The Wisdom of the Hands

Doug Stowe

Sometime in the late 1700s, a child in Pestalozzi's school challenged his teacher: "You want me to learn the word *ladder*, but you show me a picture. Wouldn't it be better to go look at the real ladder in the courtyard?" The teacher was frustrated by the child's remark and explained that he would rather not take the whole class outside the building just to look at a ladder. Later, the same child was shown the picture of a window and again interrupted the teacher. "Wouldn't it be better to talk about the window that is right there? We don't even have to go outside to look at it!" The teacher later asked Pestalozzi about the incident and was informed that the child was right. Whenever possible, children should learn from real objects, the real world, and the experiences it offers, Pestalozzi said (Bennett 1926, 119).

I doubt that you could find any educational theorist who would disagree with Pestalozzi on this. A long line of theorists, from Commenius, Rousseau, and Froebel, through William James, John Dewey, and Howard Gardner, have made the same point. Nevertheless, schools create artificial learning environments for our children. When I was a college student, I was often asked, "What are you going to do when you get out in the real world?" Students know that the academic world is contrived in comparison to the multidimensional reality beyond the classroom doors.

Perhaps the greatest problem in modern education is disinterest. Adults often fail to engage children's innate capacities for learning. And it is no wonder. At a very early age, children are told, "Don't touch!" "Keep your hands to yourself!" But the hands and brain comprise an integrated learning/creating system that must be engaged in order to secure the passions and heart. It is the opportunity to be engaged through the hands that brings the seen and known to concrete reality. Without the opportu-

To learn more about the "Wisdom of the Hands" program at the school, the author invites readers to visit <http://wisdomofhands.blogspot.com> or <http://wisdomofthehands.com>.

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nity to learn through the hands, the world remains abstract and distant, and the passion for learning will not be engaged. When passion *is* engaged, and supportive systems (teachers, community resources, technology, etc.) are in place, students find no mountain is too high, and no concept too complex to withstand an assault on their sustained interest.

My Story

I came to my own understanding of the role of the hands in learning by observing my experiences as a woodworker, and I hope that this essay will stimulate you to reflect on the role of hand activities in your own experience.

During my college years, I had planned to become a lawyer. During the summers, while working in my father's hardware store, I had an opportunity to work with a craftsman, who helped me restore a 1930 model A Ford. (I had purchased the automobile with my savings for $400.) That craftsman noted the ease with which I was engaged process of stripping the car down to the frame, rebuilding the engine, and then reassembling a nearly new car. He asked me one day why I was studying to become a lawyer when my brains were so clearly in my hands. His prophetic remark led me to examine my own goals and led me to choose the life of a craftsman.

In 1976, I became a self-employed woodworker, making custom furniture for local clientele. I also built small inlaid boxes for galleries throughout the U.S. In 1995, I began writing articles about woodworking, and my first book, *Creating Beautiful Boxes with Inlay Techniques*, was published in 1997. At that point, I began communicating with other woodworkers on the Internet, and I became disturbed by the sharp decline in woodworking in schools. Woodshops were being seen as irrelevant to modern education. Industrial arts classrooms were being converted to computer labs, and even the remaining industrial arts classes, now called "tech-ed," were being taught through simulated programs on computer screens rather than as hands-on activities.

Reflecting on my own life and my own learning style and on the role of my hands in learning, I came to regard the closing of woodshops throughout the U.S. schools as tragic. I realized that in my own experience, woodworking was intimately connected to nearly every field of study. During my work, I was actively engaged in math, engineering, artistic design, and business. I was constantly learning about the physical, chemical, and biological properties of the materials. I came to regard the woodshop as the ideal multidimensional, multidisciplinary, integrated learning experience. I therefore began reading and learning as much as I could about the role of woodwork in education. I also decided that, to avoid being dismissed as a disgruntled voice on the educational sidelines, I needed to become a woodworking teacher myself. In that way, I would have some credibility.

Historical Notes on Woodworking in Education

In recent years, it has been generally assumed that woodworking was where you placed slow learners, those who would not be capable of tackling more academic subjects. The woodshop was often thought to be the place where troubled youth could be parked to keep them in line and out of trouble — while keeping them in school instead of allowing them to drop out. Actually all of that was very far from the original intent.

In the late 1870s, the "fathers" of manual training in the U.S., John D. Runkle at MIT and Calvin Woodward at Washington University, St. Louis, had noticed that their engineering students were having a great deal of trouble thinking in three dimensions. Their students' academic work was leaving them handicapped in the kinds of spatial understanding and awareness that were needed. So Runkle and Woodward started woodworking programs to improve the students' thinking skills (Bennett 1937, 316-324). This relationship between the use of the hands and the ability to perceive in the abstract is something that very few academics may understand, but it something that every craftsman like me knows very well.

In the founding days of manual training in the United States there were two rival systems. One, the Russian system created and promoted by Victor Della Vos of the Moscow Imperial Technical Institute, used woodworking as a means to prepare students for industrial employment. This was the system that first inspired Runkle and Woodward when it was introduced in the Philadelphia Centennial Ex-

position in 1876. A rival system, commonly called "the Swedish system" or Sloyd, was started by Uno Cignaeus in Finland and was further developed and promoted worldwide by Otto Salomon in Nääs, Sweden. Educational Sloyd was a developmental tool to be used in general education and applicable to the learning needs of all children. Salomon believed that woodwork and other handcrafts can foster a variety of important character traits, including industry, independence, perseverance, and an appreciation of the need for precision and exact work. He saw handwork as developing both the mind and the body (Salomon, n.d.; Bennett 1937, 7, 55-69).

Hand and Brain

The relationship between the hand and the brain is suggested by classic works in neurology. In **[AUTH: PENNFIELD IN REFS]** Penfield and Rasmussen's *The Cerebral Cortex of Man* (1950), the "homunculus" drawing of the brain reveals the disproportionately large amount of the cerebral cortex utilized by the human hand. As Frank Wilson (1998) emphasizes, the use of the hand for tool-making and tool-use must have been pivotal in human evolution, and the development of manual capacities co-evolved with the development of the brain. Wilson (personal correspondence, Jan 16, 2005) believes that this co-evolution extends well beyond the creation and use of the early stone instruments:

> No one knows precisely when our ancestors started handling textiles and manufacturing thread, but our ability to do this, along with many other tasks, was made possible because of two critical and parallel changes in upper limb and brain structure. Biomechanical changes in the hand permitted a greatly enlarged range of grips and movements of the hand and fingers; the brain provided new control mechanisms for more complex and refined hand movements. These changes took place over millions of years, and because of the mutual interdependence of hand and brain, it is appropriate to say that the human hand and brain co-evolved as a behavioral system.

Wilson adds,

> The entire open-ended repertoire of human manipulative skill rests upon a history of countless interactions between individuals and their environments — natural materials and objects. The hand-brain system, or partnership, that came into being over the course of millions of years is responsible for the distinctive life and culture of human society. This same hand-brain partnership exists genetically as a developmental instruction program for every living human. Each of us, beginning at birth, is predisposed to engage our world and to develop our intelligence primarily through the agency of our hands.

We can gain an appreciation of the subtle interrelations between hand and consciousness by paying attention to our own hands during woodwork or other handcrafts. For example, you will observe that the hands initially become engaged in sensing the surface qualities of objects, but when these qualities become known, the consciousness of sensing diminishes. If there is some change in the surface qualities, the consciousness returns to take note.

You will notice that as working movements become skilled patterns, they no longer require conscious attention. Instead, they become conveyances through which other object qualities can be known as those objects are transformed. An example from woodworking involves the holding of a chisel. For a trained carpenter, the hand itself disappears from consciousness, but for a beginner, the proper grip and the angle of the wrist take tremendous concentration. As skilled movement is acquired, the hand becomes unconscious and the mind senses only the engagement of the cutting edge at the end of the tool in the surface of the material being shaped. The hands move out of the way of direct consciousness to allow direct access of the mind to the surface qualities of objects. It is part of the miracle of the hands that they are empowered to act in seamless unconscious harmony with thought, so perhaps it is only natural that their contributions to our learning has gone unnoticed in modern education.

Research in a variety of areas tells us that the hands shouldn't be overlooked in education. As expert musicians will testify, playing of a musical instrument critically involves manual dexterity and

sensitivity (see Wilson 1986), and new research suggests that playing of instrumental music in school has a significant effect on the development of math proficiency (Catterall et al. 2002). This research was co-sponsored by the U.S. Department of Education. It is truly astounding how rarely the United States government is able to take its own advice. It is a clear case of the left hand not knowing what the right hand is doing.

A second interesting topic is the use of gesture. Susan Goldin-Meadow (2003) hypothesizes that the movement of the hands actually facilitates the movement of thought in the brain. Goldin-Meadow (2005) observes,

> Why must we move our hands when we speak? I suggest that gesturing may help us think—by making it easier to retrieve words, easier to package ideas into words, easier to tie words to the real world. If this is so, gesture may contribute to cognitive growth by easing the learner's cognitive burden and freeing resources for the hard task of learning.
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> Moreover, gesture provides an alternate spatial and imagistic route by which ideas can be brought into the learner's cognitive repertoire. That alternative route of expression is less likely to be challenged (or even noticed) than the more explicit and recognized verbal route. Gesture may be more welcoming of fresh ideas than speech and in this way may lead to cognitive change.

A third interesting bit of research is found in *Baby Signs* by Linda Acredolo and Susan Goodwyn (2002). Their studies suggest that teaching toddlers to use hand sign-language facilitates oral language acquisition, and the authors have started a movement among parents wanting to give advantages to their own children. The authors (2002, 28) found that

- At 24 months, the children taught sign language were on average talking more like 27- or 28- month-olds. This represents more than a three-month advantage over the non-signing babies. In addition, at 24 months the children taught to sign were speaking in significantly longer sentences.
- At 36 months, the children on average were talking like 47-month-olds, putting them almost a full year ahead of their average age-mates.
- Eight-year-olds who had been research subjects scored an average of 12 points higher in IQ than their non-signing peers. (Acredolo and Goodwyn 2002, 28).

Our understanding of the hand/brain system and the role the hands play in learning is far from complete. In the meantime, we are doing harm to our children by requiring them to sit idly at desks with hands stilled.

The Clear Springs School

In 2001 I joined the faculty of the Clear Springs School, an independent progressive school which was expanding to the high school level. We secured a foundation grant to start a woodworking program called "The Wisdom of the Hands." The purpose of the program was to provide evidence of the value of the woodworking experience to all children regardless of their ultimate educational objectives.

The Wisdom of the Hands program started out much like other high school woodworking programs with afternoon classes at the high school level, but with two distinct differences. The first was that rather than being pre-vocational in purpose, woodworking was part of the arts curriculum. We had (have) a strong design component, and students are encouraged to design their own work.

Our program also differed from traditional pre-vocational programs because we tried to integrate woodworking activities with other courses. We found it easiest to integrate woodworking with the math and science areas. For example, we made wooden models of geometric solids and we built mineral collection boxes for earth science classes. We also studied the various species of local woods and trees to enhance the biology curriculum.

In 2002, inspired by my studies of Educational Sloyd, we began woodworking activities in the lower grades. We built adjustable workbenches that could be used at the first and second grade levels, and we soon offered weekly activities to all Clear Spring elementary and middle school children.

There are no textbooks that can offer enough projects for standalone weekly woodworking courses at all grade levels, but that was never our purpose. Our woodworking projects are developed in collaboration with core teaching staff. They tell me what they are studying, and if they or their students have any ideas about woodworking projects that might correspond to their studies. We then plan and prepare materials for weekly projects.

Some of the best projects have been student-initiated. For example, the first and second grade students complained that the other students were constantly running past their classroom, and it was annoying and distracting. They suggested that we make signs in woodshop that would tell the others to please walk. In their classroom, they designed snails and turtles and various road signs on paper. In the woodshop, we transferred the shapes drawn by each student onto wood and cut out the shapes. The students cut sticks and sawed points so they could be driven into the ground at places where the children would see them and be reminded to walk slowly. They nailed the signs to the sticks in woodshop and returned to their classroom for painting and lettering.

The fact that this project grew out of students' own interests is very important. It allowed the children to express their feelings and concerns to the larger student body and was therefore empowering.

As you can see, being a woodworking teacher at Clear Spring is not an isolating activity. All the teachers have become creatively engaged in helping plan projects, and they work side-by-side with the students in the woodshop.

In an accreditation evaluation of our school, the team leader called special attention to the Wisdom of the Hands program. The program, he said,

> introduces all students at the School to the wonders of woodworking, creative exploration, and problem solving that brings about nascent artistic talent. The ability to touch, feel and begin to understand the value, beauty, and nature of wood; to measure accurately; to learn about angles; to take risks; to be patient in finishing the created product; to take pride in one's accomplishments; and to produce a work of beauty lead to an understanding and awareness of the inter-connectedness of knowledge. It integrates the world of nature, the fine arts, economics, history, cultures, and one can include poetry in its endeavors. I find it difficult to think of a better way to immerse children in the learning process.

The Wisdom of the Hands program has had additional benefits for the Clear Spring School. For many years the mission of the school was somewhat vague. We talked about "the Clear Spring way," but it seemed to mean different things to different people. While serving on the school development committee, I began looking at the various interesting programs that have defined our school as unique through the lens of the Wisdom of the Hands program. Like woodworking, our camping, community service, annual trash-a-thon fundraiser, and outdoors programs involved learning through the hands. In late 2005, the Board of Clear Spring School revised the school mission to read: "Together, all at the Clear Spring School promote a lifelong love of learning through a hands-on and hearts-engaged educational environment."

Concluding Comments

Woodworking in school — with real tools, real materials, real work, and making real objects — turns abstract concepts to concrete, experiential learning. At a time when the high school dropout rate is so distressingly high, we might consider the need for greater use of the hands in education.

In the final moments of the movie *Apollo 13*, the character played by Tom Hanks, at the moment of disaster, looked in reverence at his own hands, realized his own creative power, and saved the mission from tragedy. Let's take a moment to look at our own hands and know that a promising future for American education lies within our grasp.

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