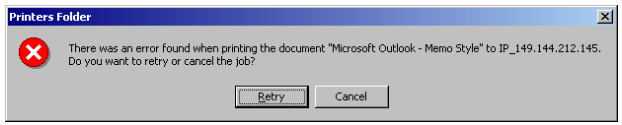
IFSM 303 Human Factors in IS



If all else fails, immortality can always be assured by spectacular error.
- John Kenneth Galbraith

Topics

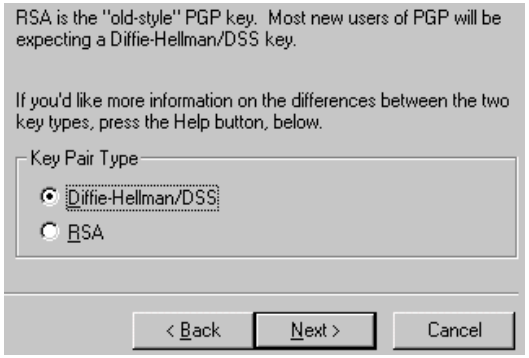
Results

Experiment

Menu Selection, Form Fillin, Dialog

Command and Natural Languages

What's Wrong with This?



Detailed Experimental Results

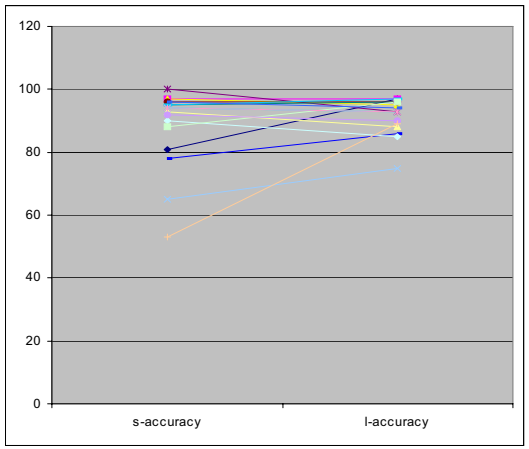
Question: Does the Font Size have an Impact on typing skills?

Test performed on 17 Users

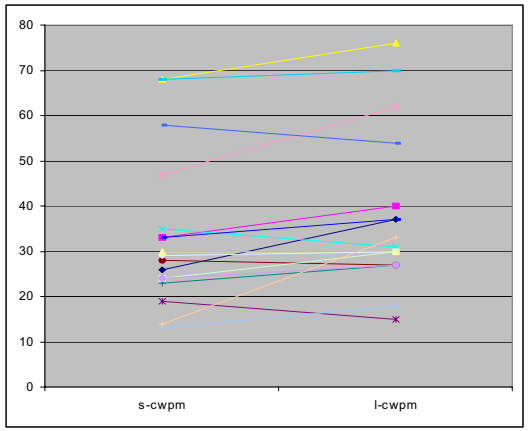
Half tested small to large
Other half tested large to small

Does it make a difference?

Simple Results - Accuracy



Simple Results - Corrected WPM



Result Discussion

There appear to be differences.

Typing with the larger fonts appear to faster and more accurate.

But are the differences significant or just within the normal variation we would expect to see?

Results in Depth

One independent variable with 2 levels
Font: small (10), large (14)

Independent *t*-Test (two tailed)

Null Hypothesis: There will be no significant difference in typing accuracy with different font sizes.

SPSS Output

Group Statistics

	Font	N	Mean	Std. Deviation	Std. Error Mean
accuracy	small	17	88.4706	12.62001	3.06080
	large	17	91.7647	5.81517	1.41039

Independent Samples Test

			accuracy	
			Equal variances assumed	Equal variances not assumed
Levene's Test for Equality of Variances	F		4.413	
	Sig.		.044	
t-test for Equality of Means	t		-.977	-.977
	df		32	22.501
	Sig. (2-tailed)		.336	.339
	Mean Difference		-3.29412	-3.29412
	Std. Error Difference		3.37012	3.37012
	95% Confidence Interval of the Difference	Lower	-10.15882	-10.27430
		Upper	3.57059	3.68606

Look up the critical *t* value from table

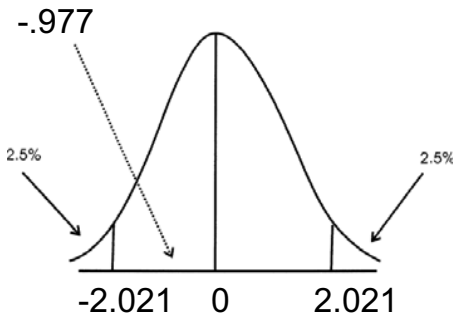
TABLE D *t* distribution critical values

	Upper tail probability *p*											
df	.25	.20	.15	.10	.05	.025	.02	.01	.005	.0025	.001	.0005
1	1.000	1.376	1.963	3.078	6.314	12.71	15.89	31.82	63.66	127.3	318.3	636.6
2	0.816	1.061	1.386	1.886	2.920	4.303	4.849	6.965	9.925	14.09	22.33	31.60
3	0.765	0.978	1.250	1.638	2.353	3.182	3.482	4.541	5.841	7.453	10.21	12.92
4	0.741	0.941	1.190	1.533	2.132	2.776	2.999	3.747	4.604	5.598	7.173	8.610
5	0.727	0.920	1.156	1.476	2.015	2.571	2.757	3.365	4.032	4.773	5.893	6.869
26	0.684	0.856	1.058	1.315	1.706	2.056	2.162	2.479	2.779	3.067	3.435	3.707
27	0.684	0.855	1.057	1.314	1.703	2.052	2.158	2.473	2.771	3.057	3.421	3.690
28	0.683	0.855	1.056	1.313	1.701	2.048	2.154	2.467	2.763	3.047	3.408	3.674
29	0.683	0.854	1.055	1.311	1.699	2.045	2.150	2.462	2.756	3.038	3.396	3.659
30	0.683	0.854	1.055	1.310	1.697	2.042	2.147	2.457	2.750	3.030	3.385	3.646
40	0.681	0.851	1.050	1.303	1.684	2.021	2.123	2.423	2.704	2.971	3.307	3.551
50	0.679	0.849	1.047	1.299	1.676	2.009	2.109	2.403	2.678	2.937	3.261	3.496
60	0.679	0.848	1.045	1.296	1.671	2.000	2.099	2.390	2.660	2.915	3.232	3.460
80	0.678	0.846	1.043	1.292	1.664	1.990	2.088	2.374	2.639	2.887	3.195	3.416
100	0.677	0.845	1.042	1.290	1.660	1.984	2.081	2.364	2.626	2.871	3.174	3.390
1000	0.675	0.842	1.037	1.282	1.646	1.962	2.056	2.330	2.581	2.813	3.098	3.300
z^*	0.674	0.841	1.036	1.282	1.645	1.960	2.054	2.326	2.576	2.807	3.091	3.291
	50%	60%	70%	80%	90%	95%	96%	98%	99%	99.5%	99.8%	99.9%
	Confidence level *C*											

Result

t = -.977

Critical Value is 2.021 (from *t* table)



Results

Since the calculated *t* value is less than the critical value of *t*, we fail to reject the null hypothesis.

There is no significant difference in typing accuracy between 10 and 14 point fonts.

What about corrected WPM?

Group Statistics

	Font	N	Mean	Std. Deviation	Std. Error Mean
cwpm	small	17	33.6471	16.92979	4.10608
	large	17	37.8824	17.43517	4.22865

Independent Samples Test

			cwpm	
			Equal variances assumed	Equal variances not assumed
Levene's Test for Equality of Variances	F		.023	
	Sig.		.879	
t-test for Equality of Means	t		-.719	-.719
	df		32	31.972
	Sig. (2-tailed)		.478	.478
	Mean Difference		-4.23529	-4.23529
	Std. Error Difference		5.89418	5.89418
	95% Confidence Interval of the Difference	Lower	-16.24134	-16.24175
		Upper	7.77076	7.77116

The Final Results

There is no significant difference in accuracy or corrected words per minute for typists using small or large fonts.

HCI in the News

Based on the ideas from Star Trek.

Visually impaired struggle with smart machines

Sunday, April 24, 2005 Posted: 2:09 PM EDT (1809 GMT)

(AP) -- Jay Leventhal, who is blind, still fumbles with the tiny controls on his iPod but has given up on the kiosk in his New York office building that lists all the tenants.

For Leventhal, even laundry has become a task requiring the help of a sighted person. The washers he uses now takes smart cards instead of quarters, issuing instructions on a digital screen that he can't read.

As technology has evolved, it's become lighter, smaller and more portable. For most people, that makes it more convenient. For millions of blind and vision-impaired people, it's anything but.

"The biggest barrier for blind people is access to information, and more and more information is being made available through different machines that aren't designed for people who can't see," says Leventhal, editor in chief of AccessWorld: Technology and People with Visual Impairments.

A set of goggles called JORDY functions like two high-definition television sets, with controls over color, contrast and magnification.

Blind people need a way to communicate with the machines that surround them, he says, from automated tellers to ticketing machines at train stations and airports.

Leventhal and other experts on assistive technology say there's no reason that can't happen. The technology exists in voice chips, image processors, cell phones, cameras and personal digital assistants.

HCI Video - Predictions of the Future

From 1966
prediction of the home computer

From 1981
Online Newspapers

HCI Video

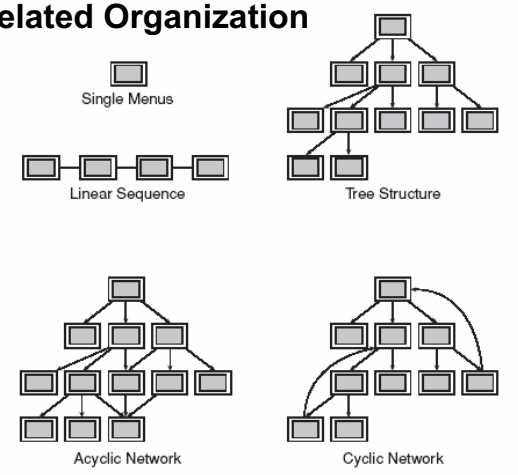
ABC (2005) Adjusting Traffic Lights

The traffic light system is a huge computer system, are the drivers are the users... How well is it designed?

Chapter 7

Menu Selection, Form Fillin, Dialog Boxes

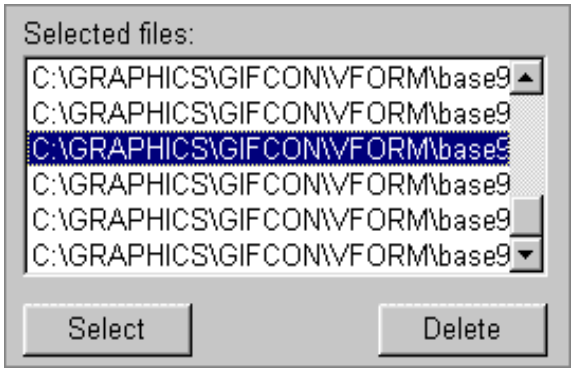
Task Related Organization



Menu Types

Single menus
- Mnemonic Letters
- Binary (Y/N)
- Multiple Choice
  - Numbers, Letters
- Highlighting Selection
- Radio Buttons
- Pull Down / Pop Up
- Multiple Selection

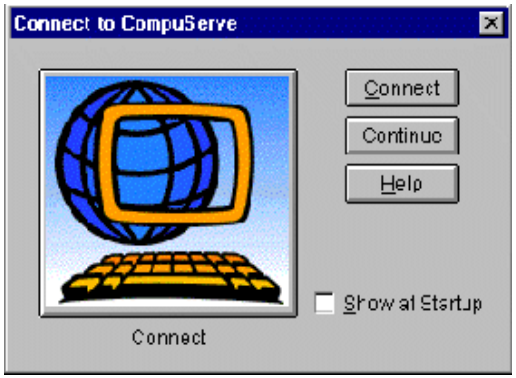
Bad Menu Types



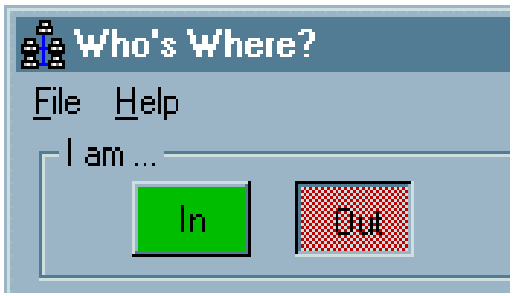
Bad Menu Types

The Windows Start menu is now seen as advertising space.

Where is the button?

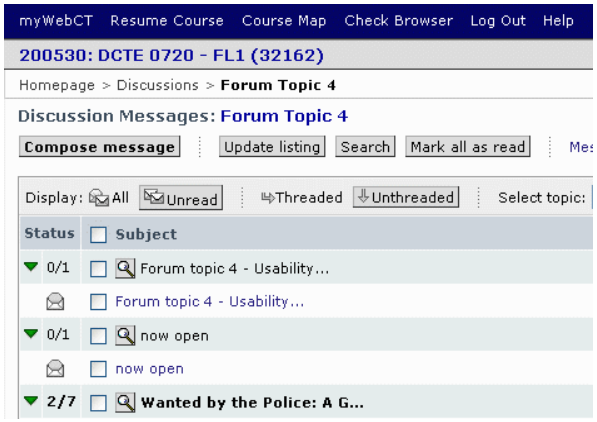


Bad Menu Types



Are you In or Out?

What Display Mode?



Menu Types

Linear Sequencing/Multiple Menus
- Wizards

Tree Structure menus
- Grouping
  - 4 - 8 items per menu
  - 3 - 4 levels

Kiger's Study on page 283
- Breath Preferred over Depth

Problems with Menus

Semantics

Getting Lost

Cyclic menus

Menu Item Ordering

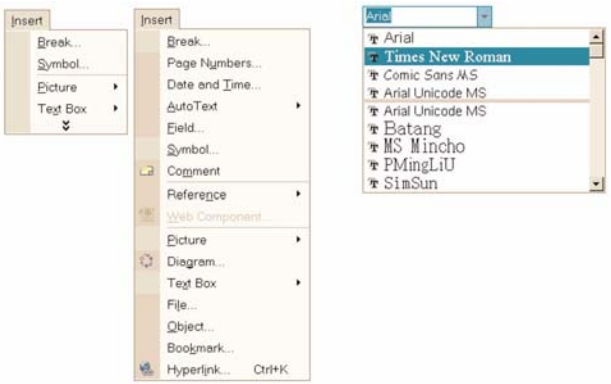
- Alphabetic
- Grouping
- Most Frequently Used
- Most Important

Card's Study	Mean Time
Alphabetical	0.81
Categorical	1.28
Random	3.23

2D Menu

Embedded Menus

Content Organization



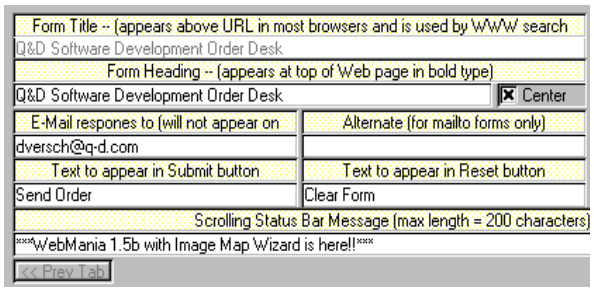
Menu Issues

- Response Time
- Display Time
- BLT Approach - Type Ahead
- Titles

Phasing of Menu Items

- Use Familiar/Consistent Terms
- Make Choices Distinct
  - Exit / Close / Quit
- Keywords on the Left

Form Fill-in



Nice Eh?

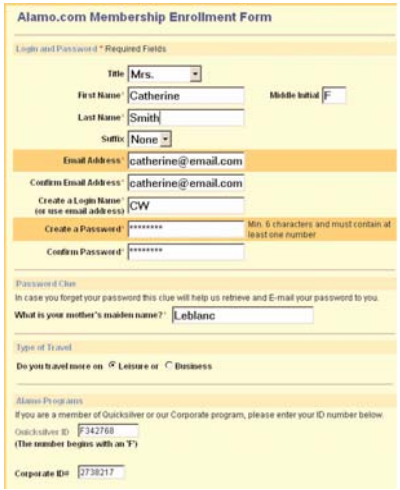
Form Issues

- Title / Instructions
- Grouping
- Visually Appealing
- Familiar labels
- Consistent Terminology

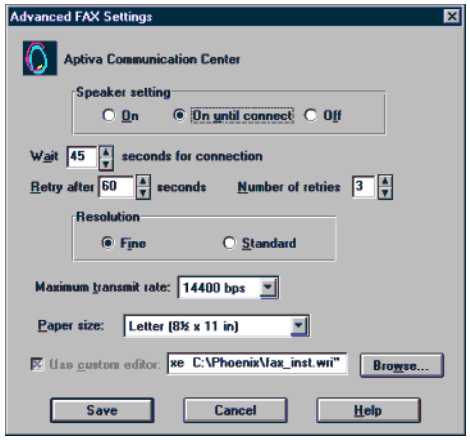
Form Issues

- Visible Space and Boundaries
- Convenient Cursor movement
- Error messages
- Optional Fields marked
- Completion Signal

How is this?



What About This?



Dialogue Box Guidelines

Internal layout: like that of menus and forms

- Meaningful title, consistent style
- Top-left to bottom-right sequencing
- Clustering and emphasis
- Consistent layouts (margins, grid, whitespace, lines, boxes)
- Consistent terminology, fonts, capitalization, justification
- Standard buttons (OK, Cancel)
- Error prevention by direct manipulation

External relationships

- Smooth appearance and disappearance
- Distinguishable but small boundary
- Size small enough to reduce overlap problems
- Display close to appropriate items
- No overlap of required items
- Easy to make disappear
- Clear how to complete/cancel

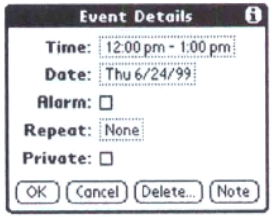
Other Menus

Audio Menus
- Telephone / Verbal
- Repeat Options
- Frequent user Options

Small Display menus
- Cell Phones / PDA
- Hardware Buttons
- Touch Interface
- Learnability

Palm Menu

Original



Redesign

Chapter 8

Command and Natural Languages

What do these mean?

CP TAG DEV E VTSO LOCAL 2
OPTCD=J F=3871 X=GB12

grep -v ^$ filea > fileb

The Big Problem

Command Languages

Simple Command List

Command plus arguments
- COPY FILEA, FILEB
- DELETE FILEA
- PRINT FILEA, FILEB, FILEC

Command Languages

Command plus options and args
- PRINT /3,HQ FILEA
- PRINT (3, HQ) FILEA
- PRINT FILEA -3, HQ

Symbols vs. Keywords

FIND: /TOOTH/;-1
- Backward to "TOOTH"
- keywords preferred

	Percentage of Task Completed		Percentage of Erroneous Commands	
	Symbol	Keyword	Symbol	Keyword
Inexperienced users	28	42	19.0	11.0
Familiar users	43	62	18.0	6.4
Experienced users	74	84	9.9	5.6

Command Languages

Keystrokes
- Mnemonics
- Visual

Naming and Abbreviations

Consistency

Consistency

Inconsistent order of arguments

SEARCH	file no, message id
TRIM	message id, segment size
REPLACE	message id, code no
INVERT	group size, message id

Consistent order of arguments

SEARCH	message id, file no
TRIM	message id, segment size
REPLACE	message id, code no
INVERT	message id, group size

Abbreviations

Truncation
Vowel Drop
First and Last Letter
First letter of each word
Standard Abbreviations
Phonics

Command Language Guidelines

- Create explicit model of objects and actions.
- Choose meaningful, specific, distinctive names.
- Try to achieve hierarchical structure.
- Provide consistent structure (hierarchy, argument order, action-object).
- Support consistent abbreviation rules (prefer truncation to one letter).
- Offer frequent users the ability to create macros.
- Consider command menus on high-speed displays.
- Limit the number of commands and ways of accomplishing a task.

Natural Languages

"Open the pod bay door Hal"

Simple Sentences

Good for novices

Needs to be Robust

Synonyms

Natural Language Interface

Geobase - Written in Prolog

Sample questions:
- What is the longest river in the US?
- give me the cities in California.
- what is the biggest city in California ?
- which states border Alabama?

Homework - Icon Design

You are going to get a word at random

Do not tell anyone your word!

You are to design an icon for that word.
- Use Randy's Icon Editor 1.5

Do not show anyone your icon!

Homework - Icon Design Guidelines No Meaningful Text 32 x 32 pixels in size Do not create a transparent icon Name the icon *NN*.ICO Where *NN* is the 2 digit number Email it to submit.homework@gmail.com Subject line: ICON *your name* Email it no later than Tuesday 6pm	End of This Lesson