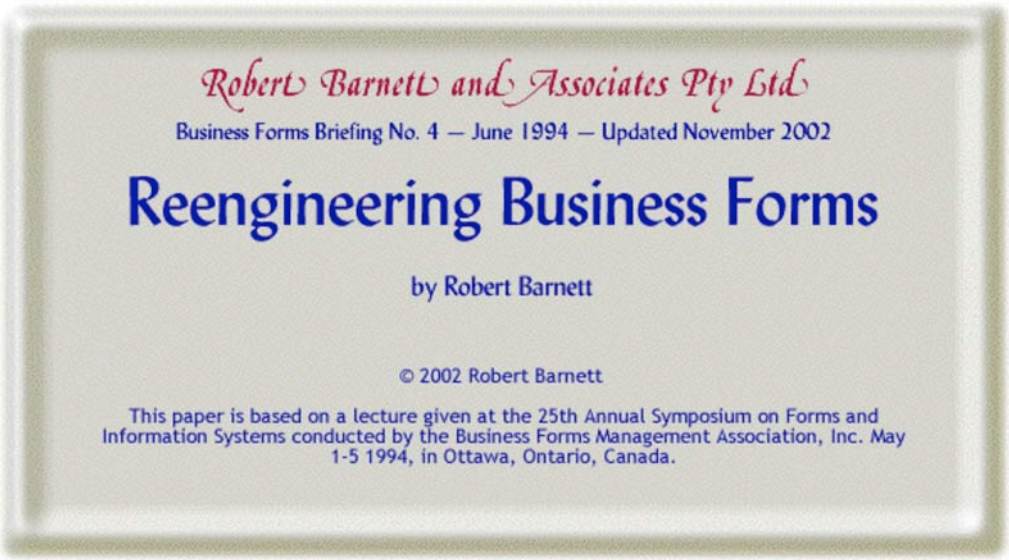

Reengineering—a not-so-new phenomenon

In 1993, I obtained a copy of the magnificent book by Michael Hammer and James Champy, Reengineering The Corporation: A Manifesto for Business Revolution (Hammer, Champy, 1993). It contained stories of amazing success in such renowned corporations as AT&T, American Express, Apple Computer, Kodak, Hallmark, Taco Bell and IBM. As I read the book, I became more and more excited about its content.

I was fascinated by the cover quote from Peter Drucker: "Reengineering is new, and it has to be done", because for me, it wasn't new! I had been directly involved in its fundamental principles for years. Thirty years ago, at Amalgamated Wireless Australasia (Australia's leading electronics company) we were putting into practice many of the ideas Hammer and Champy are discussing today—certainly not as effectively or with the same name—but with the same basic concepts. Many of the products were made using the process teams that the Reengineering exponents praise so highly.

The other thing that excited me a great deal was that most of the principles they espoused were the same as those I have used for many years in improving business forms. In this paper I want to present an overview of the main aspects of *process reengineering* as they apply to forms management and design. At the same time, I want to stress that this in no way describes the sum total of reengineering—it only deals with the application of the principles in ONE narrow business field. Hopefully, such forms reengineering will take place as part of a company-wide reengineering of all its business processes.

When this paper was originally written I had been working with large corporations that claimed they were embarking on business reengineering. They used the right jargon and were wildly enthusiastic, but ironically they hadn't applied reengineering principles to their business forms.

Electronic forms were introduced to the world around 1985 through companies such as Shana, Jetform, Adobe and Derina, but it is only since writing the original version of this paper that they have started to become popular. With significant advances in technology

and especially the use of the Internet and intranets, reengineering of business forms takes on a whole new focus.

While process reengineering is no longer the fad that it had become in the mid 1990's, and while many people had misapplied the concepts proposed by Hammer and Champy, I believe that their basic approach is still sound and is especially applicable to the management and design of both paper and electronic business forms.

What is business reengineering?

Hammer and Champy say that it means *"starting over"* and they give a formal definition as: "the **fundamental** rethinking and **radical** redesign of business **processes** to achieve **dramatic** improvements in critical, contemporary measures of performance, such as cost, quality, service, and speed."

They draw attention to four key words and I would like to look at these as they relate to forms.

1. Fundamental

Get back to basics and on every form assignment ask: WHY? **Why** do you want the form? **Why** do you use it? **Why** is it designed the way it is? Do you even need a form to carry out the task? Before you can work out how to redesign a form, you MUST ask why it is needed. And this applies not just to the major purpose, but to each individual data item—is it really necessary?

If someone invents a form to solve or circumvent a problem, it often ends up as an inefficient office routine. I've found many occasions when the problem has disappeared but the form has remained—often no longer needed.

2. Radical

Far too many organisations just make superficial changes to their forms. They change the graphic style to make them look "pretty" or employ the latest printing fads such as graduated screens and round-cornered boxes. You need to get down to basics—to the root of the issues.

In many organisations, forms review programs are limited to sending forms due for reprinting to users and asking their opinions or what changes they want to make. Apart from being an unnecessarily costly exercise, it frequently achieves little in forms improvement or better business efficiency. Reengineering your forms is far more than just making improvements to layout and appearance.

3. Dramatic

Your greatest effort in forms improvement should be directed to those forms that will bring the richest rewards. Far too many organisations spend vast amounts of time on minor graphical or printing changes rather than on significant user-oriented cost savings.

Good forms improvement comes from dramatic changes, not just the placing of 'bandaids' on minor problems.

4. Processes

Most form designers focus on peripheral matters such as colour, type, caption position, line thicknesses, shading density and logos. They focus on reducing sheets of paper rather than reducing work. But to really improve forms you need to focus on the processes—the way the form is used. Don't lose sight of the higher objective. Accuracy is far more important than speed.

How to reengineer your forms

Understand The Current Process

Here is the real key to forms improvement. Many analysts just gather data about the existing forms or the required new system. They learn about the number of forms used in each area, the cost of production, the frequency of use, and even the distance that forms move between desks. They concentrate on industrial engineering techniques such as paper flow diagrams, flow process charts, string diagrams, multiple activity charts, and time study. Data analysis is an important step, but you need to go much further than just understanding how many forms are used, or how fast they move through the organisation.

To effectively work with forms you need to **understand** what people do and **why**. The first step is often an error analysis of the existing forms. This won't necessarily show you why errors are being made, but at least it will direct you to the most problematic areas. If you were to analyse the errors on any major form, you will usually find a high proportion of the forms incorrectly filled in. It would be common to find error rates as high as 90% or even 100%. Just consider these recent Australian statistics:

- A life insurance proposal form with 100% having one or more errors—in one study, 1560 errors in 200 forms *(Fisher, Sless, 1990)*.
- A state government utility studied 2000 high volume forms (100 each of 10 internal and 10 external forms) and found approximately 80% in error.
- A major Australian Government application form was found to have close to 100% of forms in error. Many of these forms are returned up to 4 times to applicants to get more information. My conservative estimate is $2.5 million per year just to correct errors. This does not take into account costs of records management, paper, typing letters, mail-room processing, or many of the other incidentals. The figure is probably 5 to 10 million dollars per year—and this is ONLY error correction, not routine processing. When you consider that Australia has a population of only 16 million people, this is a significant error cost.
- An application form for business incorporation resulted in letters to 90% of the applicants asking for more information.
- A state government insurance corporation allocates 20 minutes per form in its work planning JUST to deal with errors.
- A government grant application form has 97% of applications wrongly completed.

Consistently, studies have shown that most errors are caused by the form designers not understanding the needs of the form users, and more importantly, what the users understand.

To design effective forms, you have to understand them how users understand them. You need empathy for the users. You have to manage the meaning of the form, not just the layout.

Learn by Observation

Traditional methods of forms improvement include opinion surveys, pilot studies, readability scores and focus testing. But these long-held traditions don't hold true when examined in the light of actual results. These methods consistently produce flawed results *(Barnett 1991)*. They concentrate on treating people as machines but ignore their minds and the complexities of their social interactions *(Shulman, Penman, Sless, 1989)*.

To produce quality forms we need a different approach; one that lets us see the forms in action; one that lets us work out in advance if the form is going to work. We need methods that give us empirical evidence for why users make mistakes, why they don't carry out what was expected of them and the problems they face *(Barnett 1999)*.

Observational studies are a method whereby you can find out why people are going wrong where you can highlight specific user problems and fine-tune the design to get rid of them. Using structured observational studies we watch users filling in or using the forms and, with appropriate questions, we can learn **why** they make mistakes. We learn about their **real** requirements, what they really need and want, and we collect information about their behaviour when using the form.

- For our purposes, behaviour includes:
- The way in which the person carries out the task.
- Physical things such as turning pages or moving through the document, etc.
- Facial expression and other mannerisms that might indicate problems, frustration, lack of understanding, confusion, etc.
- What the person says.
- Most important of all: finding out as much as possible about how the person **understands** the document. What is the cause of any misunderstanding? Do they give answers to form questions that the processors correctly understand? Do they carry out instructions or do what is expected with the information given?

One of the most valuable aspects of observational studies is that you can actually see the form improving through the testing stages. They also provide a great amount of fine detail and yet they are relatively inexpensive. While each round of testing uses only a few people (perhaps 6 to 10), over the course of the study these can add up to a large group.

The Process Team

Forms have traditionally been developed using the assembly line process. Form design is frequently one of the last steps in the systems development process—work on everything else in great detail but only allocate a few hours at the end for graphic design. Over the past 35 years that I've worked with business systems, I've seen more bad systems than good ones—I would regard many of the computer-based systems as disasters. By contrast, in

1979 I was asked to work with a team of American consultants specialising in police systems.

They took the approach that before writing the computer programs they would find out about their human users' needs. I was called in to look at the forms and procedures aspects and, in the process, found that the planned methods were not all appropriate. So we worked out a new solution—we came up with a radically different approach to form design—and after making sure that it fulfilled police needs, they went to work on the programming. Six months later the system was implemented without a hitch. I do not believe that such trouble-free implementation would have taken place if the human aspects had been tacked onto the end of the project.

I appreciate that my discussion of the process team is somewhat different to that proposed by Hammer and Champy, but it is the principles they espouse that I'm concerned about. Form design is usually regarded as just a matter of simple drawing after someone else has done the analysis. It is often only a matter of transferring an analyst's concepts to visual form using a computer drawing program. Form development doesn't just rely on a series of simple tasks but involves multi-dimensional work incorporating many skills. These skills would naturally include such matters as ability to draw, an aesthetic quality, neatness, understanding of printing, typography and data processing as well as computer keyboard skills. But they also extend to analytical ability, a pleasant approach to people, an open mind, and a logical and realistic approach to business problems.

I am making more and more use of line staff in forms development work. In times gone by analysts would consult with owners about their possible needs, develop the forms and procedures and then send them back to the owners for comment. Now, we get the owner involved in the whole process, taking an active part in the team, analysing errors and especially taking part in observational useability studies.

In Forms Management Departments, staff become multiskilled. No longer do we separate analysis from design, but all staff progressively learn the whole task. Analysts learn about typography, printing and graphic design while designers and desktop publishers learn about business systems and dealing with people.

The process we use is like that used by Kodak for product development. They call it "concurrent engineering". Developers regularly check to see whether someone else's work has created a problem for them or for the overall design. Problems are solved immediately rather than waiting weeks or months. So in our systems work, the forms and procedures are developed in a unified way with the computer programs rather than in a sequential or parallel process.

The role of information technology

In *Reengineering The Corporation*, the authors stress the importance of using technology the right way.

"A company that cannot change the way it thinks about information technology cannot reengineer. A company that equates technology with automation cannot reengineer. A company that looks for problems first and then seeks technology solutions for them cannot reengineer.

"…to paraphrase what is often said about money and government, merely throwing

computers at an existing business problem does not cause it to be reengineered. In fact, the misuse of technology can block reengineering altogether by reinforcing old ways of thinking and old behavior patterns."

They go on to explain that reengineering is about innovation and achieving entirely new goals by exploiting the latest technological capabilities. For example, a nation-wide bank is unable to introduce electronic forms because the standard copper telephone lines cannot handle the heavy data load. But place a satellite dish on the roof of every branch and copper lines no longer have to be used.

When Apple Computer first released the Macintosh®, I was fascinated by the advertisements. I could see a business tool that would revolutionise form design. I travelled the streets of Sydney talking to Apple resellers but they told me I was crazy for thinking I could use Apple's "toy" for serious business work. I even approached Apple's Australian headquarters and they wouldn't listen. Anyway, we stepped out and bought our tiny Macs with their baby screen, mouse and incredibly low memory capacity. MacDraw® and MacWrite® came free with the box, so we were set to go—word processing as well as design. Well, MacDraw was pretty crude and so was MacWrite. To get very fine lines and small type I had to draw forms larger than required and reduce them to 40% on printout—but it worked. When various companies and government departments saw what I was able to do, they started equipping their form design sections with Apple Macs and we saw vast productivity improvements. Forms analysts were able to more than double their daily output. It seems strange now, but when I went to my first BFMA Symposium in 1986, every time I mentioned that I used a Mac for form design, the looks on people's faces showed clearly that they thought I must have come from some primitive tribe. Little did they realise that we had discovered a tool that was putting us ahead of the rest of the world. Today, the Mac concept has been copied (somewhat crudely) to run on all PC's and we're doing things with forms that ten years ago few would have thought possible.

Now we can hook our computer to the front end of an offset printing press and image the plate while the press is running, even changing variable data on every revolution of the plate. Even high speed laser printing that seemed so innovative 15 years ago is almost fit for the museum when compared to the latest full colour electronic imaging devices.

With rapid advances in electronic forms technology we're able to do things with forms that were impossible even 5 years ago. We can now create electronic forms that are self-checking.

For example, the Australian Government has very strict legislation governing the design rules for road vehicles. For a vehicle to be registered for use on Australian roads the manufacturer has to submit all the engineering specifications on a set of some 140 forms. In the days of paper forms, the manufacturer had to study the design rules and ensure that the vehicle complied before sending in the forms. Even then, engineers meticulously examined the forms when they were received to ensure conformity to the rules. Now, all this is done electronically. As the manufacturer's representative fills out the forms on the computer, if any engineering detail does not comply with the design rules, or is even unusual, they get an immediate warning message explaining the problem. Once the forms are completed, they are electronically transmitted to the Australian office where the system automatically detects any errors or missing data, saving many hours of manual processing and checking.

Another interesting example of electronic forms is a whole bookkeeping system developed using Shana's Informed electronic forms software by the Australian Taxation Office and distributed free of charge to all small business. Known as *E-Record*, the electronic forms enable a small business to record all its accounting details, employee time sheets and payment records, and other relevant forms so that they comply with the tax laws. They can even retrieve their own details from the Tax Office and then transmit their business tax returns directly from the forms if they are connected to the Internet.

Using a different program, members of the public can fill out their private tax returns on a computer and submit them electronically.

But the big danger in all this is that organizations tend to look on the Internet and electronic forms technology as a panacea for all their business problems. They look on computerisation as reengineering, but forget to examine the whole process.

Finding forms to reengineer

Where do you start? For an organisation with thousands of forms this can be a real headache. Do you start in one department and work through everything? Do you set about systematically converting all your forms to electronic format? Do you start at form number "1" and work through until all are finished? Do you wait for forms to come up for reprint?

The most obvious starting place will be with forms directly associated with business reengineering projects. This is by far the best way to go. But even if your organisation is not into this yet, you can still apply the principles to your forms.

I have found that the best place to start is with those that you already know are causing major problems. A few enquiries around the organisation—especially with operating staff rather than management—will soon bring dysfunctional forms into the open. If others cannot direct you to such areas, look for symptoms such as these common problems:

- Counter staff spending large amounts of time assisting customers with form filling.
- Many telephone enquiries from customers (or potential customers) about applications or similar form-filling processes.
- Many requests to form fillers (customers or in-house) asking for more information or seeking clarification.
- Extensive rekeying of computer data.
- Many complaints from customers about forms and related documents.
- Large numbers of errors corrected in the office.

The next important area to analyse is high volume public-use forms—and this includes forms going out to the public, such as Account Statements, Bills, Notices, Insurance Renewals, etc. Look for the forms with potentially the greatest impact on the organisation.

A third category that usually brings positive results is high volume internal forms. A typical area would be the Human Resources Department where you will find forms used throughout the organisation by all your employees. The larger the organisation, the greater the scope for improvement will usually be. Most HR forms that I have seen have been very poorly designed and often difficult for people to fully understand. The simplest test is to examine completed forms for errors or other problems such as those listed above.

No matter what category of forms you examine, remember that you will be looking at whether or not they actually work. The old traditional approach of judging by appearances or conformity to rules is a waste of time. Extensive work with forms research over the past twenty years has shown that radically different methods are needed. You are not just dealing with paper reduction or saving time but with improved functionality and understanding of meaning.

Avoiding failure

Michael Hammer and James Champy finish their book with a chapter called "Succeeding at Reengineering". In it they list the most common errors that people make when trying to reengineer. I'd now like to look at how you can avoid most of those same errors in your forms development work.

Don't just change the process—FIX IT!

If you have bad forms, don't just automate the bad system. I went to a BFMA meeting a number of years ago where the speaker was telling us how to convert all our paper forms to electronic format. This was changing the process for no reason other than automation. I learned many years ago that automating inefficiency compounds the problems. Hammer and Champy give the example of IBM Credit who *"in trying to automate its operations…managed only to immortalize a bad process by committing it to computer software, making it even more difficult to alter in the future."*

Focus on the process

Far too many modern organisations focus on the method—downsizing, outsourcing, Total Quality Management, empowerment, customer service, focus groups—but fail to consider what business they are really in. The management emphasis is on being "seen" to be right.

For example, "quality assurance" is a typical approach that often focuses on method rather than process. The organisation develops a set of procedures to be followed to "assure" that quality is maintained.

As long as it can be proved that the procedures and “standards” were followed, then it is assumed that the organisation has done the right thing. Unfortunately, experience shows that the “standard” often bears little relationship to what the customer needs. I am reminded of a multinational forms corporation that boasts about its quality assurance accreditation, yet has a reputation for bad forms and long lead times. Now I’m not attacking the idea of better quality products or methods used to maintain high quality. My point is that placing the emphasis on methods such as “quality circles” is not the same as placing the **emphasis** on the process itself.

Let's consider form design and production. Some organisations go to a great deal of effort to maintain design standards and printing quality. They ensure that the rules of plain language are always followed, that type always follows the standard and is consistent, that the corporate logo is always used in the correct colour, size and position, that the most versatile design software is used, that printing quality is carefully monitored, that screen

densities are always checked with a densitometer, that correct colour samples are always provided—but they do absolutely nothing to find out why people make mistakes, or even worse, whether there are mistakes. The form may "look" great but it could be a total disaster. In fact, it may not even be needed.

The classic example I faced some years ago was a manager that refused to implement a forms management program because it would require the introduction of a handful of new forms such as *Request for Change*, *Form Activity Log* and so on. He said that a forms improvement program should reduce forms, not increase them. He missed the point entirely.

Don't neglect ethics

In form design you have to pay attention to what goes on inside people's heads.

Shared meaning plays an important role in human communication and especially the importance of two people believing that information is being shared *(Sless, 1986)*. Sharing may not take place (and neither may a belief in sharing) if either party is lying or believes the other person is lying. Unfortunately, the research evidence shows a large degree of mistrust on both sides of the forms usage business. Public form fillers frequently mistrust the organisation, whether it be government or private enterprise.

Many people see government employees as puppets of the politicians—out to prevent them from getting their "rightful share" of government money.

The problem is well summed up in this comment from a U.S. Government report on tax simplification.

"The American people simply do not believe that the IRS, or other government institutions, are on their side. They do not want to get more than they deserve, but they feel that the IRS should provide enough help to ensure that every taxpayer gets everything he or she does deserve. …These feelings adversely affect their attitudes toward the whole tax filling process, and the tax forms in particular." (IRS, 1980)

Customers of big business such as insurance and banking see the media reports dealing with management fraud, huge profits, failure to pay out insurance claims, repossession of family farms—and believe that the company isn't really interested in their welfare. Form designers need to recognise that they are frequently dealing with hostile form-fillers—people who are hostile to the agency even before they see the form. Present these people with a form that even remotely looks like deception, and there is no guarantee of honest answers.

The problem is magnified by the imperialist view that many administrators have of their forms. They look on the form-fillers as if they have an obligation to do as they are told—*"if they can't understand the form, that's their bad luck and they just have to learn."* But they don't learn and we end up with fiction instead of information.

On the other hand, insurance companies are very well aware of the high cost of fraud on the part of their customers. Government employees are also well aware of the extent to which people cheat the system. Good form design has to consider this lack of trust.

The problem of trust leads to the aspect of cooperation. Robyn Penman, in a discussion on discourse in courts, makes an important point about all human-talk exchanges: *"…that the information given is a function of the nature of the relationship in which it is given." (Penman, 1987)*

So in analysing why people fill in forms, we need to examine the relationship between

the form-filler and the form owner. For example, a tax form may be regarded as a legislative imposition a symbol of government coercion; an insurance claim, as an opportunity to get something for nothing; a betting or lottery ticket, as an opportunity to become rich legally.

Don't settle for minor results

As Hammer and Champy say: *"Big results require big ambitions."* It's often easy to spend a great deal of analytical effort on minor improvements only to find that the cost of analysis is greater than the savings. Concentrate on the sources of greatest return.

Keep at it

And while you are concentrating on the big picture, don't give up after the first few successes. Many organisations start their forms management programs with a great display of enthusiasm, only to let it fade out a year or so later.

Don't limit the scope

This is one of my greatest complaints about the way organisations approach forms work. They limit the program to a handful of notorious forms, or the ones with the greatest internal political muscle, rather than striving to improve the organisation's overall business.

Don't be stifled by existing corporate culture

This is another monstrous problem. I have recently had to deal with two organisations—one government and one private—where forms are designed by committees. Now I stress *committees*—not process teams. The committee process—design by consensus—is so ingrained that no one has the courage to change it. It's a political time bomb. If you're going to reengineer your forms and **really** make them better, you will have to knock down this childish barrier.

Drive it from the top

This is a subject I've had much to say about in *Managing Business Forms*. Driving the program from a high level forces an overall perspective on the work rather than the narrow focus of line managers.

Drive the project with reengineering specialists

It isn't enough to implement such a major forms program with someone who only understands the traditional ways. To run with such a program the driving force must be up to date with the latest techniques and concepts.

Don't skimp on resources

Here is another area where businesses fail in getting their forms and systems under control. It's no good just using people because they are "available" or are marking time as a result of "downsizing". In skimping, I'm not just talking about numbers, but about quality. You need the right people, with the right skills, and with the right motivation.

Don't bury reengineering

Forms reengineering, just like business process reengineering, needs to be at the top of the corporate agenda. Now forms may not be at the very top if there isn't a general reengineering project taking place, but management should be shown their importance, what bad forms are costing and how customers are being impacted.

Don't do too much at once

It is far better to work on one project at a time and achieve significant results than to spread your energies across multiple activities. Showing that you are working on a high proportion of total forms may look good on a management report, but I can assure you that you won't achieve very good real results. Of course, if you have the staff to work on a number of forms projects at once that's very good, but make sure you can do an effective job.

It's not just another business religion

Managers often like to get on with the latest innovative idea picked up at a seminar or executive training program. Being seen to do something new is often taken as good management. Don't just lump business reengineering (or forms reengineering) in with the rest and treat it the same way. If talking about "reengineering" is all you do and it becomes another buzzword, then you won't have achieved anything. Reengineering is not just a set of religious beliefs, it has to be a way of life.

Don't concentrate on the idea

Far too many ideas never get to reality—they bog down at the development stage. You can spend so much time talking about whether or not you should reengineer that you never have time to implement it.

Don't try to keep everybody happy

Almost any type of improvement program will bring about political reactions. You can't change forms without changing other people's creations, so don't make "happiness" your priority. On the other hand, if you do a good job with your analysis and useability studies, you will often have sufficient evidence to prove that your changes are worthwhile.

Don't be stopped by resistance to change

We should all know that people generally don't like change. But if we were to always baulk at such resistance, the world would never improve. It's easy to persist with mediocrity because it's comfortable, but this is not what reengineering is all about.

Aim for fast achievement

The change process has enough built in problems by its very nature. If you drag out the process, you will only compound those problems and your program will fall apart. Aim to minimise the impact and let people get on with their day-to-day tasks.

Conclusions

Good design rules alone do not lead to good forms

Quality is often seen as conformity to rules and accepted practice but does this measure **successful** performance and **understanding**? Does the use of 'plain language', traditional typographic principles and appropriate rules of layout mean that a document will **work**? Are the traditional methods of document testing and evaluation really successful, or do we just blindly follow them and hope that nobody asks too many probing questions?

Many researchers and document designers have a blind, almost religious-like 'faith' in the traditional methods. Yet the empirical evidence shows that these methods are usually inappropriate and based on a primitive understanding of the realities of human communication. 'Plain language', appropriate typography and good layout may be very necessary for a document to succeed, but these characteristics **alone** are not sufficient to guarantee that a document will work. Modern research is showing that most documents, even those evaluated 'according to the book' as good quality, are abject failures. They may look good, they may follow all the 'rules', but they don't carry out the task for which they were designed.

The real cost of public-use forms is very high

Management spends a great deal of time making decisions based on the data it receives and much of this comes from forms. Management time is costly and forms should be designed to reduce labour content as much as possible. Yet forms cost far more than most people realise.

Managers frequently see only the printing cost and because they haven't been trained in the value of good form design and the cost effectiveness of sound forms management, they just don't understand the real issues.

If the form designers don't understand the minds of the form users, the forms will frequently not fulfil their purpose. One can only guess at the tremendous cost of error processing, angry customers and lost business.

Empirical evidence for the management of meaning

I do not believe in document designer 'faith' in generalised 'laws' of information management or in the validity of the reductionist scientific method for document quality. I do however, believe in the value of empirical evidence for the management of meaning.

This has not been the place for a full discussion of the approach and I have only been able to provide an overview. But in the final analysis, the practical results justify the methods.

I do not claim to know all there is to know about communication, human behaviour, document design or process reengineering—we still have a great deal to learn—but, like Michael Hammer and James Champy, I would like to challenge you to challenge your traditional concepts.

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