

# Use of Board and Card Games to Increase Academic and Social Achievement; Emphasis - Mathematics

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**Board and card games are vital, life affecting learning tools.** As cited by Trumbull, (1986) “The preparation for the future can be seen in every game.” (Adler, 1927). Playing games and the importance of play is preparation for life (Karl Gross, 1901) and that games are like mathematical models representing reality (Brunner, 1966). According to Bishop (1991), playing games is considered one of six culturally universal mathematic activities because games are high in mathematical content (as cited by Schaelling, 1998). Playing them is a vital human activity since they build community and make enhancing skills, intellect, and problem solving fun (Schaelling, 1998).

**Board and card games are effective curriculum tools that can help students master number sense skills such as 0-9 multiplication facts.** The use of games is one principal activity in how to teach number sense (Griffin, 2004). Board and card games meet several National Council for Teachers of Mathematics standards such as number and number relationships (Leonard & Tracy, 1993). Games provide social and mathematical development and, through repeated play, students share and develop mathematical calculation strategies (Hildebrandt, 1998). Although many games are effective, there is no guarantee that every game will be effective (Bright, Harvey, & Wheeler, 1985a). After conducting 11 different studies using games for pre, co, and post-instruction, the authors reported that games can be effective for more than drill and practice and the learning of low level skills and concepts, and that higher level content can be taught with games in combination with other methods of instruction (Bright, Harvey, & Wheeler, 1985a). Maintaining multiplication skills in basic facts can be effectively treated with games (Bright & Harvey, 1985b). Bright and Harvey (1985a) summarize findings from their previous research (1979, 1980) that mathematics games can assist students in retaining, developing, and improving basic math skills and that games are especially useful at the start of the school year to help students retain basic skills learned from the previous academic school year (Bright & Harvey, 1985a). In one study of instructing students in basic multiplication facts, the author concluded that drill and games are equally effective and both methods should be used (Koran & McLaughlin, 1990).

**The use of board and card games has resulted in increased student achievement.** Although it is not claimed that the game treatment is more effective than a nongame treatment, there was a 196% increase between hundred item, 5 minute multiplication fact pre and post test scores in the number of students who scored at least 90% on the posttest (Bright & Harvey, 1985b). In another study, student multiplication basic fact skills were retrained using games at the beginning of the school year for 15 minutes a day for 7 days and resulted in a 56% average improvement on 5 minute, 100 item fact tests (Bright, Harvey, & Wheeler, 1985b). The IQ of Fiji children who played games for twenty to thirty minutes per day over a 6 to 8 week period rose an average of nineteen points (Trumbull, 1986). The largest gains in a study of 5-year-olds and 7-year-olds that played games such as *Uno*, *24*, and *Dominoes*, were in the areas of enumeration, rote counting, number sequence, and number pattern recognition (Peters, 1998). In 2000, all fourth and fifth grade students at Patrick Henry Elementary were given a bingo style game, *Take It Easy*, to take home to improve their computational skills and 70% of the 2001-02 fifth graders passed the math portion of the Virginia standards test, up 29% from the previous year (Pearlman, 2004). According to a 1997 research study, students participating in a program of computer and traditional game playing after school program scored eight points higher in math and reading on a state proficiency exam than their nonparticipating counterparts (Rich, 2004).

**Board and card games can motivate students to participate in the learning and understanding of mathematics.** “Mathematical games can foster mathematical communication as students explain and justify their moves to one another. In addition, games can motivate students and engage them in thinking about and applying concepts and skills.” (National Council of Teachers of Mathematics, 2000-2004, webpage). Games motivate students who can effectively practice math skills (Lamb & McBride, 1991). The use of games can make the learning and retention of basic facts more interesting and less repetitive than essential drill and practice (Meyer & Riley, 1986). Sammie Myers, cofounder of a group that teaches young kids and adolescents mathematics through games, reported that young people will keep doing what is fun and that she uses games to grab their attention (Kirkland, 2002).

**Students have indicated that they like using board and card games to learn mathematics such as multiplication facts.** In a study using a combined drill and game multiplication fact intervention strategy, teachers reported that children were more motivated to play the game intervention and, on a day of choice, none of the students chose the drill activity (Koran & McLaughlin, 1990). In a study of 31 third and fourth grade students, students indicated that the playing of multiplication games was one of the things they most liked to do in class (Fleith, 2000). By playing mathematical games, everyone enjoyed and learned the multiplication combinations (Anderson & Kamii, 2003). Games were popular with children in the mathematical intervention study (Peters, 1998). Teachers were surprised at the enthusiasm and delight children exhibited when playing their invented games (Hildebrandt, 1998).

**Teachers and staff have indicated satisfactory results in the use of board and card games with their students.** Games were popular in the mathematical intervention study because teachers felt they provided motivation for low achieving students (Peters, 1998). As a vehicle for teaching mathematics, board games stimulate learning through competition and creativity (Caldwell, 1998).

**The use of games involving parents to teach mathematics to students is an underutilized source** (Tregaskis, 1991). Two authors recommend the use of games at home and in the classroom to maximize student mathematical self confidence, problem solving, communicating, and reasoning skills (Leonard & Tracy, 1993). Based on interviews of parents and analysis of other studies, Griffin and Case, research professors on helping disadvantaged children with mathematics, suspect that a lack of board games in lower income homes may explain why children of low income households lagged 2 to 3 years behind their middle class counterparts (Viadero, 1994). Mathematics instruction games can help meet the concerns of educators and parents that students enjoy and be motivated to develop and retain the cognitive skills in mathematics necessary for success in later life (Bright, Harvey, & Wheeler, 1985a). Games help families, students, and teachers make real life, positive connections with math concepts (Leonard & Tracy, 1993). Family members expressed surprise to learn that many commercial games have high math value, which also can be used by teachers to promote home school partnerships (Leonard & Tracy, 1993).

**To support home school partnerships, families and schools should use games on a daily learning basis to motivate and educate** (Leonard & Tracy, 1993). In one project (Tregaskis, 1991), to help relieve classroom time constraints, parents were given games to take home as homework to help their children understand what they were learning in math class, to either practice number combinations and develop quick recall of facts or learn basic math concepts. High interest and dedication were shown throughout the project and after the project, with parents and children reporting that they liked the games (1991). Parents indicated a gain in confidence as teachers and indicated that their children gained confidence in their own mathematical ability (1991). In another example, to help students attain math skills, make math connections to everyday life, and problem solve in a fun and positive environment, a family math night was held with 45 fourth graders who participated in playing math related games with their parents (Acri & Hall, 1995). In Japan, teachers provide developmental multiplication experiences in the classroom with the expectations that children practice multiplication facts with their parents at home (Reys E. & Reys J., 1995).

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