Usability: A Business Case

Susan Weinschenk
Chief of Technical Staff
Human Factors International

Usability: A Business Case

"In recent years, usability has become more than a concept. In many organizations, usability is an important part of software development. And more and more companies are discovering that not only is usability good for users, it's also good business."

Introduction

This paper concentrates on the business case for usability, aligning usability efforts with the goals and needs of the organization, and finally implementing usability in a cost-effective way. The paper is a revision and update of a 1999 publication entitled, *Usability is Good Business*, authored by George M. Donahue, Susan Weinschenk and Julie Nowicki.

Background: What is Usability?

Usability is a measure of how well a computer system—such as a software program, a corporate Web site, an intranet, an extranet or an e-commerce site—facilitates learning; helps users remember what they've learned; reduces the likelihood of errors; enables them to be efficient; and makes them satisfied with the system.

The notion of "end users" or "intended users" is implicit in the definition: Usability must be considered in the context of the system's everyday users. Since a system's developers are rarely its intended users, their finding the system easy to use does not mean end users will have the same experience.

Usability engineering is the process by which we design and develop products that fit in with how people think, learn, behave, and play. Its roots go back to World War II and cognitive psychology.

In recent years, usability has become more than a concept. In many organizations, usability is an important part of software development. And more and more companies are discovering that not only is usability good for users, it's also good business.

Benefits: Usability and its Advantages

"*The benefits of usable technology include reduced training costs, limited user risk, and enhanced performance…. American industry and government will become even more productive if they take advantage of usability engineering techniques.*" Al Gore.

As the above quotation from Al Gore, former Vice President of the United States, suggests, usability engineering is a sound business and management strategy, offering significant economic benefits to the organizations that apply it.

Share this white paper:

""

- To a company developing IT systems, for example, increased employee efficiency and satisfaction may translate into lower personnel costs.

- For an e-commerce site, higher end-user efficiency may mean better sales.

- Usability engineering can also help companies reduce development costs and shorten development cycles.

- Of course, users also benefit from usability, whether they're company employees using an internally developed IT system, consumers using commercial software or Internet-surfing shoppers looking to buy from e-commerce sites.

When technology, such as web sites, intranets, or software is easier to use it allows the users to complete tasks more easily and quickly. An employee looking up his or her 401K benefits at a corporate intranet site spends only five minutes on the task, rather than 10, and can therefore get on to the next task of their work day. In many cases, the improvement of efficiency may lead directly to an increase in profitability.

The relationship between usability and profitability is most direct in e-commerce, as this quotation from Forrester Research suggests:

> *Usability goals are business goals. Web sites that are hard to use frustrate customers, forfeit revenue, and erode brands. Executives can apply a disciplined approach to improve all aspects of ease-of-use. Start with usability reviews to assess specific flaws and understand their causes. Then fix the right problems through action-driven design practices. Finally, maintain usability with changes in business processes.*

Usability-engineered sites also offer visitors potential improvements in efficiency and productivity. Interpreted in the context of online shopping, this means an enjoyable, rather than frustrating, experience. No time is wasted searching for merchandise or figuring out how to buy it. It is an experience in which the shopper feels confident that his credit-card number and other personal information will be secure—an online shopping experience that leaves no doubt in the shopper's mind that the experience was superior to making the purchase from a brick-and-mortar shop.

However, many of these online shopper wannabes won't succeed in making a Web purchase, because many e-commerce sites are still too difficult for the average user.

Share this white paper:

Increased sales and customer satisfaction

When systems match user needs, satisfaction often improves dramatically. In a 1992 Gartner Group study, usability methods raised user satisfaction ratings for a system by 40%. Better user satisfaction can lead to better sales for e-commerce sites and commercial software applications alike. On the Web, users can quickly become frustrated and leave the site. Usable sites enhance user experiences, making them likely to stay longer on the site and also return. Online shoppers spend most of their time and money at sites with the best usability, according to Jakob Nielsen. Good navigation and site design make it easier for users to find what they're looking for and to buy it. The potential for usability affecting the e-commerce bottom line positively is quite favorable, according to Nielsen: "It is common for usability efforts to result in a hundred percent or more increase in traffic or sales."

Similar conclusions can be drawn about the connection between improved usability and better commercial software sales. Given two commercial software products with the same functions at the same price, customers prefer the product that's easier to use. Wixon & Jones did a case study of a usability-engineered software product that increased revenue by more than 80% over the first release of the product (built without usability work). The revenues of the usability-enhanced system were 60% higher than projected. Many customers cited usability as a key factor in buying the new system.

A competitive edge

Ease of use is always high on customers' lists of what they most want in a hardware or software system. Giving customers what they want would seem to mean giving them usability. Users appreciate software that doesn't waste their time or try their patience with complicated user interfaces. Building usability into software tells users that the manufacturer values their time and doesn't take their patronage for granted. Usability can help differentiate commercial software systems from competing systems. For example, Microsoft Office and Lotus SmartSuite have employed usability in advertising to distinguish their products from each other.

The importance of having a competitive edge in usability may be even more pronounced for e-commerce sites. Such sites commonly drive away nearly half of repeat traffic by not making it easy for visitors to find the information they need.

Share this white paper:

And it is the repeat customers who are most valuable. New users at one e-commerce site studied spent an average of $127 per purchase, while repeat users spent nearly twice that. Usable e-commerce sites build goodwill. Users recognize the effort put into making their e-commerce experience easy and efficient by returning to usable sites. Moreover, one of the biggest obstacles to e-commerce is trust. Consumers must trust a site before they will disclose the personal and financial information often required to make an online purchase. An e-commerce trust study found that "navigation" and "presentation"—both usability concerns—were essential to creating trust.

Advertising advantages

Stressing usability can help distinguish an e-commerce site from other sites and differentiate commercial software applications from one another. Compaq, for example, made usability part of their advertising campaigns, as has Microsoft.

The advertising value of usability remains largely unexploited, despite its great potential. This seems especially so in e-commerce/e-business, where the customers are increasingly non-technical consumers who won't suffer technical difficulties gladly.

Better notices in the media

The media has discovered the connections among usability, productivity and cost-effectiveness, especially on the Internet. Nowadays, companies are regularly taken to task about usability in the hard copy of business publications and on the electronic pages of e-business sites. *Business Week* asserted: "Companies have paid lip service to ease of use…. But… to get wider dispersion, manufacturers have to make PCs and their software as user-friendly as toasters." *CIO Business Web Magazine* pointed out: "On a corporate intranet, poor usability means poor employee productivity; investments in making an intranet easier to use can pay off by a factor of 10 or more, especially at large companies." If the media is aware, can the shareholders be far behind?

In 1993, Nielsen studied the attention devoted to usability issues in the trade press reviews of new software products and found approximately 18–30% of the accounts in press reviews were usability related. Another study found an average of 11.2 usability-related comments per review.

A good review in an industry publication can be worth millions in advertising. Such reviews increasingly include usability as a criterion. One of *Internet Week*'s most popular columns, for example, features user interface design and usability specialists discussing the relative usability of various e-commerce and e-business sites.

Share this white paper:

Reduced development and maintenance costs

Focusing on real user needs and knowing what you're designing and for whom, can mean fewer design arguments and fewer iterations. Usability techniques allowed a high-tech company to reduce the time spent on one tedious development task by 40%. At another company, usability techniques helped cut development time by 33–50%. Companies that develop information-technology systems for internal use can often reduce development, support, training, documentation and maintenance costs by applying usability-engineering techniques. These techniques are quite effective at detecting usability problems early in the development cycle, when they're easiest and least costly to fix. By correcting usability problems in the design phase, American Airlines reduced the cost of those fixes by 60–90%.

One rather famous study found that once a system is in development, correcting a problem costs 10 times more than fixing the same problem in design. If the system has been released, it costs 100 times more relative to fixing in design.

This study also found that 80 percent of software life-cycle costs occur during the maintenance phase. Most maintenance costs are associated with "unmet or unforeseen" user requirements and other usability problems.

Software development projects in both IT and commercial software environments often overrun their budgets and schedules. Overlooked tasks and similar problems, issues that usability techniques like user analysis and task analysis are eminently capable of addressing, often cause such overruns. Usability work has even enabled the release of a product ahead of schedule. Developers of commercial software also stand to benefit greatly from usability. Whether or not a company conducts usability testing, its customers will, in effect, usability test the system. However, correcting problems after a system has been released can be 100 times more costly than correcting them prior to release.

A certain printer manufacturer, for example, released a printer driver that many users had difficulty installing. Over 50,000 users called support for assistance, at a cost of nearly $500,000 a month to the company. To correct the situation, the manufacturer sent out letters of apology and patch diskettes (at a cost of $3 each) to users. They ended up spending $900,000 on the problem. No user testing of the driver was conducted before its release. "The problem could have been identified and corrected at a fraction of the cost if the product had been subjected to even the simplest of usability testing," wrote the researcher.

Share this white paper:

Improved productivity and operational efficiency

People are more productive using usability-engineered systems. One company showed a 25% increase in throughput and a 25% reduction in user errors after screens were redesigned according to usability principles. With its origins in human factors, usability engineering has had considerable success improving productivity in IT organizations. For instance, a major computer company spent $20,700 on usability work to improve the sign-on procedure in a system used by several thousand people. The resulting productivity improvement saved the company $41,700 the first day the system was used. On a system used by over 100,000 people, for a usability outlay of $68,000, the same company recognized a benefit of $6,800,000 within the first year of the system's implementation. This is a cost-benefit ratio of $1: $100.

Increased productivity may also mean that it's possible to do as much, or more, with fewer people. One company saw its data-entry staff decrease by a third after usability improvements to the system. Difficult systems can also be stressful to use. Alan Cooper, the "Father of Visual Basic," worked on a project to improve the usability of an airline in-flight entertainment (IFE) system. IFEs are essentially computers connected via a local area network that provide seatback movies and music to travelers on transoceanic routes.

One airline's IFE was so frustrating for the flight attendants to use that many of them were bidding to fly shorter, local routes to avoid having to learn and use the difficult systems. The time-honored airline route-bidding process is based on seniority. Those same long-distance routes have always been considered the most desirable. For flight attendants to bid for flights from Denver to Dallas just to avoid the IFE indicated a serious morale problem.

People try to avoid using stressful systems. If they must use them, stress tends to undermine their productivity. As Cooper's anecdote illustrates, poor usability may undermine morale. It can lead to turnover. Employee turnover costs can be significant; they equal one-and-a-half times the employee's salary, according to one study.

Share this white paper:

Reduced training costs

Usability-engineered systems frequently require less training. When user interface design is informed by usability data and expertise, the resulting user interfaces often facilitate and reinforce learning and retention, thereby reducing training time. As usability expert Jakob Nielsen has pointed out, "Every hour you can cut off user training is one hour more for productive work and one hour less to pay an instructor."

At one company, end-user training for a usability-engineered internal system was one hour compared to a full week of training for a similar system that had no usability work. Usability engineering allowed another company to eliminate training and save $140,000. As result of usability improvements at AT&T, the company saved $2,500,000 in training expenses.

Lower support costs

The cost of providing telephone support for computer software has been estimated between $12 and $250 per call, depending on the organization. [21] Support costs can add significantly to an internal IT system's total cost of ownership. Usability engineering can help keep support costs in line as well. For example, after spending $70,000 to build a usability lab (a one-time cost) and to usability test an accounting system used by car dealerships, Ford Motor Company got support calls down to zero. The initial savings was estimated to be worth $100,000. Presumably, the benefits of the reduction in calls continued to be realized in subsequent years. When a software product is understandable and easy to learn, users don't need to call support as often. This means that commercial software companies need fewer people to work the support lines. (And perhaps fewer DJs to entertain those on hold.) At Microsoft several years ago, Word for Windows' print merge feature was generating a lot of lengthy (average = 45 minutes) support calls. As a result of usability testing and other techniques, the user interface for the feature was adjusted. In the next release, support calls "dropped dramatically"; Microsoft recognized "a significant cost savings."

Reduced documentation costs

Because their user interfaces tend to be predictable, consistent and coherent, user documentation is often easier to create for usability-engineered systems. Documentation that's easier to create is written more quickly and is less prone to inaccuracies.

Share this white paper:

And usability-engineered systems often require *less* documentation. This means that usability-engineered systems can be less costly to document than systems developed without usability. Usability work eliminated the need to reprint and distribute a manual, saving one company $40,000 in one year.

Litigation deterrence

Although software makers don't seem liable to the same sorts of litigation as, for example, a manufacturer of medical equipment may be, there is some risk of poor usability being an element in lawsuits and other actions. For example, the Standish Group reported that American Airlines sued Budget Rent-A-Car, Marriott Corp. and Hilton Hotels after the failure of a $165 million car rental and hotel reservation system project. Among the major causes of the project's disintegration were "an incomplete statement of requirements, lack of user involvement, and constant changing of requirements and specifications," all issues directly within usability's purview.

Though applying usability techniques in a software development project is no guarantee against lawsuits, as consultant Charles L. Mauro remarked, "It is hard to imagine that a plaintiff's attorney would push to trial knowing that a corporation had employed professional usability engineering methods in the design of their products… usability is a litigation deterrent."

Quotable Stats: Usability statistics

Here are some general statistics to think about:

Every $1 invested in UCD returns between $2 and $100. (Pressman, 1992)

Nearly 80% of software life-cycle costs occur during the maintenance phase. (Pressman, 1992)

According to the Standish Group, 60% of that maintenance phase is due to re-work because the user requirements were not clear in the beginning. Approximately 63% of software projects exceeded their estimates with the top four reasons all related to product usability:

• Frequent requests for changes by users

• Overlooked tasks

• Users' lack of understanding of their own requirement.

• Insufficient user-to-analyst communication and understanding

(Lederer and Prassad, 1992)

Share this white paper:

An average of 48% of application code is devoted to the user interface and 50% of the development time required for the entire application is devoted to the user interface portion. (Myers,1995)

Some compare usability to quality assurance. There are important similarities:

- Both seek to improve system quality
- Both are cost-effective
- Both can reduce development time

Quality and Usability

In spite of the above important similarities, they also have important differences:

- Usability focuses on the user interface, on the elements the end user directly interacts with, and the quality-of-use issues s/he directly encounters: screens, windows, menus, error messages, consistency, navigation, orientation, etc.
- Usability engineering's purpose is to enhance the quality of the end user's experience while quality assurance focuses on elements with which users do not interact directly, such as code integrity.
- Quality assurance is now familiar to most software professionals, but most software professionals are not as familiar with usability engineering.

Understanding its benefits and cost-effectiveness may lead to a wider appreciation of usability engineering.

How do you make the case for usability in hard dollars and cents? The best way to work with ROI for usability is to decide ahead of time which metrics make the most sense for your project and your organization. That way you can plan ahead for the ROI and for the metrics.

Productivity

The first project for which I calculated ROI pertained to a large banking application with 5,000 users around the world who would be using the application to process loan applications eight hours a day. Here is what we calculated:

We planned to do a usability test of the current product. We assumed:

- We do the test and discover five problems.
- We fix the five problems NOW during the prototype stage and we will save the users an average of one minute per problem.
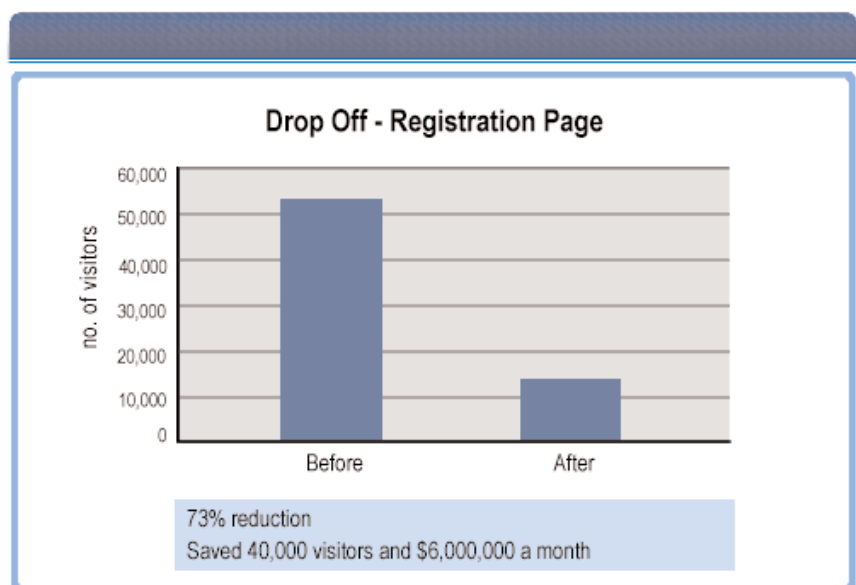
Share this white paper:

Planned Metrics: Calculating Usability ROI Ahead

- So we will save users five minutes for all the problems per day.
- There are 5,000 users using this software x 5 minutes = 25,000 minutes a day.
- There are five days a week, so that is 125,000 minutes a week.
- They work 50 weeks a year, so that is 6,250,000 minutes a year.
- This is 104,166 hours per year.
- Using a loaded labor rate of $15/hour, this means the savings in $$ from time alone is $1,562,490.
- Expected life of the project is five years. We'll use three here = $4,687,470.
- Then we'll save on training on development time for not having to fix later, on help desk calls.

We came up with savings of $11,000,000 over the life of the project for spending $40,000 now.

Improving drop-off rate

- HFI worked with an online office supplies retailer. Their concern was the large number of drop-offs at the Web site. People were not finishing their order from the Web site. Before the redesign, the drop-off rate from the registration page was 55,000 visitors a month. After redesign, this was reduced by 73%. They saved 40,000 users and $6,000,000. In addition, they had a 67% increase in repeat customers.

Drop Off - Registration Page

73% reduction
Saved 40,000 visitors and $6,000,000 a month

Share this white paper:

Reducing training time

HFI worked with a large oil producer in Canada on their intranet. They were most interested in cutting down on the training time necessary for employees to learn how to navigate around the intranet. The training time went down from one day to 15 minutes.

- The company has 4,000 permanent employees (not counting maintenance contractors).

- Assuming that 3,000 have to use the intranet, 3,000 people x 7 hours = 21,000 hours.

- Assume a rate of pay of $15/ hour = $315,000.

- Productivity improvements: monthly reports went from 2 hours to 15 minutes.

- Round DOWN to 1 hour x 1000 employees = 1,000 hours a month x $15 = $15,000 savings a month = $180,000 savings a year.

Reduction in Training

no. of training

Before   After

8 hours to 15 minutes

So for the first year, the savings are $180,000 + $315,000 = $495,000. Cost was about $22,000. Benefit = $473,000.

Share this white paper:

Reducing calls to the help desk

HFI designed an interface for a US energy company. Data on typical help support desk calls after a new application is launched internally, showed that the average number of calls a day for the first month is 300. In the first month of the new intranet application we designed, the help desk had 0 calls.

Reduction of 300 calls a day x 20 days for the first month = reduction of 6000 calls x $10/call = $60,000. (The industry estimate is between $12 and $225 per call!)

Average number of support calls per day

no. of calls

Other Intranet Applications   HR Express

0 help desk calls after launch!

Identifying ROI metrics

The more specific you can be about YOUR situation to YOUR key stakeholders, the more persuasive you will be.

Instead of saying: "We'll be able to increase sales at the Web site," say, "If we modify the registration page at the Web site, we will reduce drop off rates by 70%."

According to Forrester, there is no standard metric that a company can or should rely on. So make sure the metric you use is of importance to your organization and your key stakeholders.

Every product is different. Think about what would have the most impact for you.

Share this white paper:

Though it's good that usability can benefit both companies and end users, the focus in usability cost-benefit analysis should be on the benefits that are the most relevant to the group for which the analysis is conducted. As Mayhew and Mantei write:

> "*One needs to decide the relevant audience for the analysis and then what the relevant categories of benefits are for that audience, because not all potential benefits are relevant to all audiences.*"

For example, a commercial software company would be more interested in a cost-benefit analysis that focused on usability's potential for reducing development costs and increasing customer satisfaction than on its potential to improve end user productivity.

Here are examples of how to calculate ROI:

- A single project may have more than one measurement that applies.

- Clickstream analysis can also be useful, but you have to support it with a human interpretation. An article from CIO Magazine (November 15, 2002) discusses that many companies still don't analyze customer drop-off rates and cautions about being misled by the data. Just knowing where a drop-off happened doesn't tell you WHY. You need to use clickstream data to determine locations and then usability evaluations to say why.

Typical ROI Measures

ROI Measurement	Criteria
Conversion rate	# of visitors who buy or % increase
Avg order value or net dollar/visitor	$$$
Increase in pages viewed	# or % increase
Decrease in drop off	# of people or % reduction
Decrease in typical # of calls to help desk	# or %
Reduction in training	# of days/hours reduced
Increase in Usage	# of people, # of sessions, or % increases
Savings of User's time	# of minutes/hour and/or multiplied by labor rate
Savings of Programmer's time	# of minutes/hour and/or multiplied by labor rate
Error Reduction	# or % or resulting $$ amount if any

Share this white paper:

Organizing projects according to ROI

One way to start working on matching your projects to their ROI implications is to work through the thought process

:• Project to problem to consequence to cost of NOT fixing to Usability Fix to ROI.

Examples:

ROI Calculation Examples

Productivity:

(Time Saved) X (Employee Cost) X (# of Employees) = Cost Savings

(1 hr a week) X ($30/hr) X (1000 Employees) = $30,000 per week

= $1,5,000,000 a year

ROI Calculation Examples

Errors

(# of errors) X (Avg. repair time) X (Employee cost) X (# no. of employees)
= Cost Savings

(2 errors/week) X (60 mins) X ($30/hour) X (100 employees) = $6000/week

= $300,000/year

ROI Calculation Examples

Cost of Development and Maintenance:

(# of changes) X (avg. hours/change) X (cost of developer) X (4, if change is late!)
= Cost Savings

(20 changes) X (8 hours each) X ($40/hour)
= $6,400 if fixed early, or $25,600 if changed late

Share this white paper:

Budgeting for ROI

To plan ahead for usability, you will want to think about how to prioritize your usability priorities in terms of alignment with business goals and building a usability infrastructure. If you were only thinking of particular problems or projects, you would use a form of the table from above. But if you are thinking about budgeting, you may want to think in a different way other than just problems. Another alternative is to think about your usability work from the point of view of business goals. You can do a quick ROI analysis, or you can spend more time and be thorough.

Planning ROI

Product	Problem	Consequence	Cost of NOT fixing	Usability Fix to Apply	ROI ($$$ saved or added less cost to fix)

Planning ROI

Product	Problem	Consequence	Cost of NOT fixing	Usability Fix to Apply	ROI ($$$ saved or added less cost to fix)
Internet SIte	Customer application form is difficult to use	Have a high drop-off rate; Application forms not completed. Application forms completed with errors. Increase of calls to the Help Desk.	Estimate we are losing 25 potential customers per day. Each customer is worth $600 a year in revenue. $xxx,xxx Estimate error costs at $xxx,xxx Estimate costs of Help Desk calls to be $xxx,xxx.	Redesign application form. Test the redesign and iterate.	$200,000 saved less $30,000 cost = ROI in 1 year of $170,000.
Internet SIte	Lack of standards	Pages all look different depending on where at the site you go; affects branding plans and also increases time to get content on the web	Loss of brand value; no $ amount but important to organization. 1/3 rework to fix pages that are not consistent after they have been put on the net	Develop page design standards and templates. Train staff how to use templates.	$300,000 rework cost saved per year less $125,000 for standards and templates = ROI of $175,000 in first year alone.

Share this white paper:

The following scenario exemplifies a usability cost-benefit analysis that is relevant to the audience and business context. The method is that suggested by Mayhew and Mantei. While in the scenario, the anticipated benefit is a productivity improvement from usability work on an internally developed IT system, the same methodology can be used to perform usability cost-benefit analyses for other benefits and in different organizations, including e-commerce and commercial software companies.

Cost-Benefit Analysis Scenario

Problem based Budget Strategy

Product	Problem	Consequence	Cost of NOT fixing	Usability Fix to Apply	Cost of fix for 2005 Budget
Internet Site	Customer application form is difficult to use	Have a high drop-off rate; Application forms not completed. Application forms completed with errors. Increase of calls to the Help Desk.	Estimate we are losing 25 potential customers per day. Each customer is worth $600 a year in revenue. $xxx,xxx Estimate error costs at $xxx,xxx Estimate costs of Help Desk calls to be $xxx,xxx.	Redesign application form. Test the redesign and iterate.	$30,000
Internet Site	Lack of standards	Pages all look different depending on where at the site you go; affects branding plans and also increases time to get content on the web	Loss of brand value; no $ amount but important to organization. 1/3 rework to fix pages that are not consistent after they have been put on the net	Develop page design standards and templates. Train staff how to use templates.	$125,000

Step 1: Seizing the opportunity

You work at Pretty Good Systems (PGS). You would like PGS to consider integrating usability engineering techniques into development efforts because you think it could be valuable. You're aware of complaints from the human resource department about the company's internally developed human resource system—Getting In Good (GIG). You're also aware that development on GIG Version 2 will begin shortly. You propose to your boss that you do a usability cost-benefit analysis and she approves.

Share this white paper:

Business Goal Aligned Budget Strategy

Business Goal	How Usability/HF engineering applies	Usability intervention to apply	Cost of intervention (for 2005 Budget)
Increase Self service	make online forms easier to use	Usability test & redesign	$40,000
Increase cross sell	grab attention/ draw customers to additional parts of site.	Redesign of layout & graphics	$20,000

You interview the HR director and several GIG users. They say GIG is too compli-cated. They can't understand why there's one screen for entering new applicant data, another for entering data about the applicants who have been interviewed, another if the applicant is hired, etc. "There's not that much applicant data," a GIG user tells you. "I don't see why we need so many different screens. It takes so long to go through them all." You play around with the system a bit; it seems to you that the users may be right about the number of screens.

Step 2: Identifying the benefit and how to achieve it

Your discussions with the HR staff help you identify a potential usability tech-nique and its benefits. A user-centered screen redesign with a single applicant, single data screen approach will improve ease of use and productivity.

You talk to the GIG development manager and GIG developers. You discuss allow-ing applicant data to be entered on one screen, as opposed to on several. The developers tell you it was quicker to "modularize" applicant information in GIG on the basis of the applicant's status in the hiring process phase.

"We can do it the way HR likes, but it would take an extra 30 person-hours or so," the development manager says.

Step 3: Estimating cost

Having identified a potential usability benefit (fewer screens) and a technique to make the benefit possible (redesign), you're ready to begin your cost-benefit analysis. To be on the safe side, you allow 40 hours for the change. To get the cost of making the change, you multiply 40 hours by the loaded average salary of a PGS developer, which is $60 an hour: $2,400.

Share this white paper:

```
      40    :   hours to make change
    x $60   :   average hourly loaded salary of developer
    ____

  $2,400   :   cost of change
```

Currently, processing a job application in GIG takes an average of four hours. The average loaded salary of a GIG data-entry person is $25 an hour. You multiply $25 by four to get the current cost of processing a single application: $100.

```
       4    :   average number of hours to process one job
                application in existing system
    x $25   :   average hourly loaded salary of data-entry staff
    ____

    $100    :   average cost of processing one job application in
                existing system
```

On average, PGS receives about 1,000 job applications a year. Multiplying $100 by 1,000 gives you the average annual cost of processing job applications at PGS: $100,000.

```
    1000    :   average number of job applications processed per year
   x $100   :   average cost to process one job application in existing
                system
   ____

 $100,000   :   average annual cost of processing job applications
```

Step 4: Estimating benefit

On the basis of your discussions with the HR department and your own familiarity with GIG, you believe the one-screen-per-applicant approach could cut application-processing time by half. This is your unit of measurement for usability. But to be on the safe side, you assume a 25% reduction in processing time of each job applicant. This would reduce the average processing time from four hours to three hours per applicant. You multiply three by $25 to estimate the cost of processing a single employment application if this improvement to GIG is made: $75. (This "translates" the usability measurement of time into a monetary figure.)

Share this white paper:

```
    3   :  expected average number of hours to process one job
           application in new system
 x $25  :  average hourly loaded salary of data entry staff
 ----
  $75   :  expected average cost of processing one job application
           in new system
```

Multiplying $75 by 1,000 tells you how much reduction you can expect in the average annual cost of processing job applications at PGS using this single usability enhancement: the result is $75,000, or $25,000 a year less than the current average processing costs.

```
   $75    :  expected average cost of processing one job application
 x 1000   :  average number of job applications processed per year
  ____

 $75,000  :  expected average annual cost of processing job
             applications in new system.
```

But you have to factor in the cost of making the changes ($2,400), so you subtract that amount from the anticipated first-year savings ($25,000):

```
 $25,000  :  anticipated first-year savings
-$ 2,400  :  cost of change
  ____

 $22,600  :  expected first-year benefit
```

The expected first-year benefit is $22,600. But the typical lifespan of a system at PGS is three years. Since the cost of making the changes will be incurred once, you don't need to deduct that cost from the benefit amount for the last two years. Adding the benefit amount for the first year ($22,600) to the benefit for the second and third years ($50,000), you get the total lifetime benefit of the anticipated usability work on GIG: $72,600.

```
 $22,600  :  expected first-year benefit
 $50,000  :  anticipated second- and third-year benefit combined
  ____

 $72,600  :  anticipated total benefit
```

That's a cost-benefit ratio of 1:30.25: $72,600 / $2,400 = 30.25

Share this white paper:

In this example, the benefits to the HR department and the benefits to PGS as a company will be different. Because the data-entry process in HR will be streamlined, GIG2's users should be able to get more work done; better job satisfaction is likely to be their main benefit. To PGS's management and shareholders, the main benefit would be the $72,600 costs savings over GIG2's lifespan. Though management and shareholders may be happy to know that usability engineering will improve job satisfaction in the HR department, your cost-benefit analysis focuses on the cost savings, because you know that's the benefit most relevant to the person for whome you're conducting the cost-benefit analysis: your boss.

In order to realize the cost effectiveness of usability activities, you will need to:
• Move from an emergency room model to a wellness program.
• Budget for usability according to business needs.
• Use offshore resources where it makes sense.

From an emergency room model to a wellness program

Many organizations start in, and some stay stuck in, an emergency room model of usability activities.

They do usability work on projects that are in trouble and try to save them. They work on projects piecemeal. If you want to make usability activities cost effective, you will need to change to a wellness program: you will need to develop a sustainable usability infrastructure.

Here are some examples of instituting sustainable usability:

• One of our clients, an energy company based in the US, has identified an executive champion to get "buy-in" for usability activities throughout the organization. They used HFI's product, Usability Central, to start a repository of usable designs, user-centered design methodology, guidelines and standards, and customized page templates. We worked with them to design a first showcase project with the new templates so that the benefit of the guidelines, templates, and user-centered design could be quickly seen and felt throughout the company. Staff received appropriate training in usability and the use of the new templates.

• A project manager recently told me that the first intranet application they designed using the new templates took five weeks for developers to code. And then the second and subsequent projects of similar size only took five days. They were reusing their usability investment, rather than starting over each time.

Share this white paper:

- An insurance company for which I have worked developed corporate-wide interface standards and guidelines for their Internet sites and applications. They trained and mentored the usability staff, implemented a user-centered design methodology, started a usability lab, and now have a fully working usability group of Certified Usability Analysts

- Another client of HFI's, a bank, has instituted institutionalization. Managers are clear on the value of usability. They are establishing a set of metrics to be used across projects. They have an executive champion as well as a position called "manager of user experience." They use the Schaffer-Weinschenk Method™ for their user-centered methodology. They have developed interface standards, an ongoing training department, and showcase projects.

The usability infrastructure

In order to make usability cost effective, you must build a usability infrastructure. Eric Schaffer, the CEO of HFI, gives detailed descriptions of how to do this successfully in his book *Institutionalization of Usability: A Step-by-Step Guide*.

Dr. Schaffer's book discusses how to make usability sustainable, and the steps to making usability routine.

You can also evaluate how mature your organization is.

You will want to show something concrete as early as possible, such as an intranet repository, like Usability Central, of your user-centered design method, guidelines, standards, and templates.

You will want to customize the standards and templates and use them right away for a showcase project. And you will want to train people at varying levels in user-centered design.

The 10% rules

To get people thinking about usability in their organization, we talk about the 10% Rules:

1. If you add up your IT staff in your organization, including business analysts, programmers, etc., your usability staff should total 10% of your total IT resource allocation.

2. Does usability take up 10% of each project budget?

Share this white paper:

Examples:

- You have 400 IT staff; you should have 40 usability staff.

- Overall IT budget is $25M per year; usability group budget = $2.5M per year

- Project is $1,000,000; usability work = $100,000

Share this white paper:

In order to make usability sustainable and cost-effective, consider when and how you will incorporate global and offshore staff. HFI has a Center of Excellence (CE) program based in Mumbai, India. Our own HFI staff has teams of trained and certified usability engineers in Mumbai to help support us in our work.

Share this white paper:

Our clients are beginning now to put together their own Center of Excellence teams. This allows them to maintain a local usability group and then support the usability work with global resources.

In HFI's white paper and Webcast: *Meeting the Demand for Usability Expertise: An Offshore Model*, Dr. Eric Schaffer describes when, how, and why to consider offshore resources.

Conclusion

The evidence for usability's cost-effectiveness is strong. Moreover, the likely beneficiaries of usability are not just end users; organizations that develop software and Internet applications may benefit significantly from usability engineering. Performing usability cost-benefit analyses within one's own company may be a first step toward introducing usability engineering techniques into a company.

Usability is good business. Working to improve usability via the techniques of usability engineering, such as user analysis, prototyping, and usability testing, can result in significant economic benefits to companies that develop IT applications, e-commerce sites, and commercial software. Users of these systems benefit as well.

Share this white paper:

References

1. Bias, Randolph G. and Mayhew, Deborah J., eds. (1994) "Cost-Justifying Usability." Harcourt Brace & Co., Boston.

2. Bosert, J. L. (1991) "Quality Functional Deployment: A Practitioner's Approach." ASQC Quality Press, New York.

3. Cheskin Research + Studio Archetype/Sapient. (1999) "E-commerce Trust Study." http://www.studioarchetype.com/cheskin/index.html

4. Cohen, Jackie, and Maryann Jones Thompson. "Mass Appeal." *The Industry Standard*, June 14, 1999.
http://www.thestandard.com/articles/display/0,1449,4927,00.html

5. Cooper, Alan. (1999) "The Inmates Are Running the Asylum: Why High-Tech Products Drive Us Crazy and How to Restore the Sanity." SAMS, Indianapolis.

6. Gilb, T. (1988) "Principles of Software Engineering Management." Addison Wesley, Reading, MA.

7. Gore, Al. (1998) "A Letter from Vice President Al Gore," *Common Ground*, July 1998, Vol. 8, No. 3, p. 1.

8. IBM Web page. "Cost Justifying Ease of Use."
http://www.ibm.com/ibm/easy/design/lower/f020400.html

9. Kalin, Sari. "Mazed and Confused." *CIO Web Business Magazine*, April 1, 1999.
http://www.cio.com/archive/webbusiness/040199_use.html

10. Manning, Harley. (1999) "The Right Way To Test Ease-Of-Use." *Forrester Research*, April 1999.
http://www.forrester.com/ER/research/brief/excerpt/0,1317,5299,FF.html

11. "Why Most Web Sites Fail." *Forrester Research*, September 1998.
http://www.forrester.com/ER/research/report/excerpt/0,1338,1285,FF.html

12. Nielsen, Jakob. (1993) "Is Usability Engineering Really Worth It?" *IEEE Software*, 10, 6 (November) 90–92.

13. Nielsen, Jakob. (1993) "Usability Engineering." AP Professional, Boston.

Share this white paper:

14. Nielsen, Jakob. "Loyalty on the Web." *Alertbox*, August 1, 1997.
http://www.useit.com/alertbox/9708a.html

15. Nielsen, Jakob. "The Web Usage Paradox: Why Do People Use Something This Bad?" *Alertbox*, August 9, 1998.
http://www.useit.com/alertbox/980809.html

16. Nielsen, Jakob. "Web Research: Believe the Data." *Alertbox*, July 11, 1999.
http://www.useit.com/alertbox/990711.html

17. Pressman, R. S. (1992) "Software Engineering: A Practitioner's Approach."
McGraw Hill, NY.

18. Scerbo, M.W. (1991) "Usability engineering approach to software quality."
Annual Quality Congress Transactions, 45, 726–733.

19. Standish Group. (1995) "Chaos." Research Report.
http://www.standishgroup.com/chaos.html

20. Wiklund, Michael E. (1994) "Usability In Practice: How Companies Develop User-Friendly Products," Academic Press, Boston.

21. Wildstrom, S. (1998) "A computer user's manifesto." *Business Week*, Sept. 28, 1998.

22. Wixon, D. and Jones, S. (1992). "Usability for Fun and Profit: A case study of the design of DEC RALLY version 2." Internal Report, Digital Equipment Corporation.

23. Wong, Stephanie. (1999) "Estimated $4.35 Billion in E-commerce Sales at Risk Each Year." Zona Research Press Release, June 30, 1999. http://www.zonaresearch.com/info/press/99-jun30.htm

24. Zona Research. (1999) "Shop until You Drop? A Glimpse into Internet Shopping Success." Zona Assessment Paper, Issue 6.
http://www.zonaresearch.com/promotions/samples/zaps/zap06.html

25. Schaffer, E. (2004) "Institutionalization of Usability: A Step-by-Step Guide."
Addison-Wesley, Boston.

Share this white paper:

About Susan

Susan Weinschenk, PhD, CUA
Chief of Technical Staff
Director of Training
Human Factors International

Susan Weinschenk is Chief of Technical Staff and Director of Training at Human Factors International (HFI). Prior to working with HFI, Susan was the owner and principal consultant with Weinschenk Consulting Group. For 25 years she has used her expertise in psychology to design technology products, including Web sites and applications, for the Fortune 500.

Dr. Weinschenk's work spans legacy systems, graphical user interfaces, Internets, Intranets, and Web applications. She has developed dozens of leading-edge seminars, and is a highly rated speaker at national conferences. Her consulting expertise includes work on speech applications, integrating software methodologies with user-centered design methodologies, and the design of interfaces for complicated Web applications. One of her specialties is the mentoring of executive and practitioner staff in the process of user-centered design and the transition within an organization to a user-centered design culture.

She has three books published by John Wiley and Sons and was chosen one of the "Top 100 Women in Computing" by Open Computing magazine. She has a doctorate in Psychology from Pennsylvania State University.

Share this white paper:

Human Factors International

410 West Lowe, P.O. Box 2020
Fairfield, IA 52556
Phone: 800.242.4480
Fax: 641.472.5412
hfi@humanfactors.com
www.humanfactors.com