

## Chess as an Educational Tool in Classrooms and Schools

Chess has been touted for centuries as a way of educating the mind in preparation for life. The same is true today: Googling “Chess in Education” results in 998,000 hits.

Interest in chess as an educational tool began in 1779, when Benjamin Franklin wrote:

The Game of Chess is not merely an idle amusement; several very valuable qualities of the mind, useful in the course of human life, are to be acquired and strengthened by it, so as to become habits ready on all occasions, for life is a kind of Chess, in which we have often points to gain, and competitors or adversaries to contend with, and in which there is a vast variety of good and ill events that are, in some degree, the effect of prudence, or the want of it. By playing at Chess, then, we may learn foresight, circumspection and caution. <sup>i</sup>

What researchers are finding

Franklin’s words have turned out to be prophetic, as educators and researchers across the country are proving that playing chess raises standardized mathematics and reading test scores and improves students’ self-esteem and social skills. Over the past 40 years, study after study has shown that chess improves academic performance.

In a study he conducted in Zaire in 1973-1974, Albert Frank found that good, teenage (16 to 18-year-old) chess players had “strong spatial, numerical, administrative-directional, and paperwork abilities.” <sup>ii</sup>

A 1990-1992 study in New Brunswick, Canada, demonstrated the value of chess in developing problem-solving skills. By integrating chess into the traditional mathematics curriculum, teachers were able to significantly raise the problem-solving skills of their students. Primary school chess hence exploded in New Brunswick. In 1989, a total of 120 students played in provincial school chess championships. Three years later, more than 19,000 played in that same championship. <sup>iii</sup>

Between 1979 and 1983, Robert Ferguson analyzed the impact of chess on students’ thinking skills in the Bradford Area School District in Pennsylvania. Ferguson found that after spending 60-64 hours playing and studying chess over 32 weeks, students showed significant progress in critical thinking. He concluded that chess is superior to

many currently used programs for developing creative thinking and therefore could logically be included in a differentiated program for gifted students. <sup>iv</sup>

Chess has been shown to raise standardized test scores. Using the Wechsler Intelligence Scale for children, a Venezuelan study found that learning to play chess significantly increased the IQ scores of a group of 4,000 second-grade students. The results were so dramatic that during 1988-'89 school year, the Venezuelan government introduced chess lessons to all students. <sup>v</sup>

In 1997, James M. Liptrap, chess sponsor at Klein High School in Spring, Texas, conducted a study of non-honors-track students in reading and mathematics. According to his results, chess-playing students made twice as much improvement as non-chess playing students in reading and mathematics, as measured by the Texas Learning Index. In fifth grade, regular-track chess players scored 4.3 TLI points higher in reading ( $p < .01$ ) and 6.4 TLI points higher in math ( $p < .00001$ ) than their non-chess-playing peers. <sup>vi</sup>

Ten years later, 75 students who took part in a tutoring program provided to the Chicago Public School by Chess Academy demonstrated a 26 percent gain in reading and a 24 percent gain in mathematics, as measured by standardized tests. <sup>vii</sup>

Stuart Margulies reports on a two-year effort to use chess to increase the standardized reading test scores of students in District 9 of the New York City Public Schools. Margulies found that the percentile scores of District 9's chess-playing students went up an average 5.4 points, with students of average ability demonstrating the biggest increases. Teachers reported that as students became more competent in chess their ego strength grew, and because they felt better about themselves, they learned to read better. <sup>viii</sup>

Margulies spells out three additional theories on why chess improves reading. He notes that chess masters believe that playing chess develops general intelligence, self-control, analytical skill, and an increased ability to concentrate. It also gives high achievers a chance to work together, acting as a type of Gifted and Talented program. Lastly, the same skills and cognitive processes required to play chess are also required for reading.

Margulies sums up these arguments with an analysis of the complex task of both reading and playing chess. When reading, students use lower-level thinking processes to recognize words, and higher-level processes to extract meaning from those words within the context of a story. When playing chess, students must first recognize the pieces and then make strategic decisions about where to move them. <sup>ix</sup>

In her article, "Chess as a Way to Teach Thinking," Dianne Horgan makes a strong argument for using chess as a tool in the classroom. Writes Horgan, "Among the

presumed educational benefits are improved concentration and mental discipline, better skills in planning, and appreciation of the consequences of actions.”<sup>x</sup>

Chess educators have argued that chess is beneficial not just for the intellectually gifted, but also for learning disabled and hyperactive children. Among chess educators and parents, countless case studies attest to the educational benefits of chess for such students. Horgan takes note of a study by Johan Christianen, who worked for two years in Belgium with learning disabled and hyperactive fifth graders. During that time, one group of students studied chess after school, one day a week. The results of the study: the chess-playing students performed better on Piagetian tasks and standardized tests, and significantly better on school tasks, than their peers in a control group.<sup>xi</sup>

Horgan explains that pre-adolescents play chess differently than adults. They have less developed knowledge bases and make decisions based on intuition rather than on the outcome of previously played games. They also engage in “satisficing,” settling on a solution that seems satisfying to them and therefore requires no need to search further. This does not always result in the best move, but is a useful and efficient heuristic.

One of the strongest arguments in favor of using chess as an educational tool is that it provides immediate feedback, which in turn expedites learning. Students also learn higher-order thinking skills when they use chess notation to immediately analyze their games. According to Horgan:

Children [who play chess] may be less defensive about their errors and able to learn more from experience. Foreign language teachers often report that children are less intimidated and more willing to risk sounding “funny.” Children, because they are in a constant learning mode, may learn more from feedback than adults. At any rate, chess offers unusual and multiple opportunities to process feedback. In tournaments, players write down all their moves. They then replay their games with coaches or other players, trying rejected alternatives and testing what the outcome might have been. This multi-level feedback and evaluation benefits all learners and is far superior to simply knowing whether one won or lost. Because children’s schemas are naturally fluid and open to modification children may be able to learn faster as a result of high quality feedback.<sup>12</sup>

Horgan concludes that teaching children to think logically, plan ahead, and make sound decisions is difficult, but possible. She believes “learning these skills early in life can only benefit later intellectual development.”<sup>13</sup>

She further contends that such an approach helps children achieve Piaget's highest formative operations of thought. The process involves moving through four periods: sensor motor (infancy, a time of mostly reflexive behavior), pre-operational (toddlerhood and early childhood, when egocentric thinking predominates), concrete operational (elementary and early adolescence, when intelligence is demonstrated through logical and systematic manipulation of symbols related to concrete objects); and formal operational (late adolescence and adulthood, when intelligence is demonstrated through the logical use of symbols related to abstract concepts). According to William Huitt and John Hummel, early in this last period there is often a return to egocentric thought. Furthermore, only 35% of high school graduates in industrialized countries obtain formal operations; many people do not think formally during adulthood. <sup>14</sup>

What educators are saying

There is much anecdotal evidence to support using chess as an educational tool in the classroom. According to psychologist Howard Gardner, who wrote the book *Frames of Mind* and formulated the theory of multiple intelligences, "Skill in chess probably depends on logical, mathematical, and spatial intelligence; and since it is a competitive game, interpersonal intelligence is probably important as well." <sup>15</sup>

The late Ollie LaFreniere, former statewide coordinator of the Washington Chess Federation, believed educators were beginning to see that chess was a powerful teaching tool. Jerome Fishman, a guidance counselor in Queens, New York, is one of those educators. Says Fishman, in an article on the New York City Chess program:

I like the aspect of socialization. You get into a friendly, competitive activity where no one gets hurt. Instead of two bodies slamming into each other like football, you have the meeting of two minds. Aside from developing cognitive skills, chess develops their social skills. It makes them feel they belong. Whenever we get a child transferred from another school who may have maladaptive behavior, we suggest chess as a way of helping him find his niche. The kids become better friends when after the game they analyze possible combinations ... we have kids literally lining up in front of the school at 6:45 a.m. to get a little chess in before class. <sup>16</sup>

Adds teacher Jo Bruno, of Brooklyn, New York:

In chess tournaments the child gets the opportunity of seeing more variety and diversity. There are kids who have more money than they have, but chess is a common

denominator. They are all equal on the chessboard. I believe it is connected academically and to the intellectual development of children. I [now] see the kids able to attend to something for more than an hour and a half. I am stunned. [Previously,] some of them could not attend to things [in the classroom] for more than 20 minutes.<sup>17</sup>

Bruno brings up the important point that chess can help students learn to concentrate on a single task for long periods of time. Why is this? The author believes that many adolescents find chess fun and exciting, which explains their ability to play for long periods of time without distraction.

A teacher working at a Montessori school in Virginia says chess instruction meshes well with her school's emphasis on abstract principles, and believes it will increase growth in competitive math and strategic planning activities.

Educators at the Roberto Clemente School in New York report that chess has improved not only academic scores, but social performances as well. "The effects have been remarkable," says assistant principal Joyce Brown. "Not only have the reading and math skills of children soared; their ability to socialize has increased substantially, too. Our studies have shown that incidents of suspension and outside altercation have decreased by at least 60% since these children became interested in chess."<sup>18</sup>

Connie Wingate, principal of PS 123 in New York, says of a New York City Schools chess program:

This is wonderful! This is marvelous! This is stupendous! It is the finest thing that ever happened to this school...Children are trying, through chess, to apply themselves and do something to better themselves. And that filters into the entire school and community. More than anything else, chess makes a difference...what it has done for these children is simply beyond anything that I can describe. The highest-scoring student in our school is a member of the chess team. Academically, they are all doing better in class, and it's in no small part because of chess. Just how they feel about themselves, their self-esteem, makes them all winners.<sup>19</sup>

"Chess is perhaps the world's best-kept secret in terms of how to improve a kid academically and provide a lifelong pursuit," says Aremin Hacobian, executive director of the International Academy of Chess in Boston, Massachusetts. Hacobian insists that childhood is the best time to learn chess. "The capacity of kids to learn this game far

exceeds that of any adult,” he says. “It’s like learning a foreign language. A five- or six-year-old kid is open to anything, far more willing to absorb the endless possibilities that the world affords.”<sup>20</sup>

Recently I had a conversation with the Wendy Miller, the mother of three daughters who attended Clara Mohammed School in Milwaukee, the site of a chess club and teacher provided by the Wisconsin Scholastic Chess Federation (WSCF). Miller said that after joining the club, studying chess, and participating in several chess tournaments, her daughters – who had struggled with math – began earning A’s and B’s in the subject.

### Chess by the numbers

Chess has been taught as part of the regular school curriculum in 30 countries; in Russia, it has been part of the curriculum for 40 years. Chess continues to grow in popularity in the United States. Last year, according to program officials, 20,000 students in New York City took part in the Chess-In-The-Schools program. A total of 400,000 have participated since the program began 22 years ago.

In 2006, a total of 10,000 students took part in America’s Foundation for Chess’ “First Move” program, according to program officials. Next year, that number will grow to 60,000, and in 2010, to more than 100,000. The US Chess Federation has about 80,000 members, about half of whom are school-aged children.

### Math and reading scores

Worldwide, there are 29 countries whose students score higher on standardized math tests than those in the United States. While it is difficult to rank the states in reading and math scores, Wisconsin is one of seven states that failed to reach any of the American Federation of Teachers’ standards in the major subjects.<sup>21</sup>

Wisconsin uses the Wisconsin Knowledge Concepts Exam (WKCE) to assess student progress. According to 2008-’09 results, 80% of the state’s third graders scored at the proficient or advanced level in reading. Statewide, 78% of fourth-grade students scored at the proficient or advanced level in math. A total of 85% and 83% of Caucasians scored at the proficient or advanced level in reading and math, respectively. For Hispanics, the results were 61% and 59%; for African Americans, 55% and 45%.<sup>22</sup>

As can be seen from the following chart, reading and math scores in eight Wisconsin cities are – with one exception – below the state average.

Percent of students scoring at the proficient or advanced level on the 2008-’09 Wisconsin Knowledge Concepts Exam (WKCE)

| City      | 3rd Grade<br>State<br>Average<br>Reading | City<br>Score | Percent<br>Change | 4th Grade<br>State<br>Average<br>Math | City<br>Score | Percent<br>Change |
|-----------|--|---------------|-------------------|---------------------------------------|---------------|-------------------|
| Beloit    | 80%                                      | 68.5%         | -11.5%            | 78%                                   | 61%           | -17%              |
| Green Bay | 80%                                      | 70.5%         | -9.5%             | 78%                                   | 73%           | -5%               |
| Kenosha   | 80%                                      | 75.7%         | -4.3%             | 78%                                   | 77%           | -1%               |
| Madison   | 80%                                      | 73.7%         | -6.3%             | 78%                                   | 73%           | -5%               |
| Milwaukee | 80%                                      | 60.4%         | -19.6%            | 78%                                   | 52%           | -26%              |
| Racine    | 80%                                      | 66.8%         | -13.2%            | 78%                                   | 60%           | -18%              |
| Sheboygan | 80%                                      | 78.4%         | -1.6%             | 78%                                   | 81%           | +3%               |
| Wausau    | 80%                                      | 78.7%         | -1.3%             | 78%                                   | 76%           | -2%               |

## Communities of learning

Dale A. Blythe and Nancy Leffert contend that “learning is best facilitated by building a community of learning.”<sup>23</sup> This concept is pervasive in our culture today in the forms of universities, public school districts, private schools, charter schools, youth baseball and soccer leagues, churches, synagogues, and mosques to name just a few. According to Blythe and Leffert, such communities serve as a context for adolescent development.

Communities of learning have also developed around chess, both for adults and at the scholastic level. Scholastic chess communities can take several forms, ranging from informal, after-school clubs where a few parents or teachers pass out some chess sets and let children play, to highly organized clubs featuring more parent involvement, formal instruction, competition among students, organized rewards for students, and advancement in chess schools. Still other chess communities exist within the structure of an organization such as a Boys & Girls Club. (Academic chess growth is usually slower in these environments.)

Scholastic chess communities can also flourish in second- and third-grade classrooms where teachers have adopted the “First Move” chess curriculum. Or in a school where every student is taught chess for an hour or two per week. It is this model of a scholastic chess community that has the greatest potential for improving reading and math achievement.

Complimenting all of these communities of learning are local, state, and national competitions in which students can participate; chess camps; and private chess lessons.

## The role of the Wisconsin Scholastic Chess Federation

The Wisconsin Scholastic Chess Federation (WSCF) is an umbrella organization dedicated to supporting chess communities throughout the state in the areas of: communication, competitions, ratings, scholarships, tournaments, and start-up grants. A major goal of WSCF is to raise the funds and organize the volunteers necessary to increase the number of schools that include chess instruction in their curricula.

The research clearly proves that chess is a powerful tool that can be used to help students in many areas of their development – first and foremost, in reading, math, and problem solving. It has the potential to have a profound effect on the education of thousands of students in Wisconsin, particularly those attending low-achieving schools located in both urban and rural areas. Beyond that, chess can be used to improve the quality of life for every student in Wisconsin. It can become part of the culture, just like baseball, soccer, or football. Consider, for example, the following story, which could become the story of many Wisconsin students.

Circa 1987, Bill Hall began teaching in East Harlem, New York, where he found students who were disengaged, academically behind, and clueless about their future. He showed them a chessboard and invited them to come in after school to play. That day, a couple of students showed up. Over time, the number grew. And with each new student, Hall would begin with the first lesson: “controlling the center.” Hall’s students went on to win local tournaments, play in New York’s state chess tournament, and travel to Moscow to compete against some of Russia’s best students. As time went on, Hall found it incredible how much his students had changed. Not only had they become excellent chess players; now they were talking about going to college.

One young student named Pagan had been documenting the group’s trips in a journal, and Hall remarked that perhaps one day Pagan would write a book about growing up in East Harlem playing chess. Replied Pagan, “Yes, chess has been good to us. But if I write a book it won’t be dedicated to chess. It will be dedicated to the teacher who taught us about the importance of controlling the center – and that center is really ourselves!”<sup>24</sup>

We have the opportunity to teach thousands of Wisconsin students how to control their centers.

<sup>i</sup> Franklin, Benjamin, 1779, "On the Morals of Chess."

<sup>ii</sup> Frank, Albert, 1974, "Chess and Aptitudes," doctoral dissertation, Trans. Stanley Epstein.

<sup>iii</sup> Gaudreau, Louise, 1992, "Étude Comparative sur les Apprentissages en Mathématiques 5e Année."

<sup>iv</sup> Ferguson, Robert, 1995, "Chess in Education Research Summary," p 4-6.

<sup>v</sup> *ibid*, p. 8.

<sup>vi</sup> Liptrap, James M., "Chess and Standard Chess Scores," *Chess Life*, March 1998.

<sup>vii</sup> <http://www.thechessacademy.org>.

<sup>viii</sup> Margulies, Stuart, "The Effect of Chess on Reading Scores: District Nine Chess Program, Second Year Report," The American Chess Foundation.

<sup>ix</sup> *ibid*.

<sup>x</sup>Horgan, Dianne D, 1987, "Chess as a way to teach thinking," United States Chess Federation.

<sup>xi</sup> *ibid*.

<sup>12</sup> Horgan, p. 8.

<sup>13</sup> *ibid*, p. 2.

<sup>14</sup> Huitt, W. & Hummel J., 2003, 'Piaget Theory of Cognitive Development,' *Educational Psychology Interactive*.

<sup>15</sup> Gardner, Howard, 1983, *Frames of Mind: The Theory of Multiple Intelligences*.

<sup>16</sup> Palm, Christine, 1990, "Chess Improves Academic Performance," a publication of the New York City Schools Chess Program.

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<sup>17</sup> *ibid*.

<sup>18</sup> *ibid*.

<sup>19</sup> *ibid*.

<sup>20</sup> Coeyman, Marjorie, "Kingmakers," *Christian Science Monitor* (August 10, 1999), Vol. 91, Issue 178, p. 15.

<sup>21</sup>

[http://www.centerforpubliceducation.org/site/c.kjJXJ5MPIwE/b.4104821/k.75F2/States\\_standards\\_continue\\_to\\_improve.htm](http://www.centerforpubliceducation.org/site/c.kjJXJ5MPIwE/b.4104821/k.75F2/States_standards_continue_to_improve.htm)

<sup>22</sup> <https://wlds.dpiF.wi.gov/spr/>

<sup>23</sup> Blyth, Dale A., & Leffert, N., "Communities as Contexts for Adolescent Development: An Empirical Analysis," *Journal of Adolescent Research*, Vol. 10, No. 1, pp. 64-87.

<sup>24</sup> Coudert, Jo, "From Street Kids to Royal Knights: How a caring teacher and the game of chess changed lives in the ghetto," *Readers Digest*, June 1989, pp. 141-146.