

Work Simplification: From Bricklayer to Microcomputer by Dr. Ben S. Graham, Jr.

Billions of dollars worth of productivity improvement have been generated with a process called work simplification. Executives in companies that have used the process have been delighted with the enthusiasm their employees have shown for it. Some individuals speak of it with deep feeling as the most exciting and worthwhile activity of their careers. It has the flavor of doing things right.

Work simplification is based on respect for the dignity of people and of work. It is defined as "the organized application of common sense." The organizational aspect of the definition involves easy-to-understand tools, which enable people who are not engineers to study their work quickly and with confidence. The common sense in the definition refers to the experience of those people who know the most about the work - the people who do it.

Work simplification builds teamwork by using techniques (charts, diagrams, etc.) that provide a common language for people who work in different departments and for people with varying amounts of experience. Newcomers with limited experience learn in a matter of days what normally would have taken years, and veterans, who know so much about their work that it is confusing, find that these tools enable them to keep track of the details. When people work together to improve their jobs, they feel more respect for themselves and for one another, important ingredients for winning teams.

The roots of work simplification date back more than 100 years, yet it is as valuable today as it was a century ago. However, it is in danger of becoming abused. To fully comprehend the value of work simplification, it is necessary to take a look back at those roots. How was the process developed? Where does it stand today? What is the proper role of the information resources manager in the process?

Gilbreth Develops the First Work Improvement Tools

On July 12th, 1885, a handsome young, third generation New Englander rode Boston's Columbus horsecar to his first job. Frank Bunker Gilbreth was five days past his seventeenth birthday, a high school graduate, wearing a crisp new pair of white, bricklayer overalls. He had impressed a partner of the Thomas J. Whidden Company, contractors and builders, who offered him an opportunity to learn the business from the bottom up and earn his way into partnership.

Frank had passed examinations for entrance to MIT, but he decided against university studies in favor of this job. His university would be a scaffold and his first professors would be Tom Bowler, an Irish-American, and George Eaton, a Nova Scotian, both, to use Frank's words, "natural, rollicking, first-class human beings" and top notch journeyman bricklayers.

On that scaffold, he gained an insight that transformed him into, perhaps, the greatest contributor of all time to industrial productivity. First he saw that each bricklayer used slightly different motions while accomplishing the same result. Then he noticed that the motions they used when demonstrating were not the same as those they used throughout the day. Later he saw different methods being used for difficult parts of the wall, others when the worker was rushed, etc.

Instinctively, he sorted through these methods looking for the best. In time, he became an excellent bricklayer and developed a method that incorporated the best he had seen plus new ideas of his own including a bricklaying scaffold, which he patented.

By the age of 22, Gilbreth had improved a five-thousand-year-old job and had enabled bricklayers to lay brick faster with less effort and fatigue. On one particularly difficult type of wall, where the previous record had been 120 bricks per hour, his methods allowed them to lay 350 bricks, an increase in productivity of over 190%. This early success launched his lifelong search for the *one best way* for doing any of the tasks of life; a search he shared with his psychology-trained wife, Lillian, with their twelve children, with employees in his own company, and eventually with leaders of industry, academia, professional groups, government and mankind.

Frank Gilbreth was certainly not the first or only person to find a better way of doing work, but he may have been the first to make that search the center of his life and apply it to all aspects of living. He began with a single, highly successful improvement, followed it with many more and eventually uncovered essential secrets of *how to improve*.

Gilbreth developed a number of improvement tools, which clearly display the facts of work and make improvement opportunities obvious. These tools include the flow process chart, therblig analysis,

micro-motion study using motion pictures, the chronocyclegraph using special lighting techniques with cameras, factory layout modeling, measurement with predetermined times, and more.

Early Abuses

Before long, some universities began to include Gilbreth's techniques in their curricula for a newly emerging profession, Industrial Engineering. ("The first university course in industrial engineering was introduced at Pennsylvania State College in 1908...") As the effectiveness of these techniques became known, subtle changes crept into the way the methods were applied.

The Gilbreths had keen respect for the dignity of work and for the skilled people who performed it. From the start, it was clear that improvement came from enhancing those skills, and employees should benefit along with owners and customers. However, there were some who used the techniques simply to get more work for less pay. Rather than enhancing skill, they sought to de-skill the work with machines that operated faster and faster and that were tended by younger people at lower-wage rates. These "speed-up-campaigns" were the product of a non-professional mutation, which gained the label *efficiency expert*.

Mogensen Gives the Tools Back To the Workers

Meanwhile, most of the early professionals were guided by attitudes ranging from thoughtful concern to deep respect for workers and their skills. Still they encountered resistance. Often the strongest resistance came from conscientious workers with years of experience who knew a great deal about their jobs and couldn't see how someone who had never done the work could figure out how to do it any better. It wasn't that they didn't want to improve.

A young industrial engineer by the name of Allan Mogensen ran into this type of resistance repeatedly and came up with an easy way to get past it. He gave the Gilbreths' analytical tools to the workers and let them figure out the improvements themselves. Many of them embraced the techniques enthusiastically and quickly improved their work with pride.

"The person doing the job knows far more than anyone else about the best way of doing that job and, therefore, is the one person best fitted to improve it."-- Allan H. Mogensen

Lillian Gilbreth worked with Mogensen and helped him develop his "Work Simplification" conferences covering the techniques and a five-step process designed to put the techniques into the hands of employees. She brought to the work a natural affinity for the humanities, a Ph.D. in industrial psychology, and the rich management experience of a working mother of twelve.

Mogensen began his conferences in 1937 and continued them until 1985, training thousands of people from hundreds of companies. Some of these people generated millions of dollars worth of productivity benefits in their organizations with programs that involved large numbers of employees.

In 1983, when the book *In Search of Excellence* singled out companies that had dominated their industries over many years, about half of them turned out to have been influenced directly by Mogensen. This is not too surprising when one considers that innovation and employee involvement were key factors which the authors, Tom Peters and Bob Waterman, credited for the success of these companies.

One of those companies, Procter and Gamble, built its deliverate-methods-change program after Art Spinanger attended Mogensen's conference in 1944. For decades the effort grew and gradually became so much a part of life in that company that by the mid-80's, they were able to report new savings *each year* in the neighborhood of a billion dollars.

The Grahams Bring Work Simplification To the Office

That 1944 conference was also attended by Ben Graham, Sr., who began his career in the insurance business and had years of experience with paperwork systems. Although the Gilbreth techniques were designed for analyzing bluecollar work, Graham recognized their enormous power and immediately set about adapting them for paperwork.

He produced a film entitled *Work Simplification Adapted to Clerical Operations*, which illustrated a number of office improvements. He coined the term *Paperwork Simplification* and lectured and wrote prolifically on the subject. In 1953 Graham conducted his first public paperwork simplification conference, which covered the adapted techniques and several new techniques and which placed a strong emphasis on project teams.

At the time Ben Graham, Sr., was developing the concepts of paperwork simplification, most work improvement was being focused on the factory. Work in the office (indirect labor) seemed to be of little

consequence and few productivity improvement efforts were undertaken there. While others were concentrating on work in the factory, Graham found himself somewhat alone trying to improve work in the office. He was able to go about his work rather calmly and objectively, and as a result his writings have a classical quality about them that reflects timeless good sense.

Long before it became obvious, Ben Graham, Sr., noted a shift occurring in the composition of the labor force. He reviewed statistics in the 40s and 50s, which showed that the clerical segment of the labor force was growing 2 1/2 to 3 times the rate of growth of the labor force. He predicted that, in time, we would have more people working in our offices than in our factories and that we would need to prepare ourselves for the massive challenge of office automation.

"In preparing for paperwork automation, we must first get the water out of our systems, eliminate the waste, and in doing it make savings equal to, or even in excess of, our annual profits. The next step is to determine our need for equipment."

--Ben S. Graham, Sr., 1957

Although he did not live to see it, in 1971, what Ben Graham, Sr., had anticipated occurred. The clerical portion of the labor force became the largest employment group. In 1978 the professional portion became the second largest group and machine operators, the major bluecollar group, has since dropped from first place to seventh in a field of nine. We have become, overwhelmingly, a white-collar labor force.

When Ben Graham, Sr., began his conferences in 1953, his son, Ben Graham, Jr., was an intelligence officer in the U.S. Air Force. He was discharged at the end of the Korean War, and with his father's encouragement, he completed masters studies to prepare him to join in the family business. When his father died in 1960, he continued the work begun by Ben Graham, Sr. For the next six years, Lillian Gilbreth participated in Ben Jr.'s conferences and guided him. She died in 1972, having continued her husband's work for over forty years and left a legacy of dignity, decency and skill. Many people accomplished far more in their lives because of her than they would have otherwise. Ben Graham, Jr., who is one of them, has trained scores of thousands of people from over a thousand different organizations and continues to do so today.

Many organizations have used the methods of Ben Graham, Sr. and Jr., with project teams of skilled employees to study their systems and procedures, eliminating the unnecessary, combining the redundant, and developing simpler methods. This process not only demonstrates respect for the dignity of worker and the work; it also readies the procedures for automation. This preparation saves time and money by eliminating the expense of automating procedures and portions of procedures that shouldn't exist. It also helps the computer systems designers by reducing their workloads and enabling them to concentrate their efforts on the procedures of the main mission.

Abuses Resurface in Clerical Applications

However, as the number of office jobs grew, some people found the same opportunity for exploitation that efficiency experts had abused earlier in the factory. Senior executives with large budgets were vulnerable. They knew that their organizations were going to change, and while they wanted the best for their companies, they were easily convinced that this meant major commitment to automation (which they didn't understand).

It became popular to try to improve work, not by studying the work, but rather by studying and buying technology. Once again employee skills were discounted, this time perceived as obsolete. Employees were relegated to the role of "user," which usually meant that *they did the work by following instructions written by people who did not do the work*. Veteran employees who groused too loudly were shunted aside and replaced by eager newcomers who were easily persuaded to commit to the new equipment and to the new methods.

In the 60s, a concept called word processing was promoted to run offices more like factories with lower-paid, less-skilled people working in pools on faster equipment. Then came the huge systems with herculean names like Super, Ultimate, and Omega, designed to be operated by unskilled clerks. Systems became larger and larger, and people became smaller. In time, an inferiority complex settled into many user groups. Employees knew that the systems didn't work well. In fact they often didn't make sense, but *there was nothing they could do about it*.

As the work force was being rendered impotent, it began to seem appropriate to design idiot-proof systems. Ironically, a labor force, with strong traditions of self reliance and innovation and now better

educated than it had ever been before, was being treated like idiots. Systems consultants, both external and internal, were encouraged to seduce users into the new technology for their own benefit. When systems failed, excuses such as Murphy's Law and GIGO (garbage in/garbage out) were used to blame the users.

There was a love affair with the appearance of progress, which reached its height at the end of the 70s with the drive for the paperless office. Vast sums were spent automating unnecessary activities. In some organizations, the people who did the work had been so undermined that they ceased to provide feedback. Programmers with large budgets and fantasies were cut loose from reality. When the budgets ran out, reality surfaced. In spite of the enormous effort and truly remarkable developments in computer technology, the paperwork didn't go away, it grew.

The Situation Today: The Professional Society

Today we are an information society. For some time it looked as if we were trying to become a nation of clerks working for mindless bureaucracies. However, this was never to be. It didn't work and we didn't like it. It was an uncomfortable learning period not unlike adolescence. Instead, we have decided to become a professional society, a society of intelligent adults. Recently the clerical segment of the labor force has stopped growing and ceased to be the largest group. We now have more professionals in our society than anything else.

Successful organizations are rapidly adjusting to accommodate this change with an increasing emphasis on the use of employee teams focusing on productivity and quality. The more successful teams use rigorous techniques because it has become evident that without them, efforts invariably become lost in detail and deteriorate.

Techniques have evolved and with the enormous growth of the office there has been increasing emphasis on the procedure charting of the Grahams. It may look different today as team members sit at computer terminals drawing their charts, but that same good feeling of doing it right is still there. The technicians support a proper blend of technique and involvement (work simplification, the organized application of common sense) that results in clean systems properly prepared for automation.

There are, however, many systems people who are still not comfortable with the idea of users designing systems. They feel that the proper approach is for systems specialists to talk to users, find out what they need and then design it for them. In this way, they retain full jurisdiction over the design function and protect the system from amateur tampering. The issue here is a subtle one, which will not yield to simplistic thinking.

At first glance it seems to be a choice between expert and amateur. Either of these becomes a win-lose situation. If the expert calls the shots, we have good control of procedures but the systems will be somewhat out of touch with reality and disowned by alienated users. When users call the shots, they accept ownership and responsibility and handle the realities of their own areas well, but there is often a loss of coordination resulting in piecemeal change, confusion and misunderstanding. To avoid inter-departmental squabbles changes tend to be limited to what each group can do by itself.

There is, however, no reason why an organization should accept the penalties of either of these win-lose options. Why not a win-win? With work simplification, we have proven methods for bringing together teams of users with carefully prepared charts that clarify the confusion and reduce the misunderstanding. When people from different departments work together, they find an almost endless variety of ways of doing the work so there is no need to satisfy one group at the expense of another. Teams of users come up with coordinated changes that meet their needs, reflect their realistic experience and that they can embrace with a strong sense of ownership.

The Role of the Systems Professional

And what about the systems specialist or information resources manager? Be a member, no better or worse than any other member. Thus users and specialists both provide their experience. Specialists should feel honored and welcome the opportunity. They may find user allies who can make their lives much easier, but they had better be careful not to overstep their bounds and take over the project. Specialists should not pressure users to accept what they do not understand. Rather they should make sure that they understand the users' needs and that the users understand and want what they are getting as a system.

No organization will ever have systems that are better than its people. This is a timeless truth, which technology will not change. It was apparent to Confucius 2,500 years ago when he taught; "*Man can*

make systems great. It isn't systems that make man great." And it will be so in the future as we master this new professional society with a labor force steadily improving its skills for performing in a systems environment.

At present, unfortunately, there are many organizations where the cooperation between systems people and users is hurting. Small decentralized computers are often perceived as a threat by systems specialists who fear loss of control and then take steps to restrict the users from access to the equipment. This is very reminiscent of battles waged years ago between forms control and users who designed bootleg forms. When the forms group emphasized control and attempted to block the users' access to the print shop, users found other routes to meet their needs. When the forms group emphasized support and provided it effectively, they were successful.

It boils down to this. Conscientious users prefer to take matters into their own hands whenever it becomes necessary to get their jobs done. Given the opportunity, they will strive to make their systems as effective as possible. Should systems specialists help them do it or try to do it for them? If they choose the latter, they may start a battle which they cannot win, a battle where they are overwhelmingly outnumbered and where the final choices will always be in the hands of their foes.

If we insist on a win-lose solution to each of our systems decisions, the second loser in line will be the patient if we are a hospital, the public if we are a government service, the customer, the client, the student, etc. And the next loser after that will be our organization, which was just not good enough at meeting its main mission.

I'll close with two final warnings for those who might give public support to these thoughts of teamwork and mutual respect but privately intend to insinuate themselves into control and get ahead at the expense of users.

1. You can easily corner all of the credit for a system that fails. Or you can earn a rightful share of a success with many enthusiastic users helping.

2. Today's new technology is tomorrow's commonplace. When society was illiterate, there were many scribes to do our reading and writing for us. Today there are none.

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