The Roots of the Business Process Mapping[i]

Ben Graham

"I didn't understand it much because what the colonel said was full of tactics talk. Later the captain explained it, and that was better but not much. So then Sergeant Tyree showed it to us by drawing lines on the ground with a stick. That way it was clear as could be."

--Shelby Foote

Since the first lines were scratched into the dirt, people have been drawing pictures to help them explain things. People understand pictures.

Today, there are a number of techniques available for mapping (or charting) business processes. This paper focuses on a method that is at the same time simpler and yet more detailed than most others. It is a method that has proved itself over and over again during the past century, producing billions of dollars in process improvement savings. It is a method that can be understood by anyone at any level in an organization. It is a method that can provide results in a matter of days – and it is critically needed TODAY, given the turbulent nature of our work processes. It is a method that helps us to really *engineer* our work processes. It is also a method that is largely ignored today in favor of higher-level diagrams that lack the detail to support process improvement.

The study of work as a science, or *scientific management*, really began in the latter part of the nineteenth century with the work of Frederick Taylor, Frank Gilbreth, and others[ii]. Gilbreth, in his search for the "one best way," developed a collection of tools for studying work that later became the foundation of the industrial engineering discipline. One of these tools was the flow process chart – a lined, columnar form with sets of five symbols running down the page and a space adjacent to each set of symbols for a brief description. It was this tool that did so much for manufacturing during the first half of the twentieth century, and is the foundation of the flowcharting method described in these pages.

Frank Gilbreth understood the basic rules of problem-solving: Define the problem and break it down. He spent his working life developing tools that help us break down work so that it can be improved. Frank's wife, Lillian, was closely involved in her husband's work, and, when he passed away in 1924, she made it her life's pursuit that she continued for close to fifty years. She once said, "There is too much study of work that should be eliminated, not studied." It is often the case that the best solution for improving a piece of work is to stop doing it. Good tools help make that decision obvious. The right tools can make a seemingly insurmountable task a quick study. The mapping method outlined here is one of these.

In 1947, American Society of Mechanical Engineers (ASME) did something that was even then a long time in the making. They established a set of symbols as the ASME Standard for Operation and Flow Process Charts. Twenty-five years earlier in 1921, Gilbreth had presented "Process Charts – First Steps in Finding the One Best Way" at the ASME Annual Meeting. By the time the symbols were standardized they had evolved into a solid set of symbols that covered every aspect of work, in any work environment, that can be used with very little confusion. The first process charts appeared as a series of symbols strung down a page in sequential order. This was (and still is) a simple and effective way to track the flow of one item – a person or a piece of material – through a work process.

Exhibit 1.1 shows a breakdown of the basic work elements defined by Gilbreth. Gilbreth originally used a small circle to represent transportation (the wheel of a cart), which has since been replaced by an arrow.

Operation. – Doing work – An operation occurs when an object is arranged or prepared for another step – assembled, or disassembled or intentionally changed.

Transportation. – Moving work – A transportation occurs when an object is moved from one work area to another.

Inspection. – Checking work – An inspection occurs when an object is verified for quality or quantity in any of its characteristics.

Storage / Delay. – Nothing happening – A storage occurs when an object is kept and protected against unauthorized removal. A delay occurs when an object waits for the next planned action. (A "D" symbol is sometimes used to distinguish a delay from storage.)

Exhibit 1.1 Basic Work Elements

In practice, the operation symbol is filled in when representing a physical change to an object. This way, the *"value–added"* steps stand out. Gilbreth used this symbol and referred to it as the *Do Operation* (see Exhibit 1.2).

Exhibit 1.2 Do Operation

Allan Mogensen studied the Gilbreth methods while pursuing a degree in Industrial Engineering at Cornell University in the 1920s. As a young industrial engineering consultant, Mogensen introduced a concept to the study of work that was to shape his career and earn him the title of the Father of Work Simplification. He realized that improvements that were developed by employees doing the work had the best chance of being successful.

In his book, *Common Sense Applied to Motion and Time Study,*[iii] Mogensen addressed and offered solutions for many of the concerns that still snag improvement efforts.

- Mogensen offered two primary reasons that people resist change. "First of all, we resist anything that is new; secondly, we all resent criticism."[iv]
- He addressed benchmarking and the potential scope of work as follows, "Comparison with similar practices or parts of such practices may offer opportunities for radical revision."[v]
- Regarding continuous improvement, Mogensen wrote, "A chart of the process finally adopted serves as a basis for still further and stimulative improvements. Arrangements should be made for periodical review."[vi]

- Mogensen even addressed technology for technology's sake: "The process chart enables one to reject the things which are just new – unless they are really better."[vii]

In 1932, Mogensen founded Work Simplification, which is defined as the organized application of common sense. Mogensen used the process chart (among other tools) to organize and study work, and he drew upon the common sense of the people who did the work for improvement ideas. Mogensen defended participative improvement with these words, *"The person doing the job knows far more than anyone else as to the best way of doing that job, and therefore is the one person best fitted to improve it."* It is this focus on the human element of work simplification that distinguishes it from other improvement techniques. It is predicated on people who do the work being involved in the work improvement. It does not treat people, products, and information as inputs and outputs, using accounting terminology. It regards people as a treasured resource, the safe keepers of the corporate (or organizational) memory, which is the most vital factor in successful continuous improvement! Mogensen described the process chart as follows.

> In order to achieve measurement, tools are needed, and the most important of these is the process chart. The process chart is the lifeblood of work simplification. It is an irreplaceable tool. It is a guide and stimulant. It takes time to properly utilize but there is absolutely no doubt that it works.[viii]

Mogensen began conducting Work Simplification Conferences at Lake Placid in 1937 and continued them for nearly 50 years! (Lillian Gilbreth was part of the original staff, returning each year until the mid Sixties.) Ben S. Graham Sr. was a student at Mogensen's 1944 Conference. He was unique in his class in that he did not come from a manufacturing environment. He learned the methods of work simplification and adapted them from the factory into the office while directing the paperwork simplification effort at The Standard Register Company. There he developed the horizontal process flow chart to accommodate multiple information flows. He also embraced an employee team approach to process improvement that is summarized in this statement he made in 1958. "Participation by the worker in developing the method eliminates many causes of resistance and assures enthusiastic acceptance. This is more important than all the techniques put together."[ix] He subsequently joined Mogensen's staff as the resident expert in paperwork simplification.

Graham recognized that information processes usually include several documents that are interdependent on each other and that one item can't be isolated and analyzed effectively without considering its effect on the other items, and vice versa. He expanded process charting to show the relationships between multiple items. He also added two variations of the value-added operation symbol that provided particular advantage in information processing (see Exhibit 1.3). The Origination symbol represents when information is first added to a new item introduced into a process. The Add/Alter symbol represents all information changes to an item following its origination. These symbols were incorporated into a revised ASME Standard in the early 1970s. They show "value-added" steps in information processing.

Origination. An origination represents the creation of a record or a set of papers by entering information.

Add/Alter. An add/alter represents an addition or change of information on an existing record or set of papers.

Exhibit 1.3 Value-added Symbols for Information Processing.

Graham's contributions earned him recognition as the founder of Paperwork Simplification, and the horizontal, multiple flow process chart that he developed is often referred to as a Graham Chart or a Graham Process Map.

Why should we map our processes?

The value of information processing is indirect. We process information to satisfy legal requirements and to help people do their jobs better. Why should we map our processes? Preparing a process map is not a productive activity either. The reason that we draw process maps is indirect at a second level. We map processes to provide information about the work. This information is used to satisfy regulatory or certification requirements, to provide instruction and to provide a baseline, and to serve as a tool for improvement. We map processes to make them better so that they, in turn, can do a better job of helping people do their jobs better.

What is a process? A process is a series of steps that must be completed in order to achieve a particular result. A process map is a "snapshot" of a process.

In business, processes are the things we do, the activities we perform day to day that keep our organizations going. They are all the things we do to make, promote, and deliver our products and services, the things we do to get paid and pay our debts, and the administrative things we do to keep things going, to keep track, and to satisfy organizational, regulatory, and legal requirements.

Since a process implies motion, we represent movement (or flow) as a series of steps along a line. The line represents the item being acted upon. The line is followed from left to right to see the flow. The symbols on the line represent activities (and periods of non-activity) that must be completed in order to move forward toward completion. They are placed on the line in the sequence that they are to be completed.

A process map, then, is multiple series of symbols along parallel flow lines. Each symbol or step must be completed in order to move forward along a line and complete the process. It is a graphical procedure: It tells the reader what documents, forms, files, and other items are used; where the work is done; in what order it is done; and who does the work.

To help people do their jobs better

There are a number of more specific, more detailed reasons why you might want to map a process. In each case, the goal is still to understand the process better...so someone can do his or her job better. Process maps answer these questions:

- What is being done?
- By Whom? Where? When?

After those questions are answered, we ask “Why?” to the answers, and better methods become apparent.

Process maps are used for several reasons:

- to identify problems
- to help fix problems
- to assist in the development of new processes
- to compare and standardize similar processes
- for training or educating: managers, workers, new people, auditors
- for writing procedures
- to satisfy audit and certification requirements
- to establish a baseline as a foundation for future improvements. (When process maps are saved in a process map library and are reviewed periodically, they serve as a foundation for continuous improvement.)

Methodology Overview

Drawing process maps is just a part of the work simplification methodology…but an integral part. The process map is the principal tool for improvement. The map lays out the job so that it can be reviewed in an organized, structured manner. Process maps break the job down and permit an improvement team to focus their improvement effort on the detail that can be studied step by step. The work simplification improvement approach is organized in a five-step pattern. Drawing process maps fits into the second step -- breaking down the process. There are many other tools that may be used for addressing specific issues (Facilities Layout, Venn Diagram, Responsibility Chart, Man-Machine Chart…), but the process map is by far the most universally applicable tool in the toolset. Here is the five-step pattern for achieving results with work simplification. This is also referred to as the Scientific Method.

1. Select a process to study and define the project.
2. Gather the facts – Break it down, prepare a process chart.
3. Challenge the current method, step by step – Question the job and challenge each detail.
4. Develop the improvement – Eliminate, combine, change sequence, simplify.
5. Apply the improvement – Obtain approval, install, measure, follow-up.

You will notice a similar pattern with many formulas for improvement. For example, Edwards Deming's PDCA Cycle – Plan, Do, Check, Action – and Six Sigma's DMAIC system – Define, Measure, Analyze, Improve, and Control. The charting method described here may be easily incorporated into these other improvement methodologies.

_____

Author

Ben B Graham is President of The Ben Graham Corporation and author of the book, *Detail Process Charting: Speaking the Language of Process,* published by John Wiley Publishers. His company pioneered the field of business process improvement, and has provided process improvement consulting, coaching and education services to organizations across North America since 1953. Ben has worked with many organizations to build libraries of business process maps and develop effective, process-focused, continuous improvement programs. His organization publishes Graham Process Mapping Software, which is designed solely for preparing detail process maps. More information about the software is available at http://www.processchart.com

References

i Ben B. Graham, Introduction in Detail Process Charting: Speaking the Language of Process (Wiley, 2004), p. 1-7

ii On October 12, 13 and 14, 1911 pioneers in the field of scientific management gathered at Dartmouth College for the first Conference on Scientific Management. Participants included Frederick Taylor, Frank B Gilbreth, Dr. Lillian M. Gilbreth, Henry L Gantt, Harrington Emerson and many others. Taylor and Gantt both had seminal works published in that year. Taylor's The Principles of Scientific Management and Gantt's Work, Wages and Profits. Emerson's Efficiency: As a Basis for Operations and Wages was published in 1909 and Gilbreth's Field System and Bricklaying System were published in 1908 and 1909 respectively.

iii Allan H. Mogensen, Common Sense Applied to Motion and Time Study (McGraw-Hill, 1932).

iv Ibid., p.17.

v Ibid., p.39.

vi Ibid., p.39.

vii Ibid., p.40.

viii Allan H. Mogensen with Rosario "Zip" Rausa, Mogy: An Autobiography (Idea Associates, 1989), p. 44–46.

ix In a letter to his son, Ben S. Graham Jr., June 1958.

