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National College of Art & Design

Faculty of Design Department of Industrial Design

The Internet : A Tool for the Designer.

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Submitted to the Faculty of History of Art and Design and Complementary Studies in Candidacy for the Degree of Bachelor of Design.

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INTRODUCTION

This thesis is an analysis of the Internet as a tool for the designer. The main issue being analysed is whether the Internet has changed the methods by which designers have conducted business. Designers and manufacturers using the Internet at present will be studied to reinforce the argument that the Internet has undoubtedly changed and will continue to change both the multi-national and the self-employed designer.

Chapter 1 provides an overview of the Internet, focusing on the Internet's history, its growth and development from a research to a commercial network of the future to be utilised by the designer and others as a commercial medium.

As the intention of this thesis is to show how the Internet will change, for the better, the world of the designer, Chapter 2 analyses the commercial advantages of the Internet and how it will affect the designer in gaining competitive advantage.

In Chapter 3, counter-arguments will be put forward. In other words, arguing against the original theme. It is necessary to consider both negative and positive sides of the Internet.

This involves researching areas such as security, copyright, vulnerability of data, etc. An important area to be examined at this stage is the relevant solutions that can be offered to aid in the Internet's future growth.

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Also, another important area to be looked at are the obstacles blocking the future growth of the Internet such as vulnerability of information distribution, lack of innovation and creation in design (maybe an improvement needed in multi-media aspects and 3D graphics).

Following this analysis, a conclusion will be drawn upon to synopsis the entire thesis and address the challenging title. In conclusion, this thesis will aim at answering the question asked in the title. Through analysis of information it should be evident that the Internet will greatly benefit the designer. A set of more reporting to set to set movied of this and abstraction on many theory of the probability of the transmission with as subnetability on motor water results to the set of innexation and created at the test of the set of a set of the set of innexation and created at the set of the set of the set of the set of the sublimed of the set of the set of the set of the set of the sublimed of the set of the sublimed of the set of the sublimed of the set of the set

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CHAPTER 1: OVERVIEW OF THE INTERNET

HISTORY: The Internet is a global web of computer networks and owes its existence to the Pentagon in the late 1960s. The US Department of Defense were afraid that the government might lose control if the Russians attacked which would wipe out the conventional means of communications.

They created a network by linking universities and other important sites around the country, as a result Berkeley University in California was one of many designing the early system called ARPANET.

In 1974, a standard networking protocol emerged from the various research and educational efforts involved in this project. It was a communications protocol for exchanging data between computers on a network.

This protocol became known as TCP/IP (Transmission Control Protocol/Internet Protocol) or the IP suite of protocols (Lynch, 1993, p.13). The TCP/IP protocols allowed ARPANET to communicate with other computers irrespective of their operating systems or computer hardware.

The early Network computers were located in bomb-proof rooms and relied on the phone lines to communicate with other sites. The Pentagon insisted that the system would work even if some of the locations were damaged. In the case of lines being damaged the system would send the information through a different route which was still working. For the information to find its way through the electronic maze, a single address was all that was needed which is still one of its strong points today.

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ARPANET soon stopped being solely used by the military. The National Science Foundation (NSF) expanded on ARPAnet with NSFNET, which was initially designed to connect universities and research centres.

The connections were used for transferring information and for communication through Electronic mail (e-mail) As the networks grew they became what we now know as the Internet.

Using it was difficult and frustrating as it was accessed by typing in complex UNIX commands but its power was obvious. No other method used to network universities around the world was so universal and flexible.

After winning over the academic world the Internet began to serve as a connection for commercial use. When restrictions of use were reduced the commercial use boomed and in 1994 companies passed out universities as the main users.

The Internet today is accessible from every state in the US and in most countries in Europe and Asia with Africa having very little access. The Internet today is no longer operated using commands but uses an easy to use point and click format.

The most popular Internet services are accessed through various applications available for a large range of operating systems. "All the services work over the common network structure of the Internet. The Internet itself is just a massive communication media." (Shah, 1995, pg. 10)

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INTERNET SERVICES

The Internet in its broadest meaning includes individuals, groups, organizations, schools, universities, commercial services, companies and governments. Having access to the Internet means having use of the main Internet services such as Gopher, e-mail, FTP, Telnet and the World Wide Web.

GOPHER :

Gopher is a very basic menu-based based system that provides links between files on different systems around the Internet. Gopher provides access to text, documents, graphics and sound. The user of gopher does not need to know where the information is located as different icons denote different types of file.

"Literally a way of burrowing from site to site on the Internet without causing excessive erosion or road works. What they do is provide a convenient menu driven system for searching." (Prochak, 1994, pg.31)

ELECTRONIC MAIL :

Electronic mail (e-mail) is the most popular activity on the Internet. E-mail is a system that allows messages, documents, graphics, images and drawings to be sent to other users on the Internet.

It is possible to create group mailing lists where information sent to one address will cause the information to be sent to all the members of a group. It is an easy way of sending out office memos, reports and customer/product information.

"E-mail may soon replace faxes as the primary means of rapid communication. In fact, there is nothing a fax machine can do that

INTERNET SERVICES

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can't be done faster, better and cheaper with e-mail." (Canter, 1994, pg. 10)

FILE TRANSFER :

The File Transfer Protocal (FTP) is used to transfer files to and from remote locations. It should be differentiated between Telnet which allows a user to execute files on a remote location. FTP allows the user to transfer and receive specific files from the remote location.

TELNET :

Telnet is used to connect and access information from remote hosts. The user accesses the information as if they were connected to the remote computer. "Imagine being able to connect your monitor and keyboard to your neighbour's computer via a cable connection." (Leibs, 1995, pg. 48) The user can access the remote host's services.

WORLD WIDE WEB :

The World Wide Web (the web) is a hypertext based information service. It provides access to multi-media, documents, and databases. The web is made up of web-sites and home pages. The home page is the introduction to a web site, and is made up of text, images, sound, video information and links to other sites on the Internet.

The World Wide Web is the most effective way of providing information because of its visual impact. The web can be used as a complete presentation media for companies to make products, services and corporate information available. "The Web provides a magazine-style graphic interface with hypertext linked documents." (Prochak, 1994, pg. 30)

The commercial world dominates Internet usage with more than 80,000 companies connected worldwide. The World Wide Web is the best place to be and be seen on the Internet for big and small design consultancies as well as multi-nationals.

The web is like a giant information guide by typing in what you are looking for in a search-engine, the search-engine finds the home page of the information you are looking for.

The web site has all the information about the company, new-product information and services as well as some way of interacting with the company whether by ordering or giving your opinion on the companies products and services.

Huge consumer goods companies such as Sony, Virgin, Reebok and Mercedes have all turned to the Internet for marketing. Newspapers, magazines, music and book publishers see the Internet as a means of new opportunity.

As a new medium for communication with almost no distribution costs, the Internet has the potential to reshape the media world, letting new competitors in and forcing established giants to evolve or die. The Encyclopedia Britannica sales have collapsed with the competition from CD-ROMS, the next step will be the Internet.

There is also quite a bit of government information on the Internet with over 138 Departments, National Laboratories, Institutes. More and more governments and related bodies are connecting to the Internet because of the mass information distribution potential. The second second control dependence in a multi-basegory with a control of the control of the

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GROWTH OF THE INTERNET:

The Internet grew quickly as it filled many needs. "The builders of the Internet dug no trenches or laid no cables they simply leased existing telephone lines." (Anderson, 1995, pg. 42)

In the mid-eighties the Internet joined forces with commercial networks which accelerated its growth. The Internet gopher made its debut in 1982 and the World Wide Web information service appeared in 1989.

Whereas e-mail and file transfers have been around since the mid and late seventies within large company networks. Information could only be sent to users on the same network and therefore has not the same implications as it has today.

Until 1983 the Internet consisted of fewer than 500 host computers. By 1987 the number had grown to include 28,000 host computers. Last year the Internet doubled in size, as it has done every year since 1988. It now reaches nearly 5 million host computers each of which may connect several more individual users.

At the same time the World Wide Web has grown 20 times over. In just 18 months users of the web created more than 3 million multi-media pages of information, entertainment and advertising.

The Internet is currently made up of 45,000 networks world-wide. There are approximately 30 million people world wide who have some sort of Internet connection. "The World Wide Web is growing faster than any other protocol the Internet: at a rate that could triple its size in one year." (Ellsworth, 1995, pg. 4).

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The media has also followed the growth of the Internet.

Three years ago US newspapers carried about three articles per month mentioning the Internet, two years ago there were about seventy per month, last year there were about three hundred per month (Ellsworth, 1995, pg. 5).

Currently there are many articles published daily, magazine articles, magazines and books about the Internet as well as features on the television.

The media are not only promoting the Internets potential by reporting it in traditional print media but they are also publishing articles on the Internet through articles on their own web sites.

No communications medium or consumer electronics technology has ever grown as quickly; not the fax-machine not even the PC. At this rate, within two years the citizens of cyberspace will outnumber all but the largest nations. (Anderson, 1995, pg. 38).

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SECTION ONE :

PRIOR TO THE INTERNET

This section will look at how designers conducted business prior to being connected to the Internet and investigating design methods. Before the arrival of the Internet the typical designer had to be a master of all trades.

New product information, research, advertising all had to be undertaken by the designer. This all took up a considerable amount of time and money, leaving the designer with less time for designing. As most of the time was spent looking for clients, collecting surveys, information, standards, legislation, dealing with customer queries at the same time trying to promote the consultancy to as wide an area as possible.

The telephone and fax were the main tools used to communicate with clients, peers and prospective clients. Phoning and faxing for information and clients often ended up expensive, as well as wasting lots of time; as clients were not available when the designer needed information as to the design. Collecting research information such as ergonomics, standards, legislation, market-research often led to chasing other people round in circles and in the end not getting all the right information.

Some designers invested in ergonomics books, British Standards and monthly design journals, this allowed them to do a lot of their basic research from the studio. Consequently, everything had to be catalogued and easily found, it also meant that things had to be put back in the correct order. As a result a lot of space was taken up over

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the years, collecting standards, ergonomics, materials and processes books as well as various design journals for inspiration.

As technology moves on, techniques and processes change also. This required library updates regularly to keep up with the competition. Old project drawings, renderings and literature began taking over the studio, creating the need for a more spacious office.

Traditional methods such as brochures, promotional materials, surveys and questionnaires were utilised to gauge the consumer reaction of new products. These methods resulted in slow response-time and failed to reach a wide demographic audience.

In addition advertising is limited to the amount of money that can be afforded whether that is on local or national newspapers, radio, television or in design journals.

Prior to the Internet the biggest product to affect design was the personal computer (pc) and packages for the computer which made the designers role easier. With the advent of the computer and new design packages such as Autocad, 3-D Studio, Silicon Graphics and Microsoft Office the designer could carry design work and the day to day running of the studio simultaneously.

Technical drawings are done using Autocad, therefore the designer does not have to spend hours labouring over hand drawings which were cumbersome, slow and prone to mistakes. Doing the drawings on the computer allowed mistakes to be altered with the touch of a few buttons, the drawings could be saved on disc and copies could be posted or print outs could be faxed to clients and manufacturers. en a ante a stratting "alte d'are a a sur mais a contract. En la caracteria La caracteria voltare e sviger i a realizar a secondar

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The main aim behind the use of CAD was to be the creation of a product under the best possible conditions. CAD would offer the designer a means of visualizing, controlling and providing specifications for every aspect of the product in question. (de Noblet, 1993, pg. 374)

3-D packages such as 3-D Studio allow the designer to make models of the proposed product on the computer; the designer no longer has to spend hours drawing measured perspectives of the product from different views showing its salient features.

The greatest potential three-dimensional systems lies in the difficult transition from idea to rough model: many designers can easily articulate ideas in their heads but the difficulty lies in transcribing the idea into three dimensions quickly and efficiently. (Powell, 1990, pg. 46).

Using such packages allows the designer to create more professional presentations. As the images are done on the computer all modifications to the new product can be done easily rather than drawing them out again the designer could edit the drawings easily. All the drawings can be arranged and is shown to the client as a slide show.

The 3-D modeling proves to be an effective tool for explaining products over hand renderings as a result of the photographic qualities of the computer, giving the client a better visualization of what the product will actually look like. (See fig.1 & 2)



FIGURE 1: Designers using 3-D modeling to design the wing of a truck.

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HGURE 1; Designers using 3-D modeling to design the Wing of a truck.



FIGURE 2: Finished rendering of the wing.

With the hardware and software available to him the designer has new and varied tools with which to approach, develop and test a design. CAD provides a real extension to the designer's material capabilities - it is a toolbox that he can adopt to suit his needs and abilities. (de Noblet, 1993, pg. 374-375)

Graphics packages such as Photoshop and Quark Express allows the designer to create professional presentations and editing facilities. This was previously unavailable and relied on the designer's visuals by hand or by rub-down transfers. Therefore these packages are tools for creating more professionalism within design. In addition, it provides the designer with computer skills a competitive edge.

Computers are taking over the professional design studio, replacing the traditional tools of the designer such as the drawing table, Magic markers, scale-rulers and compasses.



FIGURE 2: Enrished rendering of the wing.

With the hardware and software available to him the posigner right new and varied tools with which to approach, develop and test a design. CAD provides a real extension to the sergner's material capabilities - It is a toolbox that he can adort to suit his needs and abilities, (de Noblet, 1993, pg. 374-375

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Computers are taking over the professional design studio, replacing the traditional tools of the designer such as the drawing table. Magic markers, scale-rulers and compasses.

SECTION TWO:

THE INTERNET AS A TOOL FOR THE DESIGNER

The usefulness of the Internet depends on the products or services of each consultancy or product manufacturer. Finding new clients or new client bases is not often an easy task. It involves careful market analysis, product marketing and consumer testing. The Internet is a ready base of several million people from all walks of life.

Designers can easily find new clients from this massive group given that the designer has Internet presence with a portfolio of previous work, services provided and studio literature on the World Wide Web.

Imagine being able to immediately download specifications, drawings, application stories, selection tools, and simulation software, without having to wait for the material to arrive in the mail or via facsimile. (Jones, 1995, pg. 55).

Market research can be obtained more easily and with a wider demographic area by posting up questionnaires on the relevant newsgroups bulletin boards or by having a comments page attached to your home page, so that each visitor to the site may fill in the form. Visitors can comment on specific products and problems.

DesignLink (www.designlink.com) is a San Francisco based bulletin board system for creative professionals providing networking and e-mail services to the design and photo communities as well as on line resources including reference archives, shareware software, and complete portfolios of artwork from photographers, designers, illustrastors and other artists. (see fig. 3)

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FIGURE 3: Designlink Homepage.

Accessing information over the Internet is faster than waiting for faxes or the postal service. By using a search-engine the designer types in what he/she is looking for and the information is located, and the designer is free to roam around the document, library, company any where in the world.

When the information is found it can be downloaded, printed or saved to disc. Magazines, books, documents, images and articles related to the search will be listed on screen for the designer to chose from. All the information is available without even leaving the office.

The ability to search is one of the most powerful time-saving tools that the on-line medium offers. Users can find relevant articles by keyword, and searches can extend beyond current product information to include archives of prior announcements and application stories. (Jones, 1995, pg. 54).

Designers are using the Internet to heighten public interest with web page information. Working for clients in different countries with different

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Access to the efformation over the internet is faster than souting for fases or the courts survices by using a search-engine the designer types in what here a standing for and the information is located, and the designer is term around the document. (brany, company any where in the survice)

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Designers are using the Internet to heighten public interest with web

time zones has been difficult in the past. As a result of the Internet, electronic-mail and web pages serve the client; any query from the client can be e-mailed to the designer any time of the day or night and can be addressed by the designer when he gets in.

The web pages serve the client 24 hours a day seven days a week with no overtime. It can sort and store information which can put you ahead of the competition, even before you get to the office.

Researchers and designers communications over the Internet are usually with others in their field of design. Communicating easily with peers allows designers to share ideas, problems and solutions amongst themselves, as quite often designers find others in their field have tackled similar problems and can draw up conclusions from these by communicating easily over newsgroups on the Internet.

America On-line, for instance, hosts a Graphic Arts and CAD forum that includes direct input from computer hardware and software companies, a live "real-time" talk session and bulletin boards with thousands of questions organized into categories from technical questions about troublesome CAD software to classified ads from design companies seeking employees or clients... (Hall, 1994, pg. 76).

Designers are increasingly using the tools of the Internet to do business. Email is probably the most widely used aspect of the Internet. Images, documents, drawings and reports of findings can be sent to a client anywhere in the world by the designer or vice-versa using electronicmail within a few hours. Mailing lists are a very useful way to distribute information such as reports and drawings to a number of people at a time. See the strain of the set of the second set of the second second second set of the second se second sec

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• each Chromet, The performance of the contract of the end of the second Chrometer and the second Chrometer is a second of the second contract of the second

The key thought of most design users today is for information access. Other than electronic-mail there are other electronic information systems that are available on the Internet. Services such as Gopher and the World Wide Web provide much of the information on the Internet in a readily accessible format.

Gopher is a very basic menu based which provides links between files on different computers around the Internet. Gopher provides the designer with access to text documents and graphics.

The World Wide Web is one of the most effective ways to provide information because of its visual impact and advanced graphics. From the web the designer can access many other Internet services.

The web can be used as a complete presentation media for designers and their services. For example Bertone has made much of his product information and service information accessible through the web, with a technical support link where comments and questions can be sent by email. (See fig. 4)



FIGURE 4: Section of Bertone's World Wide Web site.

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DESIGN ON THE INTERNET + 20

The designer can find a gold-mine of freeware (free software) and shareware (software available with a small donation). These range from clipart and typefaces to the latest CAD packages, all of which can be easily down loaded. Many graphic designers find the instant availability of digitized art and type an increasingly useful resource.

Jonathon Hoefler a Graphic designer uses Applelink E-mail to send fonts to clients overseas, which is faster and cheaper than Federal Express and does not require clients to wait by their computers for the digital goodies to arrive. (Hall, 1994, pg. 76).

Many large design consultancies are using video-conferencing over the Internet. By using this technology consultancies can minimise the expense of travelling to meet with large manufacturers regularly, each time there is a minor problem. It also avoids costly in-person meetings and shortens the time it takes to launch new products by discussing product prototypes, models and drawings.

The Internet allows designer and client thousands of miles apart to view and discuss critical drawings and designs while developing and solving a problem. Designer and client can exchange information and ideas concerning the development of products as if speaking face to face.

Many of the auto-motive manufacturers such as Ford, BMW, Mercedes and Fiat are using white-board video-conferencing for long distance designing over the Internet. The white-board is a digital sketchpad on the screen that enables the exchange of ideas between computers in the same building or on opposite sides of the world. (See Fig. 5) The second second for the space of the second state second state (the part of the second s second s second se

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FIGURE 5: Whiteboard Video-conferencing.

Images and other information can be loaded onto it, creating a shared brainstorming session. Each participant is able to sketch on the screen to highlight different parts of a product which need to be changed. "BMW engineers, for instance, collaborate on-line to design car components." (Hewson, 1995, pg. 5)

INDUSTRY ANALYSIS:

For designers on the Internet the World Wide Web is the place to be and to be seen. From Bertone to BMW, Pininfarina to Ford all have made their own presence on the Internet by creating sites on the World Wide Web.



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International ather information can be located onto it creating a shared created pression. Each participant is able to static centre screen to him created fifterent parts of a product which head to be changed. "BMW encounters, for instance, collaborate an-line to design car companents." (Heacon, 1995, pa. 5)

INDUSTRY ANALYSIS

For description on the internet the World Wide Web is the place to be and to be seen, from Bartone to BMW, Phintarina to Ford all have made It ein own armetrics on the internet by amating sites on the World Wide Web.

FORD:

Visiting Ford's Home page (http://www.ford.com) is a good example of how large manufacturers are using the Internet for competitive advantage. The home page is split up into five categories, Showroom Boulevard, Financial Services, Ford Info, Historical Library and Customer Link. (See fig. 6)



FIGURE 6: Ford World Wide Web Homepage.

By clicking on showroom boulevard, the user can view the entire Ford, Mercury, Lincoln and Jaguar model line-ups and specifications. It also can find your local dealer as you type in where you are from. Therefore acting as advertising for them and their subsidiaries.

Financial Services shows the potential client how Ford can provide credit for them as well as giving the user information as to Ford finances. Ford Info gives the viewer information on stockholder relations as well as environmental factors undertaken by Ford.

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(c) to ford is theme page (http://www.lord.com) and good example of move arge manufactures are using the Internet for competitive a scarbog- the home page is split up into five categories, phowroom in scarbog- its financial Services, Ford Into, Historical Control, and Customer its See its Al



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Financial Services shows the potential alient how Ford can provide credit for these as well as giving the user information as to Ford finances. Ford Info. gives the viewer information on stockholder relations as well as environmental factors undertaken by Ford. What's New gives new product information and new design concepts. The user often has to give his/her opinion on product developments, therefore Ford are constantly collecting market-research from a large demographic area.

Ford's Historical Library tells the story of Ford's success and the family in the company, as well as information on classic cars. In the Customer Link the viewer is asked to fill out a brief survey and asked to join the World Wide Web Customer Focus Team. As a member, Ford send out new product ideas and designs to be reviewed.

Ford's designers are using white-board video-conferencing as an important design communicating tool. Ford designers, body designers in California and suspension designers in Germany can chat face to face while being able to sketch and write on the same drawing nine time zones apart. (See fig. 7)



FIGURE 7: Ford designers using Whiteboard Video-conferencing.

What they are doing will inevitably cut Ford's costs, produce more globally better cars, as well as being able to get cars to the market place sooner. It is also changing the way designers work. "This is a cultural change as well as a technological change." (Eilis, 1995, pg. 41). Le 1. Le la giver new product anomation and new center concellation ou les nation has to give historie contant on product de elépenent here has bed arb constantly collecting many researce (hum a utgra det ual stink area.

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what here are doing will inevitably but nord's norse, make more governed to date as well as being date to get date to the manet proce where it is asso changing the way designers whether is a cutural promee or well as a rechnologic acchange," (Bils, 1995, e.g., 41). Silicon Graphics workstations, InPerson, Annotator, Showcase and Inventor software provide the technical know-how for what Ford calls its Global Studio. Ford's use of White-Boarding has made the designers geographic location irrelevant.

The greatest benefit to Ford, is pure real-time collaboration with the ability to work in a collaborative mode internationally is an advantage in itself, because that translates into the ability to operate as a global company - a leaner, faster company and produce world cars of a higher quality. (Eilis, 1995, pg. 43)

Ford designers have always worked globally, but this new medium has pulled them together. Instead of packing to head to Europe, the designer now clicks on a telephone icon on the workstation and is instantly sharing a three dimensional design with a colleague at the other side of the world.

Conversations across the Internet with interactive graphics, live video are now routine between Ford design centres in California, Michigan, Japan, England, Germany and Australia.

It's not meant to be a large meeting where we can discuss important issues. This is really one on one. It's one designer talking to another, discussing a specific problem. You'll taste the effects of that inter action when you see the world-car styling of the 1996 Taurus. It's final look and feel were achieved by designers who met in the transatlantic cyberspace, says Giuseppe Delena, Ford Chief Designer. (Eilis, 1995, pg.46.) (See fig. 8)



FIGURE 8: 1996 Ford Taurus designed over the Internet.



Ford designers are using Mediamail, the latest e-mailing system from Silicon Graphics. If the designer is too late to reach a colleague in realtime, they can send a complete multimedia package of their work, text, graphics, video-clips and send it overnight digitally with alterations. When the designer overseas comes in to work in the morning, he/she can just open it up by just pointing and clicking on the new messages icon. The Internet's technology provides the way for a whole new way of designing and doing business.

QUADRAVISION:

Quadravision are a Canadian consultancy specialising in www page design and their interfaces. (See fig. 9)



FIGURE 9: Quadravision's homepage design.

Quadravision is the largest interactive marketing and design firm in Canada, providing customised marketing communications to major corporations. A subsigners are using Measonall, the latest elementaria system that the usual aphies at the designer is too ate to reacting on Neague in teach the they don read a complete markmedia package of the burg feat, non the disection and send it overnight digitally with alterations. When the assigner overseas comes is forwork in the moning height of the seligner overseas comes is forwork in the moning height digital the designer overseas comes is forwork in the moning height digital the designer overseas comes is forwork in the moning height digital contracts the technology provides the way for a write the way of the overlands and doing business.

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Welcome to Quadravision

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Quantumments the largest interactive marketing and design time in Contract stark sing customised marketing communications to major contracts this. Quadravision provide strategic planning and concept development to integrate interactive marketing with the overall corporate marketing and distribution program, opening up new distribution channels and opportunities. They have designed sites for Canadian Corporate Newsnet, Friends of the Environment, Your Life as well as for BMW Canada.

(See fig. 10)



FIGURE 10: Quadravision customers.

Quadravision designed BMWs Canadian web site. (See fig.11) They made BMWs interface an easy to use graphical look with almost all the graphics linked to a logical corresponding content. For example, selecting the coloured side bar on any page brings you back to the index page of that sub-section.

The BMW web page has a very innovative site map, a dynamic link to show you exactly where you are within the site. This allows the user to use the site quickly and easily. (See fig. 12) (a) The constraint of the state of the metric of the state of the s





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DESIGN ON THE INTERNET + 27

Feature car 318i cabriolet

FIGURE 11: The BMW Website.



FIGURE 12: The BMW Site map.



BMW Canada Inc. The ultimate driving experience.



Leaders in Innovation

The BMW Experience

The Resource Center

Safety F.I.R.S.T

BMW Dealers



The graphical content reflects BMWs image which give them a very clean, uncluttered look, with every graphical element serving a purpose, yet still being pleasing to the eye. The colours and fonts, and general layout conforms to BMWs worldwide corporate identity. The layout is consistant on every page and every sub-section is colour-coded which provides users immediate feedback as to their location.

The design of the BMW web site introduced for the first time a number of web innovations. On the opening screen there is a unique way of drawing the user into the interactive experience. The photographs on the bottom right hand corner not only change every 10 seconds but they are also dynamically linked to the coresponding content on features of their cars such as airbags and side impact protection.

The welcome page gives the user a brief tutorial on navgating it. The content of the site is much the same as that of Ford's with information and product promotion but with more of an inter-active way.

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CHAPTER 3: INTERNET PROBLEMS

USING THE INTERNET:

Accumulated industry experience and anecdotal evidence support the opinion that one of the primary barriers to adoption of the Internet, especially the WWW, as a commercial medium is ease of access. Convenience of access is at the core of the adoption process of any technological application and determines its ultimate success (Gupta, 1995, pg. 25)

Ease of access is multidimensional and includes high speed access, that is the bandwidth problem. Bandwidth refers to the total amount of data being carried over a network. In the future, it is likely that network bandwidth efficiency will be addressed. Software developers have already employed many of performance enhancement techniques includibng 32-bit code (on personal computers), new graphics formats and network data compression.

In addition, high speed modems, Integrated Services Digital Network (ISDN is an international telecommunications standard for transmitting voice, video, and data over digital lines) and cable services will partially address the need for faster links to the home (Payne J & Pool D, 1995, pg.3)

Other barriers facing commercialisation of the Internet include :

- Working within the rules of the Internet; usage policies, advertising.
- Communication.
- Non-Structured Information.

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- Security.
- Copyright.

USAGE POLICIES :

Most of the networks connected to the Internet have acceptable use policies. These policies have been developed as a set of rules for conducting business over the Internet regardless of whether the user has its own provider for access or whether they have become part of the Internet with their own site.

Some networks such as NSFNET which formed the backbone of the Internet in the US had a usage policy which prohibited information which was not of a research or educational nature.

The Federal Government and NSF specifically, are encouraging the commercialization and privatisation of what we now know as the Internet as it evolves into the National Information Infrastructure. Even within controlled networks forprofit activities are acceptable if they are related to "specifically acceptable" uses of the Internet. (Ellsworth, 1995, pg. 256).

The Internet now has several commercial providers which allow commercial traffic as well but the general Internet community and Acceptable Use Providers (AUPs) have very strong feelings about Advertising.

Broadcast Advertising over the Internet has proved unsuccessful. Unlike radio and television the Internet is an interactive media and most users do not take kindly to 'in your face' advertising by designers or anyone else for that matter. "This means never sending out bulk e-mail to people who are not expecting it." (Ellsworth, 1995, pg., 256).

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Many designers have tried advertising openly by mailing out advertisements to newsgroups only to be met with hostility. Networks have been shut down with the amounts of e-mail complaining about unwanted advertisements.

The solution to advertising on the Internet is to create a web page as each visit to the web site is solicited by the visitor. Also, passive advertising such as announcements or documents located at one site which can be freely accessible through transfer, Gopher or the World Wide Web. (See fig. 13)



FIGURE 13: Passive Advertising on the Infoseek Search-Engine

NON-STRUCTURED INFORMATION:

One of the most common complaints of Internet users is that the Internet has no catalogue of resources. Unless you know exactly what it is you're looking for and where to find it, using the Internet becomes a difficult task. Another area causing problems is the abundance of information available on the Internet.

According to Korzeniowski (Korzeniowski, 1995 p.84) "the problem lies in the Internet's complexity and the fact that its standard data search tools require knowledge and a touch of luck to quickly find information".

INTERNET PROBLEMS • 32

Many durghers have tried advertsing openly by maling out ravertient end in newsgroups anly to be met with hostility. Detworks have been in a gown with the amounts of e-mail contrataining about solvences advertisements.

It is satisfied to advertising on the Internet is to create a web mappeness work website avea site is solicited by the visitor. Also, passive advertising work are at every ements or documents located at one site which can be treatly accuments in **documents** located at one site which can be treatly accumente through transfer, Capher of the World Ware Verb.

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NON-STRUCTURED INFORMATION:

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Accorded to the units mowell. [Karzenjewell, 1995, p.84] "The problem lies in the internet or projectly and the fact that it standard data search to sig require knowledge and a fauch of lucit (or quickly find information). The World Wide Web's limitations are revealed when more than a few hundred Web pages are maintained. Firstly, there if no fulltext search mechanism built into the Web Server. Secondly, the WWW has no authorisation features, that is, servers are implemented as islands, to prevent entry by unauthorised parties. This defeats the Web's claims of connecting information together and global searches are made more difficult. Finally, the operation of hypertext transport protocol is such that an object that's located within a given Universal Resource Location may not be accessible at a later time. Moving an object to a different location changes the URL required to access it. (Korzeniowski, 1995, p. 87)

The solutions offered to these problems are being researched constantly. They include browsers, search-tools, library catalogues and directories. Consider the following, Infoseek gives WWW access, search and retrieval capabilities; Mosaic, a hypermedia browser designed for searching and retrieving. CommerceNet (backed by organisations such as Amdahl, Apple, Intel, Sun et al.) have embraced Mosaic to help achieve a niche in the commercial electronic workplace.

Hyper-G; a second generation hypermedia information system that tries to combine the advantages of the WWW, WAIS and Gopher (it has been developed at the University of Technology in Austria). Contrary to normal Web practice, links are stored, with Hyper-G, in databases rather than documents. Documents have attributes for example, name, author and creation date. Hyper G claims to organise unstructured and unmanageable data.

Another solution, aiming to combat this information retrieval/navigation problem on the Internet is library catalogues. Erik Jul, Head of the Cataloguing Project explains "the library catalogue is a newly integrated catalogue, which, in response to a user's query, both delivers an array of a) A set of a set is substance. If a family a set of the set of

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At present to deal with these problems there are books available with the addresses of the most popular web sites. In addition, there are Virtual Yellow Pages on-line with the addresses of most of the companies using the Internet, which is constantly being updated. (See fig. 14)



FIGURE 14: The Virtual Yellow Pages Web site.

Search Engines like Infoseek, Alta-Vista, and Excite are working on creating thorough search methods to make it easier to locate sites and information. These search tools will look for the required information with better quality more accurate searches. a uterman unarevant information sources maradets, of over furmation manifest of us and allows aller stated connection to them untous rights 195 bases.

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SECURITY:

Security is becoming one of the most important considerations designers must take before using the Internet to conduct business. There are two main problems,

- 1. Security of Information
- 2. Security of the Network.

Just as with transactions using the phone, postal system, Internet transactions will never be perfectly safe. Designers with computers connected to the Internet which contain confidential customer information, product information, plans, and drawings would not like the public to have access to this kind of information. At the same time they might want them to have access to other parts of their system.

By having a computer hooked up to the Internet, hackers may be able to find a way into it and vandalize the systems, steal ideas, concepts and passwords; allowing them to log in as someone else.

Before setting up security systems the designer must consider the following.

- How valuable is the information on the computer? Is it worth spending a lot to protect it?
- Must the confidential design work and details be accessible through the Internet?
- Who needs access to the information?
- Who should not have access to the information?

Poor security can discourage potential clients from using the Internet as a source for working over the Internet.

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"The only safe computer is one turned off and behind locked doors. Data in an electronic form is so readable, movable and susceptible to disclosure that one can become paranoid when attempting to manage it." (Bernstein, 1994, pg. 49).

Most designers and companies with web sites are concerned that someone can obtain important work for clients, tamper with it or even destroy it. All of these methods of protection are available in the form of:

- Firewalls.
- Encryption.

FIREWALLS:

Firewalls deal with security within organizations like Ford, BMW and Sony's information networks. It can be thought of as a security-guard monitoring all traffic in and out of the network. A firewall allows Ford to specify the level of access that will be afforded to the network users. An example of this is anonymous FTP.

BMW have set up an FTP site that allows any outside user access to the files at the site. This FTP site will allow users to access files, but only at the lowest level of security. This facility is very useful to designers who wish to place information in the public domain.

Firewalls are probably the most popular form of protection. A firewall throws a blanket protection around the user's computer system. It then filters as instructed, what can and can't get in and out of the system. The filtering works both ways.

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Many firms will not want their staff surfing the Net, wasting valuable time and money, and distracting employees from their business. On the other hand, they wish to secure their networks from hackers who may break in for whatever reason. (Micheau, 1995, pg. 10).

No firewall is foolproof and they require consistant monitoring for effectiveness. For most designers the creation of a firewall is unnecessary. Firewalls are mainly used by large companies like Ford, BMW and Sony who need ultra-high security provided by firewalls to protect new product development and internal information.

ENCRYPTION:

Encryption is another defence mechanism used whereby cryptographers apply mathematical algorithms to garble messages and create digital signatures.

Digital Signatures is a method of guaranteeing some-ones identity. There are numerous public key algorithims (which allow each member running a programme to create a public key and a private key, so when a message is encrypted in a public key, the private key can decode it.) including Pretty Good Privacy (PGP) by Philip Zimmerman and RSA (named after its inventors).

There are two emerging standards addressing the security issues, they are hte Secure Sockets Layer (SSL) and Secure Hypertext Transport Protocol (S-HTTP).

Secure Sockets Layer is a leading channel based technology, securing the channel along which the transaction is taking place. The other is a document based approach to securing the documents that make up Constitutes a constitute that that supply the details wanted vote it estants which extension with the acting employees from statuck shoess. Communication has a frequencies of encire stretched work over status to shoest it.

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the transaction. SHTTP is not widely used but the users of SHTTP declare that it is more secure than SSL. (Muldrow, 1995, pg. 80)

Plans to merge the two standards are currently being undertaken by Terisa Systems, owned jointly with RSA Data Security and are likely to improve the prospect for a single security standard.

COPYRIGHT AND INTELLECTUAL PROPERTY:

COPYRIGHT:

Designers have to be very careful with their work when producing graphics and products for and on the Internet as the Copyright Law is having great difficulty with adjusting to the new medium. It has not been able to come to terms with digital information: the ease of making an infinite number of copies, essentially for free.

Copy an article, graphics, image or even a new product concept, casually post it to a newsgroup and at a keystroke you may have robbed a company of thousands of sales. For publishers who still see a threat in the photocopier, the Internet looks like the end of the world.

The designer must make sure everything important is copyrighted and patented before putting it out on the world wide web. Everything patented and copyrighted prior to being put on the net is safe and cannot be used by anybody else as to do so would be illegal. en a stand de la companya de la seconda de la companya de la companya de la companya de la companya de la compa La companya de la comp

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Whereas if the designer insisted on publishing his/her designs onto the Internet with no copyright or patent, they would be leaving themselves open for other people to use their designs and ideas.

World Wide Web pages are made up of text, graphics, audio,video and hypertext markup language and as long as the arrangement is original and non-trival, then the design of the page will be protected by copyright.

INTELLECTUAL PROPERTY:

What happens to intellectual property when it gets on the internet? The Net dramatically changes the economics of content. Because it allows us to copy content essentially for free, The Net poses interesting challenges for owners, creators, sellers, and users of intellectual property. (Dyson, 1995, pg. 14)

How will designers be compensated for their creating value? As there are many people on the Internet who feel that there should be no copyrights or intellectual property; everything made public should be public domain.

Designers are afraid that if they publish web pages, images and graphics might be pirated by others using the Internet and therefore the designer would be losing out on the intellectual property.

Their are many ways of overcoming the problems with the Internet. Tracking usage rights is one way of protecting intellectual property. For example the usage rights for a CD-ROM might allow the user to view the graphical content for a small fee, or to make a copy of the CD-ROM for the actual retail price. e e ensiste entrettar en trakked on publicano his/hou penigns en entre 19 det meno d'all'ica patient l'hou would be kanace that schröti 1931 autorites comptations trak charge capatiders.

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The usage rights can be stored one within another, so that a digital work can include other designers work while ensuring everyone gets paid.

According to Mark Stefik, a scientist at California-based Xerox PARC, the seeming conflict between digital publishing and commerce can be overcome by fundamentally redesigning computer systems.... It rests on two key components: trusted systems to store information, and usage rights to define exactly what a user can do with a digital work. (Steinberg, 1995, pg. 45).

Another way of keeping graphics and images safe is by using digital watermarks. When Geoffrey Rhoads, an engineer from Portland, Oregan, thought about selling some of the digital astronomical images he'd been developing, he hit upon a critical problem. Once in digital form, there was no easy way to 'sign' his pictures to prove they were his. (Steinberg, 1995, pg. 46).

He came up with a mathematical technique to hide data, such as a signature or ID number inside an image. The data is invisible but the computer can analyse the graphics or images and pull out the hidden data. Making it impossible to strip the invisible code out of the graphics without ruining the image or images.

Therefore designers can distribute more images with less fear of piracy using the digital watermark. Each time the graphical images are used the code number is changed making it easy to track down the people with permission to use it as well as being able to track down the piracy to the original source. des de la composition de la subread de la velación de la composition de la composition de la composition de la Composition de la compositione de la composition de la composition de la composition de la composition de la com

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CHAPTER 4 : THE FUTURE OF THE INTERNET

WHAT EFFECT HAS THE INTERNET HAD ?

As of October 9, 1995, a significant number of the 80,000 plus Web servers on the Internet represent commercial sites. Fourteen thousand firms were listed in Open Market's (1995) "Commercial Services on the Net" directory and in the Yahoo Business and Economic directory, there were 23,540 entries under companies, with an additional distribution as follows

Yahoo Heading	Number of Sites
Classifieds	262
Directories	178
Electronic Communic	cation 67
Marketing	46
Marketing/Investmen	ts 308
Products and Service	s 4,431

(Source : Hoffman & Novak, 1995, p. 10-11)

There is no doubt that there is a great deal of commercial activity existing on the Internet. This proliferation is confusing with questions such as:

- 1) Is any-one making any money ?
- 2) Where are the opportunities ?

For designers and manufacturers, profitability from commercial activity on the WWW includes productivity savings, marketing and sales savings or the introduction of new revenue channels. A reduction in order and processing costs results in productivity savings.

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Savings can result from efficiencies in the selling and marketing functions. Commercial use of the WWW facilitates savings from reduced brochure printing, distribution costs and reductions in order-taking as customers use fill-out forms to prepare their own orders.

For example, on-line sales, advertising revenues, or information access. Additional revenues can be achieved by firms who utilise the WWW to expand into new channels of distribution and new market segments.

Secure mechanisms for transactions are essential if companies are to take advantage of the revenue-generating opportunities of the WWW. (Donaton, 1995, p.10) It is difficult to ascertain whether or not the Internet has resulted in profit but it is evident that there is potential.

STRATEGIC IMPLICATIONS OF THE INTERNET

STRUCTURAL

Manufacturers use the Internet to improve communications between business units, offices and employees. Why should a business develop and maintain its own global network if connections are less expensive from utilising the Internet ? The Internet has allowed companies to create a global corporate telecommunications system for a fraction of the cost.

"For the small company competing with giants, technology can be the great equivalent" (Nadeau, 1995, p. 121). The Internet has provided an infrastructure whereby the small design company has access to new competitive tools to reach customers and suppliers, access numerous resources, or carry out administrative tasks more efficiently. For example,

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low-cost options enable small offices to implement conferencing using both voice and data on the same line. Cyber-commerce, it is fair to say, has provided a means of boosting smaller businesses who are now in a position to offer electronic based services.

INTERNET AND INDUSTRY COMPETITION

The Internet has accelerated the pace of competition and change. Designers are using rapid telecommunications as a natural productivity tool to compete against others in the market. The Internet reduces lead time thereby introducing time-based competition; designers will compete to get information, provide product/services that are quicker, faster and better.

In comparison with other information distribution outlets, the Internet is adding a leading edge technology. This is a result of it being a more cost-effective information tool providing low-cost electronic links for a consultancy.

If a consultancy (large or small) cannot allow customers to communicate electronically with personnel via electronic mail, check on product availability on the WWW and use WAIS (Wide Area Information Server) or other methods to find solutions to a problem then it is a business that is using traditional communication and information retrieval methods and a business that is not following the pace of competition set by others. even est a plane enable small offices to implement conterences terms on't we set at distant in the same line. If instruction is a fair of the market or with 3 t means of boosting stanket businesses who are now inco codies to bothe used topic based set dutes.

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INTERNET AND HUMAN RESOURCES

The impact of commercial use of the Internet has a fundamental influence on the human resources of a business. Although people predict that certain industries will be eliminated by this new work environment it is my opinion that some areas of business will grow and other areas will be in a position to change their methods to compete in this new work environment (See fig. 15). Response from industry in facing these challenges remains to be seen.

TRADE

REPLACED BY

Air couriers Checkout Staff Bailiffs Draughtsmen Middle Managers Data Networks Image Recognition Software Electronic Credit Freezes Computer Aided Design Networks

Possible areas of growth include :

AREA

CAUSES

Designers/Advertising Career Consultants Security Equipment Environmental Systems Programmers/Designers Travel Companies Electronic Industry New Media More Redundancies Rising Crime Tighter Laws Need for Interfaces More Business Travel New Technology

FIGURE 15: Trades most affected by the Internet.

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THE FUTURE OF THE INTERNET

For those who wish to glimpse the future, navigating this netherland between potentiality and actuality becomes more challenging than everSociety is being reshaped by powerful new technologies of light and silicon. But in what ways and to what end ? (Kleine D & Burnstein D,1995, p. 1)

To attempt answering these questions is extremely difficult as no-one yet knows the answer. The most one can do is to analyse our current technological situation and how manufacturers relates to it, dig-deep into the critical challenges and opportunities facing manufacturers.

The Economist predicts that the Internet has commercial potential as a critical mass of companies, telephone companies are already developing 'industry-strength' parts of the Internet. These include AT&T, MCI, BT and smaller networking companies such as BBN and PS that are providing services with alot of bandwidth, security and reliability. Their is likely to be a clash between large access providers and those who want to provide local Internet access.

One thing is for certain, the companies that will make money in the future are those that offer the most services This is why companies like the United States MCI committed itself to invest \$2 billion in News Corporation. MCI predicts that by the turn of the century the Internet will carry as much data as the voice networks.

The question to be asked by the consumer is that of cost. In future years, what will happen to the price ? It is evident that the range of options for gaining access to the Internet is growing ever broader as giants such as MCI, AT&T, MSN enter the marketplace. It's possible that consumers will see a reduction in price and service quality with the introduction of competition.

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As the Internet concentrates alot of its activity on the WWW and as applications for the Internet (email, News, FTP, Gopher etc) are consolidated in Web browsers, the WWW looks set to become the centre of the Internet according to Wiggins (Wiggins, 1995, p.43). As the use of WWW advertising and commerce is increasing constantly, the question of size becomes important. The medium of the Web may challenge vendors of on-line information. It is probable, that consumers will demand Web delivery and on-demand access as opposed to the traditional subscribers-based services with proprietary formats.

THE FUTURE FOR DESIGNERS

Despite the affirmations of ardent Internet advocates, it is evident at this stage that commercial use of the Internet will grow with painful periods of transition. In particular, four areas exist where the Internet currently fails to meet the requirements for widespread electronic commerce.

Firstly, reliability. The Internet must become more reliable delivery system than private corporate data networks in every area. The IETF quotes a figure of Internet availability as 99.5%; compared to 99.95% availability of private networks (Bennett, 1995, p.16).

With the explosion of Internet access providers this situation should improve as the quality of their service will impact price and charges. Secondly, the problem of security which is not just a physical barrier but also a psychological barrier to commercialisation. A degree of learning will have to be undergone to educate consumers as to the protective procedures followed by firms such as encryption, digital signatures, firewalls etc. An interview contendent that data of a data with a proving the field with a province of the informational (execute interview) information (field Gap a constraint) (field Gap a constraint)

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Finally, The Internet must be easy to use if the average consumer is to experiment with its capabilities for commerce. The area for improvement here lies with the graphical user interface. This is already occurring with WWW, Netscape and Mosaic interfaces.

The role of the designer will, in the future, have to adapt teaching methods in parallel with current Internet innovations such as WWW pages, video-conferencing, whiteboarding and multi-media resources. Basically, the designer will require up-to-date training in order to sustain competitiveness.

As a result of the visual impact and graphical nature of the WWW, the future for the designer is in designing multi-media web-pages and graphical user interfaces.

"The problem with the World Wide Web, is that it lacks depth " according to Lavin (Lavin, 1995, p. 20) Designers have the opportunity to improve the Internet by providing a major dimensional change. This change involves three dimensional computing. Adding three dimensional elements to web-pages does not require a high powered workstation or a high bandwidth Internet connection. It also provides a visitor to a web-page with a more interactive experience.

Although no-one is in the position to predict the future of the Internet, it is evident that for the designer the Internet is a cost-effective marketing, communications, research and information retrieval and ditribution tool. In situ see dritemet must moletos for sea 9 dres overtales o vertales o entre estar marte verm de capabilitas tea composter de consector de contra a la contra de contra de contra de contra ha se consector estar grappidat user marco cas de contra entre entre esta entre esta entre esta entre esta entre Werte estare condutéctoria dinterta contra de contra de contra entre esta entre esta entre esta entre esta entre

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CONCLUSION

In summary the Internet will provide the designer with

- the largest network available

- electronic communications to marginal branches, customers, suppliers and vendors who previously warranted a private telecommunications link.

- a responsive method of communications to get information to and from customers faster than other mechanisms

- a new source of revenue as designers can use the Internet to gain access to end-user markets that in the past were restricted by cost.

Reality suggests that use of the Internet by designers is just beginning to emerge. If this trend is to continue growing then a transition has to be made from traditional methods to perhaps disaggregated alliances of networks of the future.

Such a transition cannot be made without overcoming limitations such as ease of access, copyright, security, non-structured information etc.

In conclusion, the Internet offers the designer both a threat and an opportunity to do business. The danger to slower moving consultancies and manufacturers is clear, for who can afford to ignore a market of 35 million users today and perhaps 120 million in 1998 ?

CONCLUSION

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APPENDIX

INTERNET GLOSSARY

anonymous ftp: The procedure of connecting to a remote computer, as an anonymous or guest user, to transfer public files back to your local computer.

ARPANET : The predecessor of the Internet funded by the US Department of Defense Advanced Projects Agency.

backbone: Backbones are the major communication links on the Internet. Most backbones are very high speed and long distance networks and primarily serve the purpose of connecting other networks to the Internet.

browser : This will come with the software. It can scan the Internet for specific items of interest for the user. They also come with 'search engines', which assist the users in finding information of interest.

client: A system or process that requests a service from another system or process.

document : Unit of information sent from servers to clients; a document may contain plain or formatted text, inline graphics, sound other multimedia data, or hyperlinks to other documents; often also referred to as a file.

electronic mail: Colloquially known as e-mail. Probably the simplest use which is made of the Internet. Basically, it is a service for sending and receiving messages over the Internet. Each computer on the Internet is addressed uniquely and many of these computers support multiple users. Users may be addressable through their e-mail address.

firewall : A computer or router that permits greater accesss from one side of a network link than from the other. This technology is important for commercial organisations that need to protect proprietary information while allowing internal users to access remote services

FTP (File Transfer Protocol) : The standard Internet protocol for copying files between computers. A very large amount if information is available through anonymous FTP, a variant of FTP where a set of files is made available for public access.

gateway: A computer that forwards and routes data between two or more networks.

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Gopher : An Internet system that helps you locate (and retrieve) files and documents by choosing selections from an on-screen menu. It is a menu driven tool making it easier to find what it is you want on the Internet.

homepage : This is the front page of a site on the WWW which provides an introduction to the information contained in the rest of the site.

host: A computer system on the Internet is known as a host or node.

HTML (HyperText Markup Language) : A markup language based on the SGML standard, HTML usually refers to both the document type and the markup language for representing instances of that document type.

hypertext : This is a form of multimedia document incorporating text, graphics, annotated voice, special programs. links to other documents through hypertext links and other special features. Hypertext is a generic term describing any media format as such and is not specific to the Internet.

Internet : The series of interconnected networks that includes local area, regional, and national backbone networks. Networks in the Internet use the same telecommunications protocol (TCP/IP) and provide electronic mail, remote login, and file transfer services.

Internet Protocol : The Internet standard protocol that provides a common layer over dissimilar networks; it is used to mov epackets among host computers and through gateways if necessary.

I.S.P. : (Internet Service Providers) Many companies and third level colleges have e-mail facilities, otherwise an access provider is needed to provide access..

login: This is the process of registering your session on a multi-user computer operating system.

Mailing List : A group who share ideas and information about a specific topic using e-mail.

modem : The device which allows computers to communicate with telephone lines (modulator/demodulator)

Mosaic : A program with a graphical interface that allows you to search and retrieve information on the Internet. Mosaic, for example, can use Hypertext Transport Protocol (HTTP), File Transfer Protocol, the news protocol (NNTP) and others. viruptos — An screated system that halos sour boats functions to a and the character build downg talectons and all an accesses much on a sup in much then made making in easier to final what if a yake out of the site share

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navigation : The process of moving from one node to another through the browser. This is normally done by following links. Various features of a particular browser may make this easier.

networking : Linking computers or terminals to communicate and share data.

Newsgroups : Like the mailing list, a newsgroup is a forum where people with common interests share information. Instead of using e-mail to distribute messages, you use special newsreader software.

Search Engine : This term refers to a program that helps users find information in text-oriented databases.

surfing : A term used to describe travelling through the information at different sites on the Internet.

server : A computer that provides services (documents, software) to oter machines that run specific software called clients and equest those sevices.

TCP/IP (Transmission Control Protocol/ Internet Protocol) : A set of protocols developed to allow cooperating computers to share resources across a network. Any real application will use several of these protocols. Information is transferred in packets which are sent through the network individually.

Telnet : A portion of the TCP/IP suite of software protocols that handles terminals. Among other functions, it allows a user to log in to a remote computer from the user's local computer.

Uniform Resource Locatorss : (URLs). A description of the location of a resource that contains the access method, the host name, and the path to that resource. A URL pionts to any resource accessible on the World Wide Web - such as an image file, gopher object, or news archive.

Web Browser : This is the software that is used to translate WAIS data, so it can be made available to an otherwise incompatible network or apllication.

Web Document: A HTML document that is browsable on the Web.

Web Page: A HTML document that is accessible on the Web.

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WWW: (World Wide Web) A hypertext based information retrieval system. It provides access to multimedia, complex documents and databases. Web application programs can access many of the other Internet services including Gopher, Usenet news, file transfer and remote connectivity.

APPENDIX • 52

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