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## Cost justifying Usability (CoU)

Below are gathered case study summaries from multiple authoritative sources and are based on numerous research projects:

### The benefits of good web design

#### Creative Good

- To hammer home its point, Creative Good offered the striking revelation that a dollar spent on advertising during the 1998 holiday season produced \$5 in total revenue, while a dollar spent on customer experience improvements yielded more than \$60.

#### IBM

- On IBM's website, the most popular feature was the search function, because the site was difficult to navigate. The second most popular feature was the 'help' button, because the search technology was so ineffective. IBM's solution was a 10-week effort to redesign the site, which involved more than 100 employees at a cost estimated 'in the millions.' The result: In the first week after the redesign, use of the 'help' button decreased 84 per cent, while sales increased 400 per cent.

#### Jakob Nielsen

- Alert Box, June 2000. It's quite normal for e-commerce sites to increase sales by 100% or more as a result of usability, but configurator-driven sites can probably increase sales by at least 500% by emphasizing usability. More important, they can probably avoid 9 of 10 returns by eliminating most mis-designed items.

### The cost of bad web design

#### Creative Good

- Poor customer experiences will have a devastating effect on holiday revenues, even with the most conservative estimates. Given an estimated \$9.5 billion in holiday spending despite a 39 per cent failure rate, the industry stands to lose over \$6 billion.
- 39 per cent of test shoppers failed in their buying attempts because sites were too difficult to navigate. Additionally, 56 per cent of search attempts failed.

## Cyber Dialogue

- The absolute number of online bankers grew 100,000 to a total of 6.3 million in the past 12 months, but 3.1 million U.S. adults have discontinued their use of online banking according to Cybercitizen Finance from Cyber Dialogue. The study also found that only 35 per cent of online bankers that discontinued their service were inclined to try it again.
- "Although Cybercitizens begin banking online to save time, more than 50 per cent have discontinued use because they find the service too complicated or were dissatisfied with the level of customer service," said Michael Weiksner, Manager of Finance Strategies at Cyber Dialogue.

## Forrester Research

- Of 20 major sites audited, 51 per cent were compliant with simple web usability principles such as "is the site organized by user goals?" and "does a search list retrievals in order of relevance?" (in other words, the average site violated half of these simple design principles).
- Most sites will waste between \$1.5M and \$2.1M on redesigns next year (1999). Why? Designers are engaged in an endless cycle of overhauls that don't fix their problems. Their goals of achieving fast performance and consistent look and feel are directionally correct but miss out on at least 20 other more specific usability objectives. And since ease of use is not measured, flaws go undetected.

## Jared Spool

- In a study of 15 large commercial sites users could only find information 42 per cent of the time even though they were taken to the correct home page before they were given the test tasks.

## JS Online

- While internet sales continue to soar, recent surveys indicate that between 27-66% of user abandoned their shopping carts.

## Jupiter research

- Loss of approximately 50 per cent of the potential sales from the site as people can't find stuff.

- Losing repeat visits from 40 per cent of the users who do not return to a site when their first visit resulted in a negative experience.

### Zona Research

- 62 per cent of web shoppers gave up looking for the item they wanted to buy online (and 20 per cent had given up more than three times during a two-month period).
- Even the most loyal internet users are having a hard time shopping online, with 28 per cent of the 239 internet savvy users reporting difficulties in finding products and services. (and 20 per cent had given up at least three different times while shopping on the web, with 39 per cent reporting they have decided either not to buy online or to do their shopping elsewhere - with catalogues and bricks and mortar stores the big winners

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taken from <http://www.hiser.com.au/world/tour/demo/demstat.doc> [April 3, 2003]

## Top 20 Statistics for Cost-Justifying Usability (Web Design)

2. In Jared Spool's study of 15 large commercial sites users could only find information 42 per cent of the time even though they were taken to the correct home page before they were given the test tasks.  
  
A study from Zona Research found that 62 per cent of web shoppers have given up looking for the item they wanted to buy online (and 20 per cent had given up more than three times during a two-month period)  
  
Forrester Research audited 20 major sites, finding 51 per cent compliance with simple web usability principles such as "is the site organized by user goals?" and "does a search list retrievals in order of relevance?" (in other words, the average site violated half of these simple design principles).  
  
From Jakob Nielsen's Alertbox column  
(<http://www.useit.com/alertbox/981018.html>)
3. 42 per cent of sites either didn't have an e-mail response system, or took longer than 5 days to respond .  
  
[www.jup.com/](http://www.jup.com/)
4. Estimates of cost of bad web design:  
  
Loss of approximately 50 per cent of the potential sales from the site as people can't find stuff.  
  
Losing repeat visits form 40 per cent of the users who do not return to a site when their first visit resulted in a negative experience.  
  
Forrester estimates, reported in Jakob Nielsen's Alertbox for October 18, 1998
5. A new study by internet research firm Zona Research Inc. found that even the most loyal internet users are having a hard time shopping online, with 28 per cent of the 239 internet savvy users reporting difficulties in finding products and services. Zona also found that 20 per cent said they had given up at least three different times while shopping on the web, with 39 per cent reporting they have decided either not to buy online or to do their shopping elsewhere – with catalogs and brick and mortar stores the big winners.  
  
Consumers Take Bad Shopping Trips, Connie Guglielmo, October 12, 1998
9. Web users generally prefer writing that is concise, easy to scan, and objective (rather than promotional) in style, research has shown. We incorporated these and other attributes into a redesign of web content. Doing so required trade-offs and some hard decisions, but the results were positive. The rewritten website scored

159 per cent higher than the original in measured usability. Compared with original-site users, users of the rewritten site reported higher subjective satisfaction and performed better in terms of task time, task errors, and memory.

Applying Writing Guidelines to Web Pages - by John Morkes and Jakob Nielsen (January 6, 1998)

11. New York, August 18 — Although the absolute number of online bankers grew 100,000 to a total of 6.3 million in the past 12 months, 3.1 million U.S. adults have discontinued their use of online banking according to Cybercitizen Finance from Cyber Dialogue. The study also found that only 35 per cent of online bankers that discontinued their service were inclined to try it again.
12. Although Cybercitizens begin banking online to save time, more than 50 per cent have discontinued use because they find the service too complicated or were dissatisfied with the level of customer service,” said Michael Weiksner, Manager of Finance Strategies at Cyber Dialogue.

<http://www.cyberdialogue.com/press/releases/index.html>

13. Over the last year online banking has attracted 6.3 million users, but a massive 3.1 million of those have closed their accounts already due to poor website design and inefficient service.

Internet Money Issue 4, 1998

15. Half the time we couldn't find enough information to make a purchase decision. For example, a service company claimed to be affordable but did not provide prices. We didn't know whether to believe the company and couldn't compare it with others. The result? Frustrated customers move on.

Forrester – Interactive Technology Strategies, Volume Three, Number Seven. September 1998 – “Why Most Web Sites Fail”, Manning, McCarthy, Souza

18. Most sites will waste between \$1.5M and \$2.1M on redesigns next year (1999). Why? Designers are engaged in an endless cycle of overhauls that don't fix their problems. Their goals of achieving fast performance and consistent look and feel are directionally correct but miss out on at least 20 other more specific usability objectives. And since ease of use is not measured, flaws go undetected.

Forrester – Interactive Technology Strategies, Volume Three, Number Seven. September 1998 – “Why Most Web Sites Fail”, Manning, McCarthy, Souza

20. By 2001, application development organizations that do not include specialists in graphic design, ergonomics and public communications on their web development teams will produce web applications whose poor quality will damage their enterprise web strategies.

Gartner Group Strategic Planning Assumption—1998

6. On IBM's website, the most popular feature was the search function, because the site was difficult to navigate. The second most popular feature was the "help" button, because the search technology was so ineffective. IBM's solution was a 10-week effort to redesign the site, which involved more than 100 employees at a cost estimated "in the millions." The result: In the first week after the redesign, use of the "help" button decreased 84 per cent, while sales increased 400 per cent.  
  
30th August, 1999 "Good Web Site Design Can Lead to Healthy Sales" By Bob Tedeschi </library/tech/reference/tedeschibio.html>
7. "Internet start-ups typically spend 300 times as much money on advertising as they spend on usability. As a result, many of these new sites will fail to keep their users and will not grow into long-term successes. VCs should question the budget allocation of their portfolio companies and refuse to waste money on sites that don't have a thorough usability process in place."  
  
Jakob Nielsen, Alertbox Nov 28, 1999  
<http://www.useit.com/alertbox/991128.html>
8. On a corporate intranet, poor usability means poor employee productivity; usability guru Jakob Nielsen estimates that any investment in making an intranet easier to use can pay off by a factor of 10 or more, especially at large companies.  
  
CIO WebBusiness Magazine, 1 April 1999  
[www.cio.com/archive/webbusiness/040199\\_use.html](http://www.cio.com/archive/webbusiness/040199_use.html)
10. Poor customer experiences will have a devastating effect on holiday revenues, even with the most conservative estimates. Given an estimated \$9.5 billion in holiday spending despite a 39 per cent failure rate, the industry stands to lose over \$6 billion.  
  
"Creative Good, Inc Holiday '99 E-Commerce – Bridging the \$6 Billion Customer Experience Gap", Hurst
14. Without a doubt, as web markets become increasingly competitive, website ease of use will become a way to stand out from the crowd.  
  
Mazed and Confused, Web Business Magazine April 1, 1999  
From a 1998 Forrester study of 25 sites:
16. Usability metric from real life: across six corporate websites, the **measured success rate was only 26 per cent** when prospective job applicants were asked to find a job opening that was suitable for them and apply for it on the site.  
  
Jakob Nielsen, <http://www.useit.com/hotlist/spotlight.html>, August 24, 1999
17. While internet sales continue to soar, recent surveys from companies that advise e-commerce merchants put the number of "abandoned shopping carts" at between 27 per cent and 66 per cent.

JS Online: Many Internet shoppers abandon order at register, August 24 1999

19. A report by Creative Good showed that 39 per cent of test shoppers failed in their buying attempts because sites were too difficult to navigate. Additionally, 56 per cent of search attempts failed.

To hammer home its point, Creative Good offered the striking revelation that a dollar spent on advertising during the 1998 holiday season produced \$5 in total revenue, while a **dollar spent on customer experience improvements yielded more than \$60.**

Creative Good Report, Oct 1999.

[www.ecommercetimes.com/news/articles/991008-2.shtml](http://www.ecommercetimes.com/news/articles/991008-2.shtml)

1. “It’s quite normal for e-commerce sites to increase sales by 100% or more as a result of usability, but configurator-driven sites can probably increase sales by at least 500% by emphasizing usability. More important, they can probably avoid 9 of 10 returns by eliminating most mis-designed items ( a 1000% improvement of the error rate metric)

[www.useit.com/alertbox/20000611.html](http://www.useit.com/alertbox/20000611.html) June 2000

## Top 15 Statistics for Cost-Justifying Usability (Systems Development)

1. It is about 40–100 times more expensive to fix problems in the maintenance phase of a program than in the design phase.

Boehm, B W (1981) *Software Engineering Economics*. New Jersey: Prentice-Hall Inc.

2. Around 63 per cent of software projects exceed their cost estimates. The top four reasons for this are:
  - frequent requests for changes from users
  - overlooked tasks
  - users' lack of understanding of their own requirements
  - insufficient user-analyst communication and understanding

Lederer, A L & Prasad, J (1992) Nine Management Guidelines for Better Cost Estimating. *Communications of the ACM*, 35 (2), pp 51–59.

3. Rauterberg and Strohm (1992) could find that only 33% of the maintenance effort is spent for debugging, and 67% of the maintenance effort therefore is needed for changing the systems (e.g. changed requirements caused by users). The cumulated effort for the early stages "problem analysis", "concept" and "specification" correlates significantly negative ( $r = -0.32$ ,  $p < 0.05$ ,  $N = 55$ ) with the effort for maintenance. This means, that adequate effort in the early development stages reduces the often cost- and time intensive repair and correction tasks in the maintenance phase.

Rauterberg, M. & Strohm, O. (1992). [Work Organization and Software Development](#). *Annual Review of Automatic Programming*, vol. 16(2), pp. 121-128.

4. If it costs \$10 to make a program change during development, it will probably cost \$400 to do it after the system is in the field.

Pressman, R S (1992) *Software Engineering: A Practitioner's Approach*. New York: McGraw-Hill

5. The “hold a joint application development and prototype approach” with an iterative development methodology will increase productivity by 25 per cent and increase quality by 30 per cent.

Gartner Group (1992) *Selecting and Implementing a Systems Development Methodology*. Report published on 16 July 1992. Stamford, Connecticut

6. The “hold a joint application development and prototype approach” with a rigorous requirements analysis and design process will result in an overall improvement in user satisfaction by 40 per cent.



Gartner Group (1992) Selecting and Implementing a Systems Development Methodology. Report published on 16 July 1992. Stamford, Connecticut

7. Eighty percent of software lifecycle costs occur after the product is released, in the maintenance phase. Of that work, 80 per cent is due to unmet or unseen user requirements, only 20 per cent of this is due to bugs or reliability problems.  
  
Karat, C (1993) Usability Engineering in Dollars and Cents. IEEE Software, May issue pp 89.
8. Systems designed with usability engineering have typically reduced the time needed for training by around 25 per cent.  
  
Landauer, T K (1995) The Trouble with Computers. Cambridge, Mass: MIT Press, p 227.
9. User-centered design typically cuts errors in user-system interaction from five per cent down to one per cent.  
  
Landauer, T K (1995) The Trouble with Computers. Cambridge, Mass: MIT Press, p 227.
10. Without user-centered design, a user interface typically has around 40 flaws that can slow users and lead to errors.  
  
Landauer, T K (1995) The Trouble with Computers. Cambridge, Mass: MIT Press, p 223.
11. Revenues for one DEC (Digital Equipment Corporation) product that was developed using user-centered design techniques increased 80 per cent for the new version of the software, and usability was cited by customers as the second most significant improvement.  
  
Wixon, D & Jones, S (1995) Usability for Fun and Profit: A Case Study of the Design of DEC Rally Version 2. In Rudisill, M et al., Human-Computer Interface Design: Success Stories, Emerging Methods and Real-World Context. San Francisco, CA: Morgan Kaufmann, pp3–35.
12. Norwich Union, an insurance company in Australia, found that calls to its help desk reduced dramatically by two thirds after one of its core applications was improved using user-centered design techniques.  
  
Norwich Rethinks Customer Service (1995). Computer World, 24 November
13. A study into the cost of end-user computing across 18 major companies in Australia found that the average cost of supporting a single workstation is \$10,000 (Australian dollars), of which at least 50 per cent is the cost of ‘hidden’ support (that is, productivity lost through users stopping work to help each other with computer problems). This study also found that the single most important factor affecting the cost of hidden support is the quality of the user interface.

Ko, C & Hurley, M (1995) Managing End-user Computing. In Information Management and Computer Security 3 (3), pp 3–5.

14. Vinter et al. (1996) found that 60% of software defects arise from usability errors, while only 15% of software defects are related to functionality.

Vinter, O., Poulsen, P., and Lauesen, S. (1996). Experience Driven Software Process Improvement. ISCN Newsletter. [Retrieved from Internet on April-3, 2003: <http://www.iscn.ie/news/sp96/o.vinter.html>]

15. Research by the Gartner Group in Stamford, Conn., reveals that in corporate practice, the average annual bill for supporting a single PC is \$13,000. Most of this cost is attributable to the amount of time that employees spend ‘futzing’ with their computers.

Cited in Gibbs, W W (1997) Taking Computers To Task. Scientific American, July 1997 issue

16. After the New York Stock Exchange upgraded its core trading systems using user-centered design techniques, productivity rose dramatically and users’ error rates fell by a factor of 10 even though workloads more than doubled.

Cited in Gibbs, W W (1997) Taking Computers To Task. Scientific American, July 1997 issue

17. In a study of around 8,000 software development projects conducted by over 300 American companies, the Standish Group found that only 16 per cent of projects were successful (completed on time and on budget, with all features and functions as initially specified). The three main reasons for project failure were:

- Lack of user input
- Incomplete requirements and specifications
- Changing requirements and specifications

Taken from <http://www.rashmisinha.com/useroi.html> [April 3, 2003]

### Return of Investment (ROI) of Usability: A Collection of Links

It is hard to directly estimate the economic impact of usability. However, it is very important to do so, both at the macro and the micro level.

Products with bad usability can have impact in terms of wasted time, errors, unfinished tasks, frustration, and even medical problems such as RSI.

A concrete calculation of usability impact is difficult to calculate, yet it is very often needed by usability advocates within companies, independent consultants etc.

Below, a collection of links to articles and cost-benefit calculators for estimating the economic impact of usability is provided:



#	Links	From	Description	Date (if applicable)
1	<a href="#">A Business case for Usability</a> , by John Rhodes	WebWord.com		Oct 2001
2	<a href="#">ROI metrics</a>	CIO Insight.com		May 2001
3	<a href="#">Mazed and Confused</a>	CIO.com		April 1999
4	<a href="#">YOu think Tomaytoes, I think Tomahtoes</a>	CIO.com	A case study of Nortel's redesign of intranet	April 1999
5	<a href="#">Usability Is Good Business</a> (pdf) (cached copy from Googe)	Compuware.com	Comprehensive article of why usability makes sense	Dec 2001
6	Designing for the Bottom Line	WebTechniques.com	Discussion of ROI on the Web	
7	<a href="#">IBM's redesign results in a kinder, simpler Web site</a>	InfoWorld.com		Apr 1999
8	<a href="#">Site Usability Must Enter ROI Calculus</a>	Internet Week		Mar 2001
9	<a href="#">Adding Value with Taxonomy</a> (needs \$\$ / membership)	Montaue Institute Review	Discussion of ROI on taxonomy related expenditures	Sep 2000
10	<a href="#">ROI calculator: Website Conversion Rate Tool</a> <a href="#">ROI Calculator: Productivity Analysis Tool</a>	Weinschenk Consulting		Dec 2000
11	<a href="#">The Usability Business: Making the Web Work</a>	Book by Joanna Bawa, Pat Dorazio & Lesley Trenner	Case studies and papers about selling and managing IA/usability within organizations	Dec 2001
12	<a href="#">Usability and Cost-cutting</a>	Frontend.com	Argues that a focus on	Nov 2001

			usability is necessary in a downturn	
13	<a href="#">Discount usability vs. usability gurus: A middle ground</a>	From Taskz.com, by Deborah Mayhew	Argues that discount methods cannot replace usability testing, and that good UE methods take time	Oct 2001
14	<a href="#">Is a high priced usability "Guru" a good investment?</a>	From Taskz.com, by Charles Mauro	Argues against expensive usability gurus, and for traditional user testing	Aug 2001
15	<a href="#">Usability Testing of Documents has many benefits</a>		Quantitative study of cost versus benefits analysis of usability testing of documents	
16	<a href="#">Cost of Various Usability Evaluation Techniques</a>	Zhijung Zang's site	Categorization of Usability Techniques according to cost	
17	<a href="#">Cost Justifying Ease of Use</a>	IBM.com	Argues that Usability makes business sense	
18	<a href="#">Conversion Rate Calculator</a>	CreativeGood.com		
19	<a href="#">Guerrilla HCI: Discount Usability Engineering</a>	Useit.com	Nielsen classic, one of the chapters from the book: Cost Justifying Usability	1994