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# From Knowledge Workers to Knowledge Athletes: Think About Baseball

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Just a piece of wood?

Baseball bats. Who hasn't swung one at a speeding ball or at least taken a few manic whacks at an inert, gym-class T-ball? The wooden baseball bat, like the game itself, is quintessential Americana. Nostalgia aside, our iconic bat is essentially just a piece of wood — turned, sanded, and finished with shellac. But its familiarity and utilitarian simplicity belie over a century and a half of research and development.

Most people are probably not aware that the first baseball bats, circa 1846, were planks of wood, narrowed at one end to create a handle. Think paddle. And this makes sense — the odds of hitting a hard, spherical ball hurled at you are better with a wide, flat surface than with a curved one. Through years of trial and error, however, players eventually realized that indeed it was possible to hit the ball, and hit it much farther, with a cylindrical piece of wood — at the time, most commonly, wagon tongue wood. Thus occurred the first quantum leap in baseball bat design.

While bat shape and geometry are continually being refined, today's bats are amazingly similar to their 19th-century progenitors. What's remarkable, however, is the vast scientific knowledge contained within these seemingly simplistic clubs:

- Scientists now grasp the flexural bending modes of vibration that occur upon a bat's impact with a ball and the effect the absorption of vibratory energy through the handle has on the distance a ball can fly — their way of understanding and describing the "sweet spot."
- Physicists have analyzed the conservation of momentum relationships upon bats given the standardized mass of baseballs, their coefficient of restitution (sponginess), and typical pitch velocities, to arrive at the ideal bat weight at maximum swing speeds — a 41-ounce bat is mathematically best for the professional power hitter.
- It is known that white ash wood is superior to blue ash, hickory, and maple. And grain densities of 10 to 20 layers of wood per inch will almost invariably propel the baseball farther than those with three to nine.

Believe me, I could go on about mass moments of inertia, cupping, taper geometry, hoop modes (the trampoline effect), and comparative acoustics. The point, however, is that sometimes very familiar objects, with everyday functionality, and of simple composition, have been heavily researched in terms of providing optimal performance

### The Office Worksurface

I would like to draw an analogy between a baseball bat — a simple piece of wood — and an office worksurface — a simple piece of "wood" raised 28 inches above the floor. This may seem like a stretch, but I wish to emphasize the embedded research relative to human performance.

Certainly there are a host of engineering issues surrounding the physical characteristics of a worksurface: rigidity, surface toughness, shear, and bending stresses and strains. These product performance attributes jump to mind first but do not directly address human performance.

Some of the human performance issues that inspire universal design specifications are fairly well known, such as edge shapes and specular reflectance. But what are less familiar, but still of great importance, are the attributes or applications of furniture, workstations, and other office features that enhance worker effectiveness and efficiency.

These issues are, and have been, the focus of much social scientific research. How might the orientation of the worksurface in a workspace affect issues of privacy and emotional comfort? Do workers perform better or differently when using organic, curvilinear worksurfaces rather than rectilinear ones? How does the color of a worksurface affect the mood, concentration, and cognition of someone indirectly gazing at eight square feet of it, eight hours a day?

Certainly investigation of social, cultural, cognitive, and affective issues proves challenging in many ways, but its impact on the bottom line is undeniable. When viewing the worksurface merely as a dimensioned plank of wood at a certain price point, it exists as an undifferentiated cost rather than an efficacious instrument. (Try telling Hank Aaron that any old baseball bat will do. And at the other end of the scale, the worst batters are most in need of an advantage.)

## Research Challenges

Of course to preserve the bat analogy, the worksurface must correlate in a meaningful way to knowledge worker performance. Not everyone implicitly accepts this. And quite frankly it is very difficult to make the argument that a specific desk or chair alone can increase worker productivity. Please be wary of anyone making overly simplistic claims like this.

For workplace researchers, quantification of knowledge worker productivity is like the ball player's illusive .500 batting average. Often researchers must suffice rather than optimize, providing only correlations between specific environmental features and job performance. But we will keep swinging for the fences.

But does lack of measurability and quantification mean that there is no effect? Does the office environment's indirect relationship (unlike the bat's inextricable role in batting) mean that worker performance is not affected by it?

As mentioned, it is difficult to isolate the influence of one specific piece of furniture on worker or organizational outcomes, and indeed researchers must often consider systems and spaces more broadly. In the baseball bat laboratory, the testing machines rigidly affix bats in vices and mechanically simulate swings. In the real world, all the batter's equipment — batting glove, cleats, uniform — play some part in his or her overall effectiveness. A bat only becomes meaningfully "productive" when held in a batter's hands in the context of a game.

For those who might discount something's (such as a piece of furniture's) effect because it cannot be adequately measured or because it is not absolutely linked with the task at hand, consider the batter's helmet. A helmet has nothing directly to do with the ball hitting the bat and the distance it flies. Theoretically, it makes no difference whether the batter is wearing a helmet at all. In fact, one might claim that performance would be improved without

its weighting the head and neck and restricting mobility.

However, would any baseball player dare to step up to the plate without a batting helmet? Imagine repeatedly facing potentially lethal 90-plus mile-per-hour pitches. How could you focus on performance and achieve the famous "flow states" of top athletes knowing that this might be your last at-bat? If you could handle the stress through the game, could you bear a series? A whole season? What might this do for career length and player retention?

Dire physical consequences aside, emotional parallels exist in the workplace. While panel height has nothing to do directly with the quality and quantity of knowledge worker ideas, it has a significant effect on privacy and the corresponding emotional sense of security. The subtle psychological effect of someone sneaking up behind you while sitting at your inward-facing workstation, the constant restroom parade past your workspace, or visitors unexpectedly popping their heads up over your partition wall can all prevent you from getting or staying in the zone.

Such environmental influences on human performance exist even beyond the individual workspace, just as the confines of the batter's box is only part of the story. In baseball, hitters are also influenced by home field advantage, stadium overhangs or domes, artificial lighting, sunshine, fan exuberance, weather, temperature, stadium noisiness, and outfield fence heights and distances. For the office knowledge worker there are broader issues of ventilation, ceiling heights, artificial lighting, window views, overhead enclosure, traffic patterns, daylight, distance to co-workers, noise distractions, and heating and cooling.

The number of influences on human performance is as great as the opportunities to leverage them to your advantage.

## Knowledge Athletes

In light of all this, I am proposing a slight shift in thinking — from knowledge workers to knowledge athletes.

This is especially helpful when considering salaries or costs to the organization. How can our comparison hold with such great disparity between professional athlete and professional worker remuneration? While admittedly the analogy might seem a bit incongruous, when looking long-term the similarity becomes a little more apparent.

As Michael Brill's BOSTI (Buffalo Organization for Social and Technological Innovation) numbers clearly show, over a ten-year period the median wage worker making \$49,570, with average annual raises, benefits, technology support, furniture, and office space, will cost the company \$969,000. This calculation uses 1998 numbers; today's figures would put the total well over the \$1,000,000 mark.

Yes, Nancy in Customer Service with her big hair and ubiquitous latte, and Walter in Accounting with his shiny head and eBay addiction are both million-dollar players of sorts. The fact remains, of course, that the average professional baseball player's salary is fifty times that of the average office worker (though their career lasts less than five years), but the money at stake in the workplace is still, and perhaps surprisingly, significant.

Restating the figures, 82 percent of the primary employee costs is salary, while only 5 percent is furniture and workplace costs. Even if furniture and related items were only able to create a slight increase in worker productivity, the small up-front expense could pay off handsomely. This is more accurate for more strategic knowledge work, where the job allows employees to hit ideas and decisions out of the park. It might be less accurate for more routine, repetitive knowledge work — such as a call center — where the bottom line impact of even the most extraordinary individual performance is less profound. The argument could be made, however,

that if work activity itself is less stimulating, then the environment might play a more important role in maintaining, if not enhancing, performance.

Either way, call center workers are still costly and the argument holds that you would want to protect the investment by providing the best work environment. Here, “best” should also consider retention. At one of the largest call center companies in the United States, annual employee turn-over ranges between 50 and 100 percent. The company calculates that each percentage point costs them one million dollars in recruitment and training. Concern for employee happiness, well-being, and satisfaction in terms of workplace environment could have very significant effects on retrieving the tens of millions of dollars in replacement costs. Again, a small investment could reap large rewards.

Baseball itself might be better off if it were to investigate the impact of environmental stadium conditions on performance the way workplace research has. James Wise, Ph.D. of Eco-Integrations has gleaned from academic literature the productivity gains made through environmental improvements: quality lighting results in six to 13 percent performance improvement; daylighting, 15 percent; thermal comfort, three to 50 percent; indoor air quality, 15 to 125 percent; individual control of internal environmental quality (IEQ), two to 25 percent. The ranges attest to the difficulty in measuring productivity, yet even at the low end great money is at stake.

Part of the difficulty in comprehending the importance of workplace human performance (or convincing infamously intransigent executives) has to do with our perception of workplace human performers. Since they are so familiar to us — they are us — we don’t see them as the highly compensated talent assets that they really are. And we don’t see furniture, workspaces, and workplaces as capable of affecting performance the same way that the best baseball equipment, perfect weather conditions, inspiring fans, and the optimal stadium

do for the professional athlete.

And “professional” is the key. Any old workstation might do in the same way that any old bat might do — at a family reunion or a church charity baseball game. But to compete in the big leagues, with millions or billions of dollars at stake, it makes strong fiscal sense for management to recognize the performance-enhancing capabilities the work environment has upon the company’s roster of knowledge athletes. Play ball!

### References

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