

The Effect of Math and Chess Integrated Instruction on Math Scores

By Ho Math and Chess

Dated: Jul 07, 2008

This study examined the effect on pupils' math scores when a truly integrated math and chess workbook was used as an instructional practice workbook. The results show that the integrated math and chess workbook significantly increased math scores.

The Effect of Math and Chess Integrated Instruction on Math Scores

John BUKY, Education Consultant

Frank HO, Canada certified math teacher

This article is published by The Chess Academy, Chicago, USA, June 2008

Research studies have shown that chess can be used as an effective game-based teaching method. However, all the past studies used chess as a separate instructional tool. There were no math contents in chess instruction provided and there was no math and chess integrated workbook used. This study examined the effect on pupils' math scores when a truly integrated math and chess workbook was used as an instructional practice workbook. The results show that the integrated math and chess workbook significantly increased pupils' math scores between pre-tests and post-tests among grade 1 to grade 8 pupils.

Key Words: math and chess; math and chess instruction, math and chess integrated workbook; math and chess integrated workbook; mathematics scores of the students

Introduction

Research papers have demonstrated that chess instruction improves analytical reasoning, problem solving skills, and academic achievement (Chrisiaen & Verholfstadt (1978); Frank & D'Hondt (1979); Smith & Cage (2000)). Research conducted by Gaudreau (1992) shows no significant differences among the groups on basic calculations. These research studies point to the direction that chess has strong effect on improving children's cognitive ability than their arithmetic computation ability. By teaching math and chess as two separate subjects, children do not have opportunities to work on basic arithmetic operations using acquired chess knowledge, this may explain why by playing chess, it may not statistically significant improve children's basic arithmetic computation ability.

How to maximize the benefits of chess instruction in such a way that not only chess benefits children's cognitive development, but also their computation ability? All the past chess instruction research studies have used chess instruction as an independent teaching tool and it is not truly integrated with math instruction. The author Frank Ho created a math and chess integrated workbook. The theoretical basis of how math and chess are integrated has been published by Ho (2006). We believe that with the creation of truly integrated math and chess workbooks, pupils will be able to increase their computation ability by working on these math and chess integrated workbooks. This is particularly important for those children who have no interest in playing chess, but they could still get benefit of chess instruction by working on math and chess integrated workbooks.

No research has been done before on the effects of using math and chess integrated workbook, this study will compare the effect of pupils' math computation ability before using the math and chess integrated

workbook and after using it to see if there is a significant difference.

Method

One hundred and nineteen pupils, in grade 1 to grade 8, from five public elementary schools in Chicago, Illinois, USA, participated in the after-school program for 120 minutes, twice a week, for a total of 60 hours of instruction. None of the students has possessed any substantial knowledge in chess. The study began by administering pre-tests in the first week of this study at the beginning of the program on 10/23/06 and a post-test was conducted at the end of the program on 3/28/07. Tests of TONF (The Compass Learning Explorer Online Diagnostic Tool was used for both the pre-test and post-test. The Compass Learning Explorer Assessment meets the requirements as a true valid and reliable criterion-referenced assessment tool.) were given to all pupils for both tests. Each lesson consisted of lecturing, practice on math and chess integrated worksheets and chess playing.

Results

Paired t test was used to analyze the data. The results of this study shows significantly different on their math scores for all grade 1 to grade 8 pupils between pre-test and post-test at level of p is less than 0.01.

	Group One	Group Two
Mean	36.46	55.45
SD	15.82	19.37
SEM	1.45	1.78
N	119	119
t =	12.8729	

Discussion

The results of this study demonstrate that a truly integrated math and chess workbook can help significantly improve pupil's math scores. Our observations show that the effect of using a truly integrated math and chess workbook also provides mental entertainment and thought by pupils as more fun than traditional computation practices. Pupils were able to sit longer when working on math and chess integrated workbook than working on traditional computation worksheets.

The result of this research is particularly interesting for children who do not have a high interest in playing chess since the math and chess integrated workbook involves visualization, analyzing, spatial relation and data processing, these types of problems provide high order cognitive skills. Without spending substantial time on playing chess, we believe that children can get the similar benefits of playing chess on cognitive effects by working on math and chess integrated workbooks. This may require further study.

Why children like to work on math and chess integrated workbook than on the traditional computation worksheets? Math and chess integrated work has visual images, chess symbols, directions, spatial relation, and tables; all these are stimuli to kids and keep their interests high while working on computation problems. This also gives children ample opportunities to think visually. Most of the time, the computation questions themselves are not written for children to work on immediately but for children to "create" themselves and these questions have to be actually "mapped" out by following directions and children love them. Children learn best while having fun.

References

Chrisiaen & Verholfstadt, (1978) “Chess and cognitive development”, Nederlandse Tydschrift voor de Psychology en haar Grensbebieden 36, 561-582.

Frank & D’Hondt, (1979) “Aptitudes and learning chess in Zaire”, Psychopathologie Africane, 15, 81-98.

Gaudreau (1992), “Etude Comparative sur les Apprentissages en Mathematiques 5e Annee”, June manuscript

Ho (2006), “Enriching math using chess”, Journal of the British Columbia Association of Mathematics Teachers, British Columbia, Canada, Vector, Volume 47, Issue 2.

Smith & Cage (2000), “The effects of chess instruction on the mathematics achievement of Southern, rural, Black secondary students”, Research in the S

Category	Education
Tags	math and chess, math tutor, chess tutor
Email	Click to email author
Country	Canada