 14-26

Rosas, R., Nussbaum, M., Cumsille, P., Marianov, V., Correa, M., Flores, P., et al. (2003), "Beyond Nintendo: design and assessment of educational video games for first and second grade students ",*Computers & Education*, 40(1), 71-94

Roschelle, M, J., Pea, D. R.,Hoadley,C., Gordin, D., A. & Means, B. (2000), "Changing How and What Children Learn in School with Computer-Based Technologies", *The Future Of Children Children And Computer Technology*10(2), 76-101.

Salen, K., & Zimmerman, E. (2004).*Rules of Play – Game Design Fundamentals*. London: MIT Press. Steinkuehler, C. (2010), " Video Game and Digital Literacies".*Journal of Adolecent& Adult Literacy*,54(1) 61-63.

VanEck,R.(2006),"Digital Game-Based Learning: It's Not Just the Digital Natives Who Are Restless",

Educause Review 14(2), 16-30.

VanDeventer, SS. & White, JA. (2002), " Expert behavior in children's video game play ",*Simul Gaming* 33(1). 28-48.

Zalvaleta, J, Costa, M., Gouvea MT, Lima C (2005), " Computer Games as a Teaching Strategy", Proceeding of the Fifth IEEE International Conference, Advanced Learning Technologies (ICALT05),Washington, DC, USA, ISBN:0-7695-2338-2