

Designing Useable Forms: SUCCESS GUARANTEED

by Robert Barnett

Robert Barnett and Associates Pty Ltd (Australia)

© Robert Barnett 2003, 2005, 2007

Between 80% and 100% of most business forms fail. Why is this so? How successful or UNsuccessful are your forms? Can forms be made to work? Can you GUARANTEE success? Many business managers and form designers just accept poorly filled out forms as a fact of life but this paper argues otherwise, making the point that there is NO excuse for creating forms that produce significant numbers of user errors.

The problem with forms

It is commonly believed that since many people are functionally illiterate, designers can do nothing to produce forms that people can use without making mistakes. On the other hand many people think that form design is ‘kid-stuff’—the sort of work you can give to a low-grade office worker—or something you can give to a graphic artist and as long as the forms look ‘pretty’ everything will be fine. There may have been little excuse 20 years ago, but now we know better. Forms can be made to work, but to do so we have to clear our minds of preconceived notions of design, forgetting what we’ve been told for many years and coming into the 21st Century. It’s not that teachers of traditional methods have been careless in doing their job—they just didn’t know what we know today. As we move more and more into the area of electronic forms, these issues become even more important.

The value of modern forms research and useability testing

The story of forms research began in the mid 1970’s and continued on through the 1980’s and 90’s with researchers such as Robert Miller, Philip Barnard, Patricia Wright, David Frohlich, Robert Waller, Janice Redish and the team from the Document Design Center in Washington D.C., and Robyn Penman, David Sless and others from the Communication Research Institute of Australia (CRIA). Since I left CRIA in 1993, our company has continued with forms research and useability testing, especially with public use documents and forms for aged people. One of the greatest lessons I’ve learned in this process is that we can never rest on our laurels—we can never stop learning about forms—and people who claim to know all there is to know about form design are kidding themselves. I’ve taught for many years that there is no place in the forms management professions for egotists. The more we examine forms issues, the more that idea holds true. But the methods don’t have to stay in universities and research institutes. Any forms analyst can learn them and begin to apply the principles to their day-to-day work.

What we’ve learned from research and useability testing

Before we examine the subject in more detail it’s worth considering some of the lessons we’ve learned. Note that a lot of the early research was carried out in a laboratory environment and was reductionist in nature, examining separate components of form filling. Some of the more recent work has been carried out in what we might consider as a ‘real world’ environment, using typical form fillers and

looking at the total form-filling process. The following examples are by no means comprehensive, but they show some of the more significant research and key issues. Source details can be found in the bibliography.

PATRICIA WRIGHT & PHILIP BARNARD (1975) ¹

This was one of the earliest research papers dealing specifically with forms and reviews the behavioural research available at that time, particularly on language and comprehension, which could be related to the design of forms. Although some of the conclusions may no longer hold true in the light of subsequent research, it raised some significant issues that are still relevant today.

- Questions should deal with one thing at a time.
- Use familiar words.
- Consider alternatives to prose. For example, a string of conditions separated by conjunctions might be more easily understood if written as a list.
- Provide adequate answer space.
- Type size should be at least 8 point and preferably 10 point.
- There should be good contrast between the printing and the background.

P WRIGHT & P BARNARD (1976) ²

P WRIGHT, P BARNARD & P WILCOX (1978) ³

Both of these papers dealt with the constraints placed on legibility by the use of character separators ('combs'). The computer world had introduced the idea of little boxes for each character and later changing this to small tick marks "combs" on the bottom of boxes to separate the characters. The research showed how the use of such marks slowed reading of the forms during data entry. This research went hand-in-hand with my own observations that such marks even cause significant errors in reading⁴.

P WRIGHT & P BARNARD (1978) ⁵

This paper discusses two experiments showing that locating questions in column headings yields poorer performance than having the same questions as row headings.

P BARNARD, P WRIGHT & P WILCOX (1979) ⁶

This paper reported on three series of experiments. Note that they dealt with form filling speed, not with accuracy or comprehension.

- Series 1 showed how people are faster endorsing an answer (e.g. circling what applies) than negating one (e.g. delete that which doesn't apply).
- Series 2 dealt with the relative speed of answering questions that had alternatives in the question (e.g. "I am male/female") compared with yes/no type answers. It also showed that having embedded alternatives at the beginning of a sentence made the question more difficult to answer than when they came at the end.
- Series 3 showed that error checking procedures were faster when the form filler had endorsed (e.g. checked) items rather than negated (crossed out) items.

PATRICIA WRIGHT (1979) ⁷

In this paper, Patricia Wright suggests that documents can be subjected to checks which are analogous to the quality control checks which apply to the production of other items.

PATRICIA WRIGHT (1980) ⁸

Patricia Wright's early research taught us a great deal about our poor understanding of basic forms issues. This lengthy article in *Visible Language* reviewed many of the research investigations into form design and usage up to 1980. It dealt with many issues that are too lengthy to discuss in this short paper, but one of the most significant is the conclusion that *"those who seek simple recipes for designing adequate forms have failed to understand the complexities of the problem."* I suggest

that this is a statement that should be placed on every form designer's desk and given to every manager who asks a designer to create a form.

M GRANT, M EXLEY, T LONSDALE & I GODDARD (1982)⁹

These people produced a major British Government report, *Forms Under Control*. While it didn't produce much in the way of new design knowledge, the study showed just how much forms need to be controlled and the problems people faced with government forms. The report came up with 62 recommendations on the management and control of government forms.

ROBERT WALLER (1984)¹⁰

Robert Waller reported on the design of a major British Government form *Claim for Supplementary Benefit*. While this was early days in the field of forms research, the information gathered from the project provided an excellent starting point for later researchers. Some of the conclusions could be modified as a result of subsequent studies, but most of the general conclusions still apply to public-use forms. Some of the many issues that came from the study are:

- Short documents are not necessarily easier than long ones.
- All the textual variables in a form interact.
- Test results require careful interpretation.
- Where a form is drawn with two-column arrangements, the columns need to be visibly separate with space or a strong rule separating them. If these layouts are used and it is necessary to include full-width items, these are best placed at the top so as not to interfere with the reading of the other columns.
- With open-ended questions, the size of an answer space can indicate to the form filler how long the answer should be.
- When a form contains hierarchical information, this is best indicated by the graphics rather than the text.
- If colour is used, use mid-tones which are both legible and conspicuous.
- Small page formats offer less design flexibility.

VM HOLLAND (1981)¹¹, JANICE REDISH AND JOHN SELZER (1985)¹²

The *Document Design Center* at the *American Institutes for Research* in Washington D.C. has produced some very significant work. One important paper, *The place of readability formulas in technical communication*, summarises the knowledge gained about the use of such formulas as the *Flesch Reading Ease Scale* and *Gunning's Fog Index*. The report highlighted how inappropriate these methods are for technical communication.

DAVID FROHLICH (1986)¹³

David Frohlich is now a researcher with Hewlett Packard. His 1986 paper, *On the organisation of form-filling behaviour*, was pioneering work in forms research and the methods he employed form the basis of the observational study approach we still use today. In the paper he reports on his research into the way people use forms and summarises his findings as *seven question principles*.

1. **Principle of linear progression:** work through the questions in the order they appear on the form.
2. **Principle of least reading effort:** only read what seems to be necessary to maintain form-filling progress.
3. **Principle of question routing:** jump directly to a new question if the form tells you to.
4. **Principle of question omission:** miss out questions which don't seem to apply to you.
5. **Principle of question preview:** if in doubt about the meaning of a current question, read the subsequent question.

6. **Principle of question review:** if in doubt about your interpretation of the previous question, review that question and the answer provided.

7. **Principle of topic scan:** if in doubt about the relevance of the current question topic, scan the local topic context.

More recent research has confirmed these principles. The subject is expanded in more detail in Chapter 15 of my book *Forms For People*¹⁴.

D KELLER-COHEN (1987, 1990)¹⁵ AND DAVID SLESS (1990)¹⁶

Midwest Bell's Telephone Bill had been a major problem for the public. Telecom, the Australian Government's telephone company, had purchased the Bell billing system and was having similar problems. Keller-Cohen reported on failure of data gathered from opinion surveys of US users to produce a better bill, highlighting the inherent failure of such methods. The Communication Research Institute of Australia also conducted research, but using different methods, was able to produce vast improvements in user comprehension.

Reporting on the Australian redesign, David Sless said:

"...Telecom devoted considerable effort to the management of human information; the result is a bill that has dramatically improved Telecom's relationship with the public. Overall satisfaction with the billing service has gone from 67% in September 1989 to 84% in April of this year (1990). Moreover, when asked about the causes of dissatisfaction, 47% volunteered the design of the bill as the reason in September 1989, whereas only 4% volunteered this reason in April 1990.

Significantly, there have been no major machine information management changes during the period in which the new bill was introduced. The data on the new bill is almost identical with the old. The major machine information difference is in the final output of the bill onto a high speed laser printer, a change made because of the needs of the human information system.

No other Telco in the world has reported such large improvements in its relationship with its public."

PHILLIP FISHER AND DAVID SLESS (1990)¹⁷

The *Communication Research Institute of Australia* conducted a world first study on the way people use Life Insurance Application forms. The old forms had an error rate of 100%, that is, all forms had one or more errors. After redesign and testing using modern methods, the error rates were reduced to 15% with most of the errors being trivial. The savings in processing time provided the funding to maintain the whole Forms Management Department.

ROBYN PENMAN (1990)¹⁸ AND DAVID SLESS (2002)¹⁹

Robyn Penman reported on studies of insurance documents showing that just designing them by following 'rules' of *Plain English* was not good enough. That alone didn't solve forms problems.

The paper by David Sless contains 4 stories on Plain English published between 1993 and 1996 and looks critically at the claims and evidence provided by plain language advocates.

MICHAEL TYLER (1999)²⁰ AND ROBERT BARNETT (1999)¹⁴

Michael Tyler and Robert Barnett conducted a series of useability studies on forms for aged people produced by different government departments. The studies showed that many of the lessons learned from research with younger people didn't apply to aged people. For example, simple form-filling processes such as sequential reading of questions were replaced by random scanning of pages, and question answer examples were often misinterpreted as being the only possible alternatives. The studies also highlighted the special needs of aged people.

Origin of many form design problems

Many of our problems in form design originated with the industrial revolution, the introduction of assembly line production and the development of large scale offices to manage the factory work volumes. Prior to this, businesses were relatively small and there was little need for office workers as we know them today. But the increasing need to manage many employees led to a rapid increase in paperwork. By the 1880's, large offices were springing up around the world and, especially in America, there was an increasing demand for greater efficiency. In the factory of the early 1900's, experts such as Frederick Winslow Taylor, Frank and Lillian Gilbreth and Henry Gantt were introducing *Scientific Management*, *Work Study*, and *Time and Motion Study*. These methods proved to be very successful in improving factory productivity and so when the office needed greater efficiency, similar methods were applied to office workers³². People such as clerks and bank tellers were judged by how much work they could put through in a given time. Stopwatches on clipboards became a common sight in the office as well as the factory. While these methods played an important part in improving productivity, they led many people to the unfortunate conclusion that the only burden people face in filling out forms is 'time', something I'll examine in more detail later.

Together with this was the idea that 'communication' was the 'sending of messages' and so the emphasis in form design was on the mechanics or layout of the form, not on the human thought processes. For example, in one of the earliest textbooks on form design, *Design and Control of Business Forms* published in 1952, Frank Knox discussed the way to prevent errors with good design.

"Prevention of errors on forms can be promoted by good design. The factors in design that contribute to this important end are:

- a. Completeness of the data and the avoidance of unnecessary data.*
- b. Clear segregation of related vertical columns.*
- c. Ease and accuracy in following a reading a line across the page.*
- d. Clear association of filled-in data with the proper printed captions.*
- e. Well-designed forms which induce a good mental attitude on the part of the office worker."*

All these points are sound but they are typical of most written material on form design, totally omitting any reference to communication and comprehension. Even when the author comments further on "good mental attitude", he relates it only to layout and printing quality. Many experts even used terms such as "human engineering" believing that the best way to improve efficiency was to treat the human body as a machine. So the way to reduce the burden of form filling was to reduce bodily functions such as hand and eye movement. It was a sincere effort to improve office efficiency, but it was misguided.

Breaking away from tradition

One of the biggest lessons I've learned in the past 20 years is that if we're going to have successful forms, then we have to be prepared to break away from traditional practices where these traditions have been researched and found wanting. For those trained and entrenched in the traditional ideas this is a tough "ask". After all, don't the teachers of form design and the traditional practitioners know what they're doing? If it worked for our predecessors, shouldn't it work for us? The answer to the latter question is 'yes'. But the problem is that we just **assumed** that these ideas worked for our predecessors.

When I first became involved in forms research 20 years ago, two things had a big impact on me. First, we found that many of our traditional ideas based solely on experience were valid. Second, we found that many things that we had taken for granted, because everyone else did them, were abject failures. I soon learned that we couldn't assume that what others told us was always right unless we had the proof, or to be academically correct, the 'empirical evidence'.

Common issues relating to forms failure

Modern research and experience have revealed a wide range of forms problems and their solutions—issues that were not understood till the mid 1980's and beyond. The following 12 issues, not in any particular order, show some of the more significant matters learned in recent years, especially in relation to public-use forms.

Issue No. 1 — Wrong emphasis on 'paperwork reduction'

The US Government's *Paperwork Reduction Act* no doubt has good intentions, but the way it has been implemented compared with a careful reading of the Act shows a gross misunderstanding of the issues.

For example, Figure 1 [emphasis mine] shows how the Act describes part of its purpose. This is only the first few paragraphs, but note the sections underlined. Figure 2 is the Act's definition of "burden".

§ 3501. Purpose The purposes of this subchapter are to--

- (1) **minimize the paperwork burden** for individuals, small businesses, educational and nonprofit institutions, Federal contractors, State, local and tribal governments, and other persons resulting from the collection of information by or for the Federal Government;
- (2) ensure the greatest possible public benefit from and maximize the utility of information created, collected, maintained, used, shared and disseminated by or for the Federal Government;
- (3) coordinate, integrate, and to the extent practicable and appropriate, make uniform Federal information resources management policies and practices as a means to improve the productivity, efficiency, and effectiveness of Government programs, including the reduction of information collection burdens on the public and the improvement of service delivery to the public;
- (4) **improve the quality and use of Federal information to strengthen decisionmaking,** accountability, and openness in Government and society;
- (5) **minimize the cost to the Federal Government of the creation, collection, maintenance, use, dissemination, and disposition of information;**

...

Figure 1 — Part of purpose of US *Paperwork Reduction Act*

the term "burden" means time, effort, or financial resources expended by persons to generate, maintain, or provide information to or for a Federal agency, including the resources expended for—

- (A) reviewing instructions;
- (B) acquiring, installing, and utilizing technology and systems;
- (C) adjusting the existing ways to comply with any previously applicable instructions and requirements;
- (D) searching data sources;
- (E) completing and reviewing the collection of information; and
- (F) transmitting, or otherwise disclosing the information;

Figure 2 — US *Paperwork Reduction Act* definition of "burden"

When you look at the Government’s own report for 1996 you find that the TOTAL emphasis is on TIME—not overall burden. Figure 3 shows part of Table 3 from that report.

The whole report is available at <http://www.whitehouse.gov/omb/inforeg/prarep2.html>. Note the words “Hour Burden” in the headings.

Table 3: Total Information Collection Burden by Agency				
	FY 1995 Total Hour Burden	FY 1996 Total Hour Burden	Estimated FY 1997 Total Hour Burden	Percent Change from FY 1995 to FY 1996
Government Totals	6,900,931,627	6,722,553,928	6,599,717,955	-2.6%
Totals, excluding Treasury	1,569,633,594	1,369,708,498	1,305,372,478	-12.7%
Departments:				
Agriculture	131,001,022	107,248,206	96,361,525	-18.1%
Commerce	8,239,828	7,960,779	8,663,555	-3.4%
Defense	205,847,538	152,490,315	127,479,302	-25.9%
Education	57,554,905	49,111,300	44,000,000	-14.7%
Energy	9,187,531	* 4,656,053	* 4,167,682	-49.3%
HHS	152,615,502	137,540,947	123,004,913	-9.9%
HUD	33,769,554	37,245,148	35,742,755	10.3%
Interior	4,165,429	4,357,370	5,069,683	4.6%
Justice	36,670,323	36,162,128	30,910,463	-1.4%
Labor	266,447,906	241,077,975	221,847,999	-9.5%
State	8,678,480	** 596,789	598,475	-93.1%
Transportation	91,022,665	66,167,487	87,832,271	-27.3%
Treasury	5,331,298,033	5,352,845,430	5,294,345,477	0.4%
Veterans Affairs	11,133,887	9,434,552	6,974,355	-15.3%
Subtotal	6,347,632,603	6,206,894,479	6,086,998,445	-2.2%

Figure 3 — Table from White House Report on Paperwork Burden

It’s also of interest to consider the report’s own definition of “effort”. (EMPHASIS MINE).

“When people speak of the burden imposed by information collection requirements (i.e., “paperwork”), they often think of taking a pen to paper and filling out a form. But paperwork burden is a much more complex concept, and it is important to consider all aspects of the burden imposed on respondents by information collections.

For example, even when filling out a simple form, the effort required (or time spent) to collect or otherwise generate the information needed to fill out the form often greatly exceeds the time spent answering the questions or checking the boxes. Taxpayers usually spend much more time calculating and documenting their deductions than actually entering them on their tax forms. Similarly, a firm reporting its inventory of certain chemicals will inevitably spend a great deal of time monitoring those levels.”

Yet the report goes on to say:

“...it is not particularly informative to look at the aggregate number of hours spent filling out government forms.”

Even though the report emphasises “hour burden” in providing information, it acknowledges that this is only **part** of the overall **burden**. Unfortunately, the Act itself is contradictory and while it says that part

of the purpose of the Act is to *“improve the quality and use of Federal information to strengthen decisionmaking, accountability, and openness in Government and society”* and to *“minimize the cost...of information”*, it defines “burden” solely in terms of *“time, effort, or financial resources expended by persons to generate, maintain, or provide information to or for a Federal agency”*.

In case my American readers think I’m just being parochial or anti-American, we have a similar program in Australia called “TimeSaver”. This program also places all its emphasis on the time taken to fill out forms. Ironically, at the official launch of the program, a journalist made the pertinent point that asking people to calculate how much time it was taking them to collect information and fill out a form was actually ADDING to their burden.

Australian Workplace Agreement (AWA)

Employer Filing Application

Part 1 • Employer Details

EMPLOYMENT ADVOCATE

Your Filing Application must be made on this form. **Facsimile (fax) applications and applications prepared on photocopies of the form will NOT be accepted.**

Call the Office of the Employment Advocate on **1300 366 632** if you would like further details.

1 What is your Australian Business Number (ABN)?

2 What is the full legal name of the business?

5 Is the employer a member of an Employer Association?

No ☐ Go to next question

Yes ☐ Which one?

TIME SAVER Please provide an estimate of the time taken to complete this form.

Include:

- The time actually spent reading the instructions, working on the questions and obtaining the information
- The time spent by all employees in collecting and providing this information

Hours Minute:

Figure 4 — Australian “TimeSaver” box

A typical example of wrong emphasis on speedy form filling is the use of ‘upper left corner captions’ in boxes, often referred to as ‘ULCC’.

Full name (include all given names)

JOSEPH WILLIAM HAGGERTY

Figure 5 — Example of Upper Left Corner Caption design

Now **IF** you’re going to put a caption inside a data box, then the upper left corner is generally the best position. It keeps it out of the way of the data, which, after all is the most important element of the data field. But the key word in all this is **“IF”**. The idea of the ULCC design comes from the desire to make forms faster to use and to take up as little paper as possible. But this desire is based on a false assumption from the industrial revolution of the 1800’s—the belief that people are just mechanical devices or machines and the way to improve efficiency is to lessen the mechanical movements of arms, legs, eyes, etc. But this overlooks the role of the mind and thought processes in filling out forms.

Using such boxes may be fine on commonly used internal forms, but research in the late 20th Century has consistently shown that errors are more likely to occur if form fillers scan the form rather than moving through it systematically. If all you give them is ULCC boxes and section headings, then scanning is the order of the day.

Note what David Sless¹⁹ says with reference to the design of insurance forms:

“If we were to improve the form, we had to alter form-filling behaviour—restructure the dialogue between

form and form filler. We did this by introducing what we later called the directed or algorithmic form. Pioneered in the UK (Waller, 1984)¹⁰, this type of form changed form-filling behaviour from one of topic scanning—where the form-filler decides which questions to answer on the basis of a minimal reading of captions or headings—to one in which the form-filler can only fill in the form by making a series of decisions, that can only be made by reading the questions.”

So, while ULCC is correct IF you want captions inside the boxes, it doesn't follow that ALL captions should be inside boxes or, for that matter, that you should even use captions in place of plain language questions. In practice, the traditional approach fails if you're interested in accuracy.

Form-filling time can certainly be a burden for the form filler, but assuming that it's the *only* problem totally overlooks what are often the greatest burdens to the form fillers.

THE PSYCHOLOGICAL BURDENS

We must never underestimate the psychological burden of forms. Confusion is a common problem, especially when questions are replaced by cryptic field captions that the user doesn't understand. There's a tendency for people to panic, especially if they are elderly. We've done extensive research with old people. Most had 60 or more years experience in filling out forms and many told us that they had never filled out an easy-to-use form. In fact, their experience was such that even when shown a simple form, they just expected it to be bad. We found that as soon as they detected a problem, they started to panic and worry about whether they were doing the right thing.

Other psychological burdens are frustration and anger. Ironically, while many form designers try to reduce the amount of paper in a form with small captioned boxes, the lack of sufficient space and the resulting clutter create an even bigger burden. Our observational useability testing has consistently shown that people don't mind a multipage form as long as the questions are easy to read, easy to understand, and with adequate answer space.

Closely tied to the above burdens is the use of inappropriate language. It may be jargon, ambiguity, or even cultural. For example, Australia, like the United States, has a multi-tiered governmental structure—Federal, State and Local. Each tier has its own laws and often Departments with the same name such as “Department of Health”. To make matters worse, the Departments don't talk to one another and immigrants from other countries find it difficult to understand why they often provide the same information multiple times. People become confused and frustrated.

A major cause of confusion with government forms is bureaucratic or legal language. We design many government forms and this is one of the most common problems we face. Many administrators want to use the language that's in the legislation, but often the form fillers don't understand it. Usually the law requires a signature, but if the person has to sign the form and state that they have answered everything correctly, then they **MUST** understand the form. I've had administrators tell me that they provide a counter or phone help service to explain the form to users. My response is that if they can explain the meaning of a question in person, why not ask the question correctly in the first place. Surely, the key point about a good form is getting the correct answer, not having bureaucratically or politically correct questions.

In recent times, with the downsizing of organisations, help staff are in short supply and we're getting more and more cries for assistance from government departments who don't have the resources to answer the questions of form fillers. While I'm not an advocate of downsizing and outsourcing, it does seem to be having a positive influence on the production of better forms.

THE BURDEN OF CORRECTING ERRORS

This is an internal burden—a time and cost burden on the processing staff that have to deal with the errors. In one Australian example, each year 550,000 people filled out a government application form for financial assistance. Close to 100% of the forms had one or more errors resulting in most of them being sent back to the applicants for more information. Some of the forms were sent back to

users up to 4 times to get correct information. We estimated that even the basic processing cost to correct the errors was over 2 million dollars per year; that's only \$4 per application. The real cost was estimated to be closer to 10 million dollars, and that was only ONE form.

In another case, a State Government utility surveyed 2000 completed forms, half of which were internal, and they found 80% to have one or more errors. Again, the error correction cost was huge.

A State Government Department had an application form for business incorporation that resulted in letters to 90% of the applicants asking for more information. They didn't know the cost.

I found an insurance corporation allocating 20 minutes per form in its work planning JUST to deal with errors—and that's the errors they knew about. Even worse were the actions of the data entry operators. Because the documents were batch processed, if there was an error that would cause a batch to be rejected, the operators would key data that they knew would be accepted. These errors were never reported to management or the applicants.

Another case was a government grant application form that had 97% of applications wrongly completed. After extensive analysis of the errors, the redesigned form was a vast improvement.

Finally, I want to refer to two major life insurance corporations that each had close to 100% of their forms with one or more errors. As part of the redesign process we conducted extensive useability studies. Subsequently, it was reported to us from one of those companies that the error rate had been reduced to around 5% of forms with one or more errors. What was just as encouraging was that during testing, one complex 24 page form were being completed by applicants in under 30 minutes and virtually error-free. The solution was the design and testing methods that I'll describe later.

THE BURDEN OF POOR INFORMATION

This is related to the psychological burden—the burden on the public when forms are processed with errors that come back to haunt people later. For example, take the case of an insurance application/proposal form that has wrong information because the form's questions were misleading or confusing.

Later, a claim is rejected because the insurance company finds out that the original information was wrong. The blame is placed on the form filler who loses out through no fault of their own—simply because the insurance company produced bad forms.

These burdens show that designers must consider far more than just filling time. The greatest cost burden to the organisation lies elsewhere. These will be even more evident as we consider further issues.

Issue No. 2 — Lack of understanding of human communication

Many people look on communication as simply the process of transferring knowledge or messages from one person to another. The emphasis is on the **transfer process** and the **method** of sending the message: so we have the common expression "*getting your message across*". But if communication was this simple—if we were all born with identical built-in coding and decoding devices—if we all spoke the same language and all understood every word in exactly the same way—we wouldn't have the problems that do exist. If communication is so simple, why do we have so many misunderstandings?

SHARING INFORMATION

Here is where we start to go wrong. The word "communication" means to "make something known" or "to impart" and comes from the Latin "*communicare*", which means "to make common". This is not just writing or talking, but imparting the **meaning and intent** of what is said. Effective communication only takes place when understanding of the words is being shared. But research has shown that this sharing can be hindered if either party does not believe that sharing of understanding is taking place. Other aspects of this will be made plainer in the following sections.

THE PROBLEM OF ETHICS, TRUTH AND MOTIVATION

The whole business world knows that ethics and truth are a major issue in form design. Admitting

that we live in a lying and cheating society is hard for many people because it implies that we all have the propensity to lie—it reflects on the character of our fellow citizens. But in form design we must face reality; if people generally aren't this way, why do we have signatures on forms, witnesses, statutory or notarized declarations, and proof of identity? Much of this is not malicious—may be just self-preservation, the survival of the fittest—or simply, "everybody else does it so why shouldn't I?" We have to understand that there is a great deal of suspicion when it comes to forms.

Dr Robyn Penman²¹ made a salient point in the conclusion of her paper, *Discourse in courts*:

"...with the intent of maximum efficiency of information gathering, the court has neglected a critical feature of all human talk-exchanges—that the information given is a function of the nature of the relationship in which it is given."

Why do people fill out the form? 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 ticket as an opportunity to become rich legally. Many form fillers do not trust the organisations that own the forms. The problem is well summed up in this comment from a U.S. Government report on tax simplification²².

"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."

You need to recognise that you are frequently dealing with hostile form-fillers and when you present them with a form that even remotely looks like deception, there is no guarantee of honest answers.

The problem is magnified by the imperialist view that many administrators have of their forms as pointed out by David Sless²³.

"The difficulty faced by many ... is that they come from cultures that automatically place them at the centre of things; they are dominated by a long tradition of imperialist ways of thinking which, irrespective of the ideological framework, creates the illusion that they are able, as if by natural right, to impose their way of thinking on the world."

The imperialists 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." It's all very well to say that people "have to learn", but 550 years of filling out forms has shown that they don't learn. And if people don't fill out the forms correctly, what you have is not information, but fiction.

Issue No. 3 — Failure to understand the role of graphics and layout in forms language

This is closely tied to *Issue No. 2*. Many people place a lot of emphasis on 'plain language' but this is only part of the story because the graphical elements and layout become a part of the language and grammar of the form. And the research has shown that it's not just the shape of the graphics but also the position and consistency of use. There is certainly a strong case for writing in clear language, but this alone will not solve your problems. As Robert Eagleson²⁴ points out in his book *Writing in Plain English*:

"Writers of functional documents should be concerned with layout as well as text. Familiar words, easy sentences and clear organisation are essential, but without good design documents can become misleading. This causes confusion and errors, wasting time and money. You must therefore look at the whole document – both text and layout."

We tend to think of 'grammar' in terms of the words and sentences, but since the language of forms involves the graphic elements and layout, these form an important part of the grammar of the form. For example, size of type used for headings, thickness of ruled lines, position of ballot (check) boxes and layout of tables all play an important part in guiding the users through the form.

This is a many faceted subject that is too large to discuss here in more detail, so I recommend reading chapter 4 of *Forms For People*¹⁴.

Issue No. 4 — Failure of section headings on public-use forms

The first time I came across this problem in the mid 1980's. Australian Taxpayers tended to skim the form and look at the headings in much the same way as they read a newspaper. They ignored the section headings that they didn't understand, often in the mistaken belief that if they didn't understand the meaning then the section wouldn't apply to them. A classic example was a heading "REBATES" in a Tax Return form. Low income earners were the ones to gain the greatest benefit from a tax rebate, but often their literacy level was such that they didn't understand the word and they skipped the section entirely.

NOTE: If you consider that your situation is not fully covered by the above,		
REBATES • Complete all columns for each claim made.		
DEPENDANTS • Reduce the rebate otherwise allowable by \$1 for every \$4 by which • A proportionate rebate may be claimed where two or more persons		
26	Maintenance of Dependents—If you are claiming a rebate at Items 29 or 30, state whether you were the sole contributor to the maintenance of the dependant(s) concerned. If NO, attach a statement giving the basis on which your rebate is calculated.	
27	Overseas Dependents—If you are claiming a rebate in respect of any dependants living overseas, state the instructions concerning overseas dependants contained in "The 1978 Form 'S' Tax Guide".	
28	SPOUSE or DAUGHTER-HOUSEKEEPER Name.....	Place of Residence of Dependant. If residing with you, write 'with me'. If not, state full address of Dependant If a Dependant for full year, write 'Full Year'. If not, state period a Dependant
29	INVALID RELATIVES 16 YEARS AND OVER (State also relationship to you and date of birth) Name.....	
30	PARENTS/PARENTS-IN-LAW Name.....	

Figure 6 — Poor use of section heading

Most section headings are redundant. A typical example is the heading "APPLICANT INFORMATION" immediately before a caption that says "Applicant's name". If the captions or questions are corded correctly then the heading serves no purpose.

We've found that with public-use forms it's better to leave out section headings and just have sequentially numbered questions starting from "1" as shown in Figure 7. The only exceptions would be when the headings are necessary to aid office processing, but even then I'd place the form filling needs ahead of the processor needs and not include the headings without thorough useability testing.

10 What task was being performed at the time of the incident?
(eg. Teaching Year 10 English, Typing for 2 hours, Mowing school yard)

11 Was the incident caused by, or related to, the above task?

No ☐ **Go to 14**

Yes ☐ Go to next question

12 What training have you received in the task being performed at the time of the incident?

Tick All That Apply

None ☐

Induction ☐

Vocational/Task Specific ☐

Other ☐ **Give details below**

Figure 7 — Part of a questionnaire form

Issue No. 5 — Poor placement of instructions

The most common problem I’ve encountered with normal form filling is that most people don’t read preliminary form-filling instructions. I’ve watched many hundreds of people fill out forms during observational studies and it has been very rare to see the form fillers read the instructions. Anecdotal “evidence” from support staff providing help to form fillers confirms this. Part of the problem form fillers have is impatience and wanting to get on with the task of filling out the form, but there is also an element of believing that such instructions aren’t necessary. Many form fillers *think* they know what to do and just go straight to the form, especially if they’ve previously filled out the same or a similar form. This relates to my earlier comments about communication. If people don’t perceive the words to be INFORMing them of something they need to know then they don’t see it as “INFORMaTion” and communication hasn’t taken place.

A closely related issue is the failure to read footnotes and notes at the end of a form. We’ve found consistently that the inclusion of footnote indicators such as asterisks (*) just don’t work. People either ignore them or don’t even understand what they mean. Notes on the back of the form are generally ignored. Once people have finished filling out a form they tend to not go further.

Further problems occur when form-filling instructions are separated from the form or are included in multiple locations. Moving back and forth between the form and the instructions causes some people to miss information and lose the flow of the questions. Great care is needed when doing this. Placing some instructions in the form and others in an explanatory sheet or booklet also causes confusion and people generally only choose one location, missing the other instructions.

All the research to date has shown that the best overall place for instructions is right at the point where the person needs them. If they need to have some information in order to answer a question then that needs to be provided right at that question, not elsewhere. If, due to legal or other complexities, the instructions are very long and need to be placed elsewhere then great care needs to be taken to ensure that they will be read. In this case useability testing, described later in this paper, is essential.

Issue No. 6 — The problem of open-ended questions

Much of the recent work in forms research has brought to light some interesting aspects of form design and its relationship to whether people tell the truth¹³. For example, open-ended questions starting with: “If you are in this category, then give us the following information“ are often left blank by form fillers. Yet, when the same question is asked with a “No/Yes” option such as “Are you in this category?”, the form fillers invariably answer it. The evidence seems to indicate that some people think that deliberately failing to answer a question is not the same as giving a wrong answer—that is, leaving it blank is not lying so that is OK. Figure 8 shows an example of a question that encourages misleading information—people tend to leave this sort of question unanswered. Figure 9 shows a better arrangement.

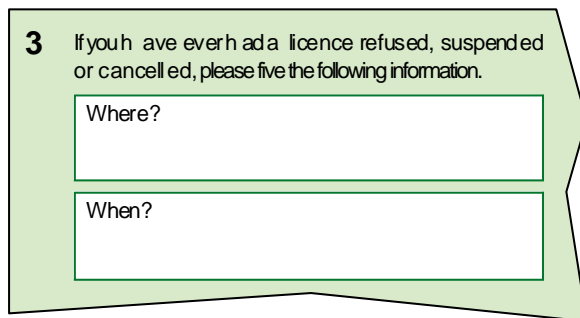


Figure 8 — Question that encourages lying

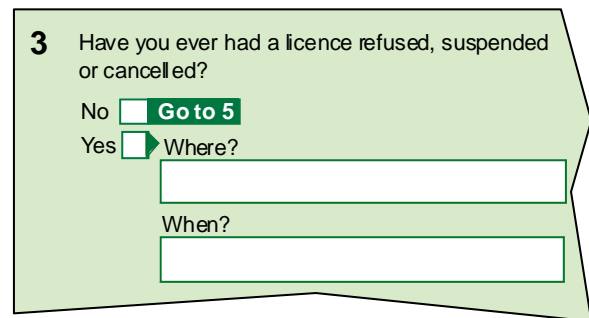


Figure 9 — Question that encourages truth

Issue No. 7 — People have psychological problems with forms

Robert Miller²⁵ found from years of experience and a number of research projects that people have many dislikes when it comes to forms. The reasons given are quite varied and include the following:

- They hate to write anything down.
- They don't like the form because they don't know the answer to the questions on the form.
- They hate to be pinned down.
- They think the form asks apparently irrelevant questions.
- They comment that “the same stuff has to be put on every form”.
- They find the appearance of the forms intimidating to fill out.
- They get frustrated because there isn't enough room to answer.
- They say that forms demand too much writing.
- The meaning of the question or category of response is unclear.
- The sequence of items doesn't make sense.
- Unpleasant operations have to be performed in filling in the form.
- They don't know how precisely (or imprecisely) the question can be answered and be OK.
- They don't know what questions are contingent on answers to other questions.
- They don't know how an erroneous entry can be changed.

Miller makes an important comment about the way form designers treat the end users.

“If one examines virtually any filled out form, what is most impressive to the eye is the printed content of words and lines and boxes, whereas the user's work in producing his data on the form is, to the eye, unimpressive and insignificant. It should be unnecessary to moralise on this inverted state of affairs. The extent to which the forms designer can create a manifest form that, while accomplishing its purpose as a support for the user's task in filling it, still retreats to the background by putting the user's entries into the visible

foreground, will have made a contribution to human dignity and the worthwhileness of human effort.”

We can see that many people regard forms as an imposition. They want to get through them as fast as possible. They may not care whether or not the form is accurately filled out as long as they can justify their actions to someone who may query their answers: “*I didn’t know I had to fill that out!*”. Form-fillers tend to skip questions that they think are irrelevant or do not apply in their circumstances.

Issue No. 8 — Inability to fill out a matrix

A matrix in a form is a table with both top and side headings and many people have difficulty comprehending the structure. This is something that often surprises form designers. Yet research has shown that a lot of people have difficulty matching the rows and columns. It’s not just a problem for forms. Even designers of bus and train timetables have found the same problems and there’s been much research into how to make them more effective.

In 2001, the Northern Ireland Statistics & Research Agency conducted a review of data needs for the 2001 census and found that there were “*a number of problems with the matrix form*” compared with using a separate page for each person.²⁶ This supports the results from other research⁵. Our experience with matrix layouts has been so bad that we would only use them when there are no other options.

Figure 10 shows an alternative for a simple matrix with attention-getting headings. Figure 11 shows an alternative to a more complex matrix using a drop shadow for each group that would have been a row in the matrix.

7 Details of witness(es)

Witness 1 — Full name

Witness 1 contact phone number

()

Witness 2 — Full name

Witness 2 contact phone number

()

Witness 3 — Full name

Witness 3 contact phone number

()

If you want to nominate more than two persons, complete additional details on a separate sheet and attach to this application.

Full name and address

Postcode

Relationship to you

Portion of benefit %

Date of birth / /

Full name and address

Postcode

Relationship to you

Portion of benefit %

Date of birth / /

Figure 10 — An alternative to a simple matrix Figure 11 — An alternative to a more complex matrix

Issue No. 9 — Failure to sign forms

Many organisations find failure to sign forms a problem, especially with applications and similar forms. It isn’t that people don’t want to sign, but often the failure to see the signature space. We’ve overcome this almost entirely in questionnaire type forms by making the declaration or signature area the final question and giving it a number like all the other questions.

Issue No. 10 — Failure to read declarations

Even when given a separate question number, many form fillers just sign the form and don't read the text of the declaration. As much as possible, we try to turn the declaration statements into separate questions. Figure 12 shows a declaration that would not be read by many form fillers.

- I certify that, to the best of my knowledge, the details entered on this Application and Agreement are true and complete.
- I have read and understand the 'Terms and Conditions' that apply in relation to the Application and agree to abide by them in the event that my application is approved;
- I informed the Employee before they signed that personal information about them is being provided to the Department and they gave their consent to this.
- If the Employee has not signed at Item 7, I have provided the reason(s) why the signature has not been obtained and certify that I have made all reasonable attempts to obtain the Employee's signature and informed them that personal information about their employment is being provided to the Department and the employee consented to this.
- I understand that if I knowingly make any false or misleading statement, I may be liable for prosecution.

Figure 12 — Example of a declaration that would not be read by many form fillers

Figures 13 and 14 show how some of the text could be turned into questions. Another problem with declarations not being read occurs when answer spaces are embedded in the declaration text as shown in Figure 15. Many form fillers would fail to check on of these boxes.

5 Do you understand that if you knowingly make any false or misleading statement, you may be liable for prosecution?

No ☐ **Your application cannot be accepted**

Yes ☐

14 Will the Employee be filling in and signing the Employee's section of this form?

No ☐ Go to next question

Yes ☐ **Go to 17**

15 Did you make all reasonable attempts to obtain the Employee's signature?

No ☐ **Your application cannot be accepted**

Yes ☐

16 Why have you not been able to obtain the signature?
Attach supporting documentation (if any).

Figures 13 and 14 — Text into questions

I declare that:

☐ I have provided all information requested by my Consultant and have chosen to purchase the policies recommended by the Consultant;

OR

☐ I understand that:

(a) if I have not provided all information requested by my Consultant or Agent;

(b) if I have chosen to purchase a life policy that differs from the Consultant's or Agent's recommendation;

(c) if I have chosen to receive advice about only a limited range of products; or

(d) if I have not been given any financial advice and have not undertaken a needs analysis;

then I may be making a financial commitment to a policy that may not be appropriate to my needs and objectives.

If the benefit from this insurance is to be paid to a trust, company or partnership, the person who signs this form must have authority to bind that organisation.

Signature of Policy Owner

Figure 15 — A declaration with embedded questions

Issue No. 11 — Using inappropriate theory

Many form designers apply theoretical ideas from other disciplines such as graphic design, publicity and advertising, book and magazine publishing, and the use of color in areas such as fashion and decorating. But people don't read forms like a magazine or book. They don't work through a form in the same way that they read an advertisement, and principles of color in other fields have little to do with forms.

Here is a typical example. Like many people teaching form design in the 1960's and 1970's I had used the "Le Courier" table of the legibility of color as shown in Figure 16. Yet closer examination should have told us that there was something seriously wrong with this table. No one in their right mind would want to print a form on black paper (7 and 11) or, for that matter, on red paper (8 and 12). We also know now that red printing has poor legibility for small text and should be used with great caution. So what's the story? Well, the answer is that Le Courier's table related to road traffic signs. When we know that, the table makes sense. Forms legibility is an entirely different matter.

Le Courier Color Legibility Chart		
<u>Order of Legibility</u>	<u>Color of Printing</u>	<u>Color of Background</u>
1	Black	Yellow
2	Green	White
3	Red	White
4	Blue	White
5	White	Blue
6	Black	White
7	Yellow	Black
8	White	Red
9	White	Green
10	White	Black
11	Red	Yellow
12	Green	Red
13	Red	Green

Figure 16 — Le Courier color legibility for road signs

Issue No. 12 — Blindly following tradition

This virtually sums up all the others but I believe it is important enough to treat separately. First, it's important to stress that traditional ideas aren't necessarily wrong. The issue here is making sure that our traditional ideas are sound, and not just following them solely on the basis of "*everyone else does it so it must be right*".

Here is just one example, but it illustrates the problem. When we go back over many years and look at the earliest textbooks we find that invariably examples of forms have open-ended boxes. That is, there are no vertical rules at the left and right ends of tables. It has been such a common practice that most designers just assume it's the correct thing to design.

Figure 17 shows *part* of an Immigration form that has to be completed by incoming visitors to the USA (note that the original form is much longer). I was told by a Qantas person that every Boeing 747 flight carries 200 extra forms and that on a full flight they are all used because people make so many mistakes. And that's in spite of having examples in the on-board booklet, flight attendants walking up and down the aisles helping people, videos showing how to complete it and a public address announcement advising people to fill out the form "*from the bottom up*". Even when you get to L.A. airport, there are people walking up and down the lines of incoming passengers examining the forms and helping them to

correct any errors before they even get to the Immigration Agent. In spite of this, the back of the form has a statement that it can be completed in 6 minutes (2 minutes to learn what to do and 4 minutes to fill it out), a ‘fact’ that every incoming passenger knows isn’t true. The problem is caused by the form fillers perceiving the relevant caption to be *under the line* rather than *over the space*. Form fillers don’t realise their mistake till they get to “Airline and Flight Number”, then they need to get another form.

Figure 18 shows how easily the high error rate could be corrected by enclosing the lines in a box.

Immigration and Naturalization Service
Form I-94W (05-29-91) - Arrival Record
VISA WAIVER

1. Family Name

2. First (Given) Name

3. Birth Date (day/month/year)

4. Country of Citizenship

5. Sex (male or female)

6. Passport Number

7. Airline and Flight Number

8. Country where you live

9. City Where you boarded

10. Address While in the United States (Number and Street)

11. City and State

Government Use Only

Figure 17 — Part of a US Immigration form: *a high error rate caused by faulty graphics*

Immigration and Naturalization Service
Form I-94W (05-29-91) - Arrival Record
VISA WAIVER

1. Family Name

2. First (Given) Name

3. Birth Date (day/month/year)

4. Country of Citizenship

5. Sex (male or female)

6. Passport Number

7. Airline and Flight Number

8. Country where you live

9. City Where you boarded

10. Address While in the United States (Number and Street)

11. City and State

Government Use Only

Figure 18 — A better approach: *completing the box would solve the problem*

Testing forms

Traditional methods such as opinion surveys, pilot studies, readability scores and focus groups consistently produce flawed results when examined in the light of real data²⁷. They concentrate on treating people as machines but ignore their minds and the complexities of their social interactions.²⁸ To produce quality forms we need a different approach—one that lets us see the forms in action and 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.

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. The aim is to study the document in action in an environment as close as possible to the real world. We don't just want to know what people *think* of the form or how they *think* we should ask the questions. We want to know about their behaviour—what *really* happens when they fill out 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.

Along with observational studies, we make a lot of use of error analysis. This involves studying 100 or even as many as 300 completed forms with the assistance of staff that are familiar with the forms. A major benefit of error analysis comes before a redesign. Systems analysts often want to do away with the old forms entirely and start fresh, but we've found that there is great value in studying the data on old forms to learn where people typically go wrong. That way, we don't repeat past bad design mistakes.

Chapters 25 to 29 of *Forms For People* cover forms testing methodology. I also strongly recommend "*A Practical Guide to Usability Testing*" by Joseph S. Dumas and Janice C. Redish²⁹ which is available from *Amazon.com*. Although emphasising human computer interface, it is very relevant to forms. I also recommend "*User and Task Analysis for Interface Design*" by JoAnn T. Hackos and Janice C. Redish³⁰.

Using electronic forms to reduce form-filler errors

If you really want a form to work, to collect accurate data and to provide for effective communication, then an electronic version is an invaluable asset. However, just computerising a bad form is not the solution³¹. Likewise, just creating a fillable PDF file of an existing paper form *without programmed intelligence* is not going to do anything to reduce errors. In fact, it's likely to INCREASE

errors. That's not a fault of the PDF format, simply a misapplication where the aim is to reduce preprinting rather than reducing the user burden. Even when you have an electronic form, you need to ensure that the form is properly designed and tested, that you have the appropriate language and routing devices, and above all, that an *electronic* version is suited to the needs of the users. It should also go without saying that you need software that will allow you to develop the relevant 'intelligence' in the form without the need for complex programming. It is for this reason that we invariably use Shana's *Informed Designer*. I believe that it is still the most versatile and easy-to-use electronic forms software available at the present time—and you don't have to be a computer programmer to use it.

Since we started working with electronic forms in the early 1990's we've had many enquiries from organisations that want to use them. But generally the motivation is off base—the primary reason being reduction in paper, printing, distribution and storage costs. In other words, it's a *forms management* issue. Another look at the US Government's *Paperwork Reduction Act* shows the emphasis:

“...ensure that information technology is acquired, used, and managed to improve performance of agency missions, including the reduction of information collection burdens on the public...”

Australia has similar legislation with the idea that using a computer eases the burden of providing information. Yet when I access Australian Government web sites I find that most of the available forms are either Word documents or print-only PDF's. Neither of these reduces the user burden. print-only PDF's may add to the user burden on some forms by not making use of color and other preprinting capabilities, while Word forms generally print poorly due to the limitations of the software when associated with various printer drivers. Even when PDF's are fillable, it is rare to find them intelligent. If forms are intelligent, the functionality tends to be very basic. My point is that the PRIMARY BENEFIT of electronic forms is not transferring the printing cost to the end user, but dramatically reducing user errors. When you consider that the research has consistently shown that most public-use forms have 80 to 100% errors, this is a significant factor.

Ways to reduce errors

Irrespective of the software used, what follows is a summary of the major ways in which we improve the accuracy of electronic forms data collection.

CONDITIONAL TABBING

Normal tabbing takes the user through every field on the form. Conditional tabbing allows form fillers to bypass questions or data areas that aren't relevant to them. This speeds form filling, but its greatest benefit is that it reduces the incidence of form fillers entering data in fields that should be left blank. It works by changing the next cell depending on what has been entered elsewhere in the form. However; a word of warning—it only works when form fillers use the TAB key. Given that some people prefer to use the mouse, it doesn't guarantee control over form-filling progress.

LOCKING USERS OUT OF FIELDS

This goes hand in hand with conditional tabbing and involves locking people out of fields they aren't supposed to complete by making data entry impossible. You may also be able to lock users out of whole pages.

CONTROL OVER HELP MESSAGES

This is one of the great benefits of electronic forms. We know that most people don't read instructions, so being able to display help messages ONLY when they're needed can be a great asset to improved form filling. By doing this, the form isn't cluttered. There are a variety of ways you can use 'help'. The help messages could display in a separate window or perhaps in a status bar. Even better is to have very important messages display automatically at appropriate times.

CONTROL OVER QUESTION TEXT AND INSTRUCTIONS

This is similar to the previous item, but goes further in changing field captions and questions

dynamically depending on the user need. It's also possible to display special routing instructions when users enter data in certain fields or check ballot boxes.

FIELD FORMATTING

This is where the designer presets the format for a field. It could be a number field that is limited to 2 decimal places, a phone number field that must follow a certain format, a date field that forces the use of 4 digit years or places month before day, or even special alphanumeric code formatting.

AUTOMATIC FIELD CALCULATIONS

This is where intelligent electronic forms have a big advantage over non-intelligent forms or just paper forms. Many forms such as Tax Returns require the form filler to add amounts or make other calculations. Given the inability of many people to carry out even basic arithmetic calculations, being able to automatically fill total and other calculated fields is a great help in reducing error.

EDIT CHECKS

These detect errors and report them to the form filler and are among the most important aspects of error reduction in electronic forms. One of the best examples I've seen is a series of over 100 Australian Government forms used by motor vehicle manufacturers to record the engineering details of new vehicles before they can be approved for use on Australian roads. Vehicles are required to comply with Australia's stringent vehicle safety design rules, so to ensure compliance the rules are built into the forms as field calculations. If any element of data is unusual, it presents an appropriate warning message. If a field contains invalid data that prevents compliance with the law, error messages appear and the form can even be prevented from being electronically transmitted. The extensive automation in the forms has not only provided the government with accurate data, but also provided manufacturers with a vastly improved turn-around on their applications for approval.

Conclusion

The simple conclusion is that there is no excuse for forms failure. If designers are prepared to step out of the bounds of tradition, apply proven techniques and use appropriate testing methodology, then forms CAN be made to work and do what management wants from them. SUCCESS IS GUARANTEED.

Bibliography

Back copies of *Visible Language* can be purchased, see:

www.id.iit.edu/visiblelanguage/Directory.html

Articles from the *Communication Research Institute of Australia* can be obtained, see

www.communication.org.au/

Papers by Robert Barnett (including a number not listed here) can be obtained from:

www.rbainformationdesign.com.au

Books by Robert Barnett can be purchased from BFMA

www.bfma.org

Some books mentioned are available from book stores and on line at

www.amazon.com

Journals and other publications are generally available from university libraries.

- 1 Wright, Patricia & Barnard, P. 'Just fill in this form'— A review for designers, *Applied Ergonomics*, 6.4, 213-220, 1975.
- 2 Barnard, P & Wright, P. *The effects of spaces character formats on the production and legibility of handwritten names*, *Ergonomics*, Vol 19, 81-92, 1976.
- 3 Barnard, P, Wright, P & Wilcox, P. *The Effects of Spatial Constraints on the Legibility of Handwritten Alphanumeric Codes*, *Ergonomics*, Vol 21 No. 1 73-78, 1978.
- 4 Barnett, Robert. *Forms for People, Chapter 18*, Canberra, Australia: Robert Barnett and Associates Pty Ltd, 2005
- 5 Wright, P & Barnard, P. *Asking multiple questions about several items: the design of matrix structures on application forms*, *Applied Ergonomics*, 9.1, 7-14, 1978.
- 6 Barnard, P, Wright, P & Wilcox, P. *Effects of response instructions and question style on the ease of completing forms*, *Journal of Occupational Psychology*, 52, 209-226, 1979.
- 7 Wright, Patricia. *The quality control of documents*, *Information Design Journal*, Vol 1, 33-42 (1979)
- 8 Wright, Patricia. *Strategy and Tactics in the Design of Forms*, *Visible Language XIV/2* 151-193 (1980)
- 9 Grant M., Exley M., Lonsdale T. & Goddard I. *Forms Under Control*, London: Management and Personnel Office, 1982
- 10 Waller, Robert. *Designing a government form: a case study*, *Information Design Journal* 4/1, 36-57 (1984)
- 11 Holland V. *Psycholinguistic Alternatives to Readability Formulas*. Washington D.C. American Institutes for Research, 1981
- 12 Redish, Janice & Selzer, John . *The Place of Readability Formulas in Technical Communication*, *Technical Communication*, Fourth Quarter 1985
- 13 Frohlich, David. *On the organisation of form-filling behaviour* *Information Design Journal* 5/1. (1986)
- 14 Barnett, Robert. *Forms for People*, Canberra, Australia: Robert Barnett and Associates Pty Ltd, 2005
- 15 Keller-Cohen D., *Organizational Contexts and Texts: The Redesign of the Midwest Bell Telephone Bill*, *Discourse Processes*, 10 417-428, 1987
- Keller-Cohen D., Meader B., Mann D., *Redesigning a Telephone Bill*, *Information Design Journal*, 6/1 45-66, 1990
- 16 Sless, David, *Information management: getting it right*, Paper presented at Managing Information Today, the 7th National Convention of the Records Management Association of Australia, 1990
- 17 Fisher, Philip & Sless, David. *Information design methods and productivity in the insurance industry*, *Information Design Journal* 6/2, 103-129, (1990)
- 18 Penman, Robyn. *Comprehensible insurance documents: Plain English isn't good enough.*, (Canberra: Communication Research Institute of Australia, 1990)
- 19 Sless, David. *Problems with plain language*, Canberra, Australia, Communication Research Institute of Australia, 2002
- 20 Tyler, Michael. *Health care forms for the aged & chronically ill: an Australian case study*; Canberra Australia, Robert Barnett and Associates Pty Ltd 1999
- 21 Penman, Robyn. *Discourse in Courts: Cooperation, Coercion, and Coherence*, *Discourse Processes* 10, 201-218.(1987)
- 22 IRS, *IRS Tax Forms Simplification Project Interim Progress Report*, New York: Siegel and Gale Inc. 1980
- 23 Sless, David. *A Matter of Position*; 1987 Presidential Address Australian Communication Association.
- 24 Eagleson, Robert, *Writing in Plain English*. Canberra: Australian Government Publishing Service, 1990
- 25 Miller, Robert. *Transaction structures and format in form design*: *Information Design*. Chichester: John Wiley and Sons Ltd. 529-544. 1978
- 26 Northern Ireland Statistics & Research Agency, *2001 Census Review and Evaluation: Data Needs Evaluation Report*, 2001
- 27 Barnett, Robert. *Empirical bases for documentation quality*, paper presented at First Conference on Standard on Quality in Documentation, Center for Professional Writing, University of Waterloo, Ontario, Canada, 1991
- 28 Shulman Arthur, Penman Robyn and Sless David, *Putting information technology in its place: organisational communication and the human infrastructure*. In J Carroll (ed.) *Applied social psychology and organisational settings*. Hillsdale, New Jersey: Laurence Erlbaum. 1989
- 29 Dumas, Joseph S. & Redish, Janice C. *A Practical Guide to Usability Testing*. ISBN 1-84150-020-8, 1999 (revised edition) Originally published 1993 by Ablex Publishing. Revised edition from Intellect, Ltd.
- 30 Hackos, JoAnn & Redish, Janice C. *User and Task Analysis for Interface Design* , ISBN 0-471-17831-4 , New York, NY: John Wiley Publishing, 1998.
- 31 Barnett, Robert. *Don't computerise a bad system and expect things to improve*, Canberra, Australia: Robert Barnett and Associates Pty Ltd, 2002
- 32 Graham, Ben S. *Paperwork Simplification*, Industrial Management Institute, 1950
[available from <http://www.worksimp.com/articles/archives.htm>]