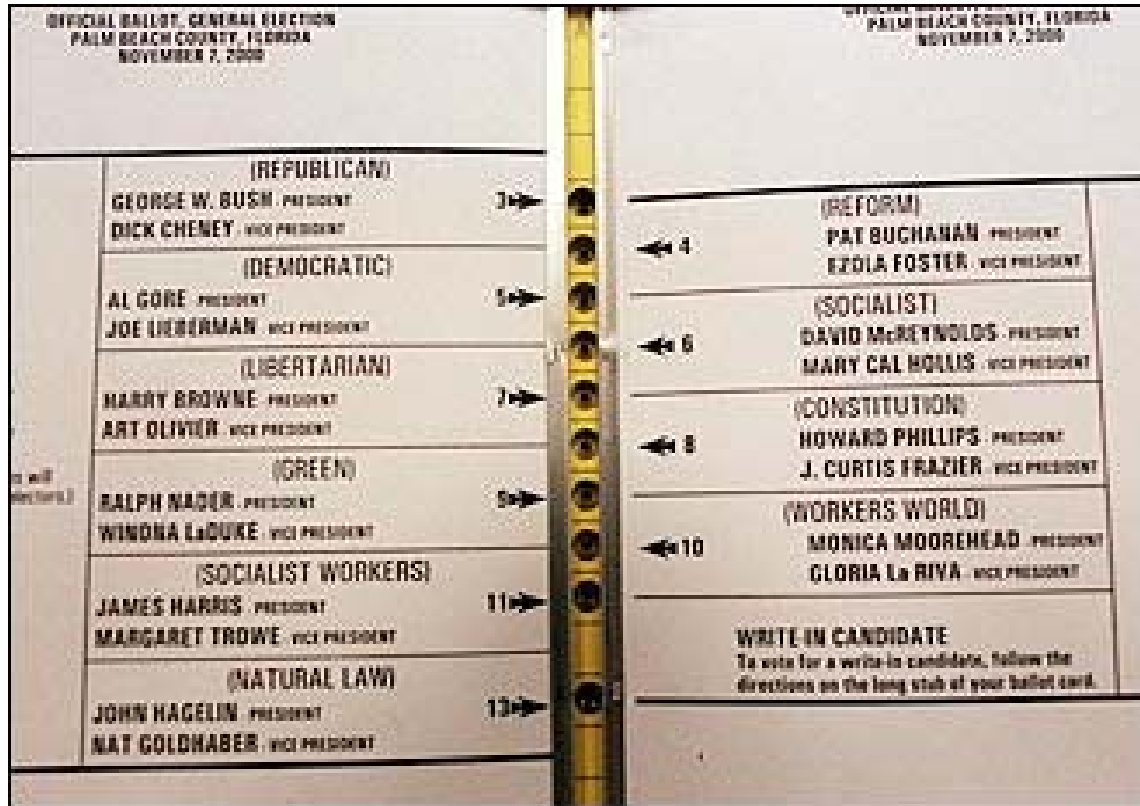


Lecture 2: Impact and Influence con't.

- Palm Beach ballot
- Business examples
- Cost Justification

Human Factors and the 2000 Election

- Palm Beach Ballot (“Butterfly” Ballot)
 - Was there a problem?
 - Was it obvious or not?
 - Was it a big problem; human error; correctable?
- Dimpled Ballots



Confusion at Palm Beach County polls

Some Al Gore supporters may have mistakenly voted for Pat Buchanan because of the ballot's design.

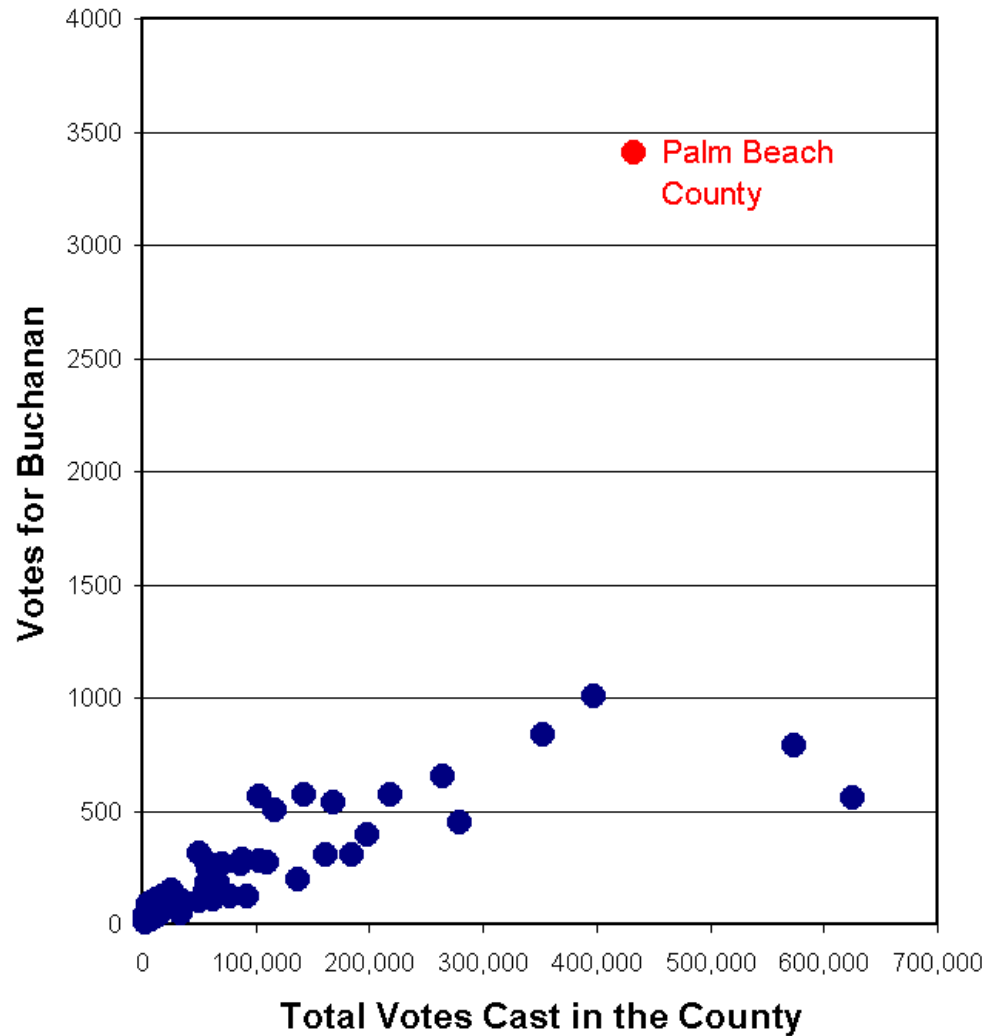
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<p>ELECTORS FOR PRESIDENT AND VICE PRESIDENT</p> <p>(A vote for the candidates will actually be a vote for their electors.)</p> <p>(Vote for Group)</p>	<p>(REPUBLICAN)</p> <p>GEORGE W. BUSH - PRESIDENT 3 ➔</p> <p>DICK CHENEY - VICE PRESIDENT</p>			
	<p>(DEMOCRATIC)</p> <p>AL GORE - PRESIDENT 5 ➔</p> <p>JOE LIEBERMAN - VICE PRESIDENT</p>			
	<p>(LIBERTARIAN)</p> <p>HARRY BROWNE - PRESIDENT 7 ➔</p> <p>ART OLIVIER - VICE PRESIDENT</p>			
	<p>(GREEN)</p> <p>RALPH NADER - PRESIDENT 8 ➔</p> <p>WINONA LaDUKE - VICE PRESIDENT</p>			
	<p>(SOCIALIST WORKERS)</p> <p>JAMES HARRIS - PRESIDENT 11 ➔</p> <p>MARGARET THOME - VICE PRESIDENT</p>			
	<p>(NATURAL LAW)</p> <p>JOHN HAGEJUN - PRESIDENT 13 ➔</p> <p>NAT GOLDHAIBER - VICE PRESIDENT</p>			
			4 ←	(REFORM)
			6 ←	(SOCIALIST)
			8 ←	(CONSTITUTION)
			10 ←	(WORKERS WORLD)
				WRITE-IN CANDIDATE
				To vote for a write-in candidate, follow the directions on the long stub of your ballot card.

Sun-Sentinel graphic

Presidential Election Results for Florida, by County



2 OFFICIAL BALLOT, GENERAL ELECTION PALM BEACH COUNTY, FLORIDA NOVEMBER 7, 2000		
CONGRESSIONAL - UNITED STATES SENATOR		
UNITED STATES SENATOR (Vote for One)	BILL McCOLLUM (REP)	21
	BILL NELSON (DEM)	22
	JOE SIMONETTA (LAW)	23
	JOEL DECKARD (REP)	24
	WILLIE LOGAN (RPA)	25
	ANDY MARTIN (RPA)	26
	DARRELL L. McCORMICK (RPA)	27
To vote for a write-in candidate, follow the directions on the long stub of your ballot card.		
CONGRESSIONAL - REPRESENTATIVE DISTRICT 16		
REPRESENTATIVE IN CONGRESS CONGRESSIONAL DISTRICT 16 (Vote for One)	MARK FOLEY (REP)	30
	JEAN ELLIOTT BROWN (DEM)	31
	JOHN McGUIRE (REP)	32
To vote for a write-in candidate, follow the directions on the long stub of your ballot card.		
CONGRESSIONAL - REPRESENTATIVE DISTRICT 19		
REPRESENTATIVE IN CONGRESS CONGRESSIONAL DISTRICT 19 (Vote for One)	MORRIS KENT THOMPSON (REP)	35
	ROBERT WEXLER (DEM)	36

3 OFFICIAL BALLOT, GENERAL ELECTION PALM BEACH COUNTY, FLORIDA NOVEMBER 7, 2000		
CONGRESSIONAL - REPRESENTATIVE DISTRICT 22		
REPRESENTATIVE IN CONGRESS CONGRESSIONAL DISTRICT 22 (Vote for One)	CLAY SHAW (REP)	41
	ELAINE BLOOM (DEM)	42
To vote for a write-in candidate, follow the directions on the long stub of your ballot card.		
CONGRESSIONAL - REPRESENTATIVE DISTRICT 23		
REPRESENTATIVE IN CONGRESS CONGRESSIONAL DISTRICT 23 (Vote for One)	BILL LAMBERT (REP)	45
	ALCEE L. HASTINGS (DEM)	46
To vote for a write-in candidate, follow the directions on the long stub of your ballot card.		
STATE - TREASURER		
TREASURER (Vote for One)	TOM GALLAGHER (REP)	49
	JOHN COSGROVE (DEM)	50
STATE - COMMISSIONER OF EDUCATION		
COMMISSIONER OF EDUCATION (Vote for One)	CHARLIE CRIST (REP)	52
	GEORGE H. SHELDON (DEM)	53
	VASSILIA GAZETAS (RPA)	54
STATE - PUBLIC DEFENDER 15TH JUDICIAL CIRCUIT		
PUBLIC DEFENDER 15TH JUDICIAL CIRCUIT (Vote for One)	RICHARD JORANDBY (REP)	56
	CAREY HAUGHWOUT (DEM)	57

REPUBLICAN)	
RESIDENT	3
RESIDENT	
MOCRATIC)	
	5
CE PRESIDENT	
ERTARIAN)	
RESIDENT	7
SIDENT	

	(REFORM
4	PAT BUC
	EZOLA F
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6	DAVID McRE
	MARY CAL F
	(CONSTITUT
8	HOWARD PH

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ELECTORS FOR PRESIDENT AND VICE PRESIDENT	
(REPUBLICAN)	3
GEORGE W. BUSH - PRESIDENT DICK CHENEY - VICE PRESIDENT	
(DEMOCRATIC)	5
AL GORE - PRESIDENT JOE LIEBERMAN - VICE PRESIDENT	
(LIBERTARIAN)	7
HARRY BROWNE - PRESIDENT ART OLIVIER - VICE PRESIDENT	
(GREEN)	9
RALPH NADER - PRESIDENT WINONA LaDUKE - VICE PRESIDENT	
(SOCIALIST WORKERS)	11
JAMES HARRIS - PRESIDENT MARGARET TROWE - VICE PRESIDENT	
(NATURAL LAW)	13
JOHN HAGELIN - PRESIDENT NAT GOLDHABER - VICE PRESIDENT	

(REFORM)	4
PAT BUCHANAN - PRESIDENT EZOLA FOSTER - VICE PRESIDENT	
(SOCIALIST)	6
DAVID McREYNOLDS - PRESIDENT MARY CAL HOLLIS - VICE PRESIDENT	
(CONSTITUTION)	8
HOWARD PHILLIPS - PRESIDENT J. CURTIS FRAZIER - VICE PRESIDENT	
(WORKERS WORLD)	10
MONICA MOOREHEAD - PRESIDENT GLORIA La RIVA - VICE PRESIDENT	
WRITE-IN CANDIDATE	
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GEORGE W. BUSH - PRESIDENT DICK CHENEY - VICE PRESIDENT		← 6	(SOCIALIST) DAVID McREYNOLDS - PRESIDENT MARY CAL HOLLIS - VICE PRESIDENT
(DEMOCRATIC)	5 →	← 8	(CONSTITUTION) HOWARD PHILLIPS - PRESIDENT J. CURTIS FRAZIER - VICE PRESIDENT
AL GORE - PRESIDENT JOE LIEBERMAN - VICE PRESIDENT		← 10	(WORKERS WORLD) MONICA MOOREHEAD - PRESIDENT GLORIA La RIVA - VICE PRESIDENT
(LIBERTARIAN)	7 →		
HARRY BROWNE - PRESIDENT ART OLIVIER - VICE PRESIDENT			
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RALPH NADER - PRESIDENT WINONA LaDUKE - VICE PRESIDENT			
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	<p>2 (DEMOCRATIC)</p> <p>AL GORE - PRESIDENT</p> <p>JOE LIEBERMAN - VICE PRESIDENT</p>	5	2	(SOCIALIST) <p>DAVID McREYNOLDS - PRESIDENT</p> <p>MARY CAL HOLLIS - VICE PRESIDENT</p>
	(LIBERTARIAN) <p>HARRY BROWNE - PRESIDENT</p> <p>ART OLIVIER - VICE PRESIDENT</p>	7	6	(CONSTITUTION) <p>HOWARD PHILLIPS - PRESIDENT</p> <p>J. CURTIS FRAZIER - VICE PRESIDENT</p>
	(GREEN) <p>RALPH NADER - PRESIDENT</p> <p>WINONA LaDUKE - VICE PRESIDENT</p>	9	8	(WORKERS WORLD) <p>MONICA MOOREHEAD - PRESIDENT</p> <p>GLORIA La RIVA - VICE PRESIDENT</p>
	(SOCIALIST WORKERS) <p>JAMES HARRIS - PRESIDENT</p> <p>MARGARET TROWE - VICE PRESIDENT</p>	11	10	WRITE-IN CANDIDATE <p>To vote for a write-in candidate, follow the directions on the long stub of your ballot card.</p>
	(NATURAL LAW) <p>JOHN HAGELIN - PRESIDENT</p> <p>NAT GOLDHABER - VICE PRESIDENT</p>	13		

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The Sun-Sentinel Virtual Ballot - Netscape

File Edit View Go Communicator Help

Bookmarks Netsite: <http://www.sun-sentinel.com/graphics/news/ballot.htm>

Back Forward Reload Home Search Netscape Print Security Shop Stop

THE EDGE INFOPLEX SPORTSPLEX ARCADE KIDS SITE MAP HELP **Sun-Sentinel** ⓘ

The virtual ballot

Choose your candidate. When you are done, click the "Done voting" button.

OFFICIAL BALLOT, GENERAL ELECTION
PALM BEACH COUNTY, FLORIDA
NOVEMBER 7, 2000

OFFICIAL BALLOT, GENERAL ELECTION
PALM BEACH COUNTY, FLORIDA
NOVEMBER 7, 2000

DONE VOTING

<p>ELECTORS FOR PRESIDENT AND VICE PRESIDENT</p> <p><i>for the candidates will a vote for their electors.)</i></p> <p>Vote for Group!</p>	(REPUBLICAN)	3 →	← 4	(REFORM)
	GEORGE W. BUSH - PRESIDENT DICK CHENEY - VICE PRESIDENT			PAT BUCHANAN - PRESIDENT EZOLA FOSTER - VICE PRESIDENT
	(DEMOCRATIC)	5 →	← 6	(SOCIALIST)
	AL GORE - PRESIDENT JOE LIEBERMAN - VICE PRESIDENT			DAVID McREYNOLDS - PRESIDENT MARY CAL HOLLIS - VICE PRESIDENT
	(LIBERTARIAN)	7 →	← 8	(CONSTITUTION)
	HARRY BROWNE - PRESIDENT ART OLIVIER - VICE PRESIDENT			HOWARD PHILLIPS - PRESIDENT J. CURTIS FRAZIER - VICE PRESIDENT
	(GREEN)	9 →	← 10	(WORKERS WORLD)
	RALPH NADER - PRESIDENT WINONA LaDUKE - VICE PRESIDENT			MONICA MOOREHEAD - PRESIDENT GLORIA La RIVA - VICE PRESIDENT
	(SOCIALIST WORKERS)	11 →		WRITE-IN CANDIDATE
	JAMES HARRIS - PRESIDENT MARGARET TROWE - VICE PRESIDENT			To vote for a write in candidate, follow the directions on the long stub of your ballot card.
	(NATURAL LAW)	13 →		
	JOHN HAGELIN - PRESIDENT NAT GOLOHABER - VICE PRESIDENT			

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NEED HELP?

RELATED ITEMS

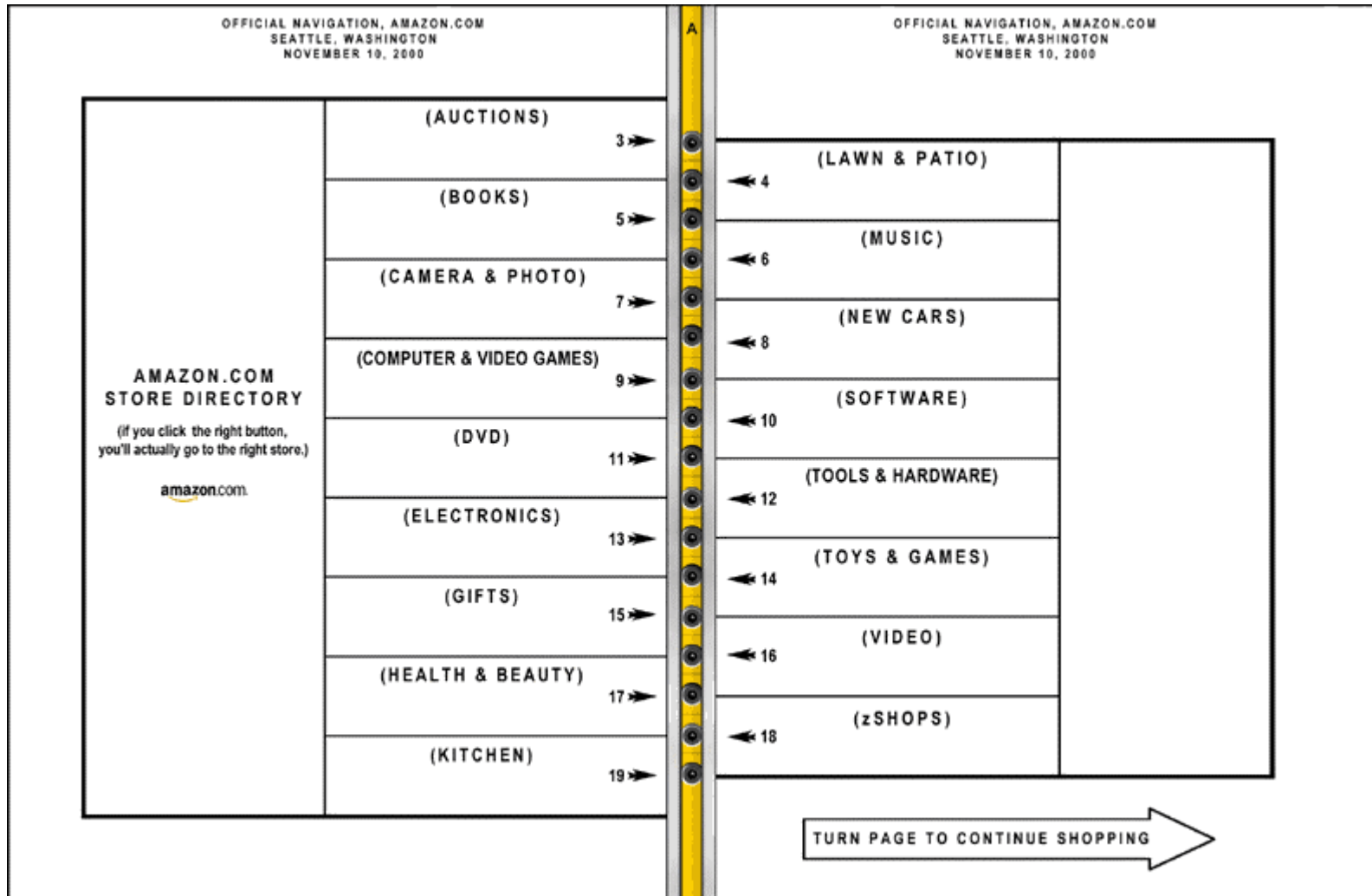
YOUR COMMENTS

Graphic not loading? Check our [Help Page](#) for instructions or see if your browser has the [Needed](#)

[Elections 2000](#)
The Sun-Sentinel's coverage of all the year's elections.

If you have comments about The Virtual Ballot, enter them below.
Note: You only have to "submit" once.

“New” Amazon.com navigation page:



Sources (2001)

Empirical analyses:

- <http://madison.hss.cmu.edu/>
- <http://www.si.umich.edu/~presnick/BallotConfusion>

Usability experts:

- <http://www.danbricklin.com/log/ballotusability.htm>
- <http://fury.com/galleries/palmbeach/index.php>

Informal analyses:

- <http://faculty.fuqua.duke.edu/~cfox/Bio/election2000note.pdf>
- <http://www.humanfactors.com/library/election.asp>

And, on the lighter side ...

- <http://www.ntk.net/nielsen2004/>
- <http://www.amazon.com/exec/obidos/subst/home/all-stores-ballot.html>

Thought Questions

- How obvious to an “expert”?
- Would usability testing help?
- 99% of voters understood ballot (Bailey)?
 - Is this true
 - How / would usability testing have helped?

Bailey – Solve Dimpled Ballot Problem

- Usability Testing
 - Instructions
 - Holding and action of punch stylus

STEP 3 -- To vote, hold the voting instrument straight up.

Punch straight down through the ballot card for the candidates of your choice.

AFTER VOTING, CHECK YOUR BALLOT CARD TO
BE SURE YOUR VOTING SELECTIONS ARE CLEARLY
AND CLEANLY PUNCHED AND THERE ARE NO
CHIPS LEFT HANGING ON THE BACK OF THE CARD.

Subsequent Developments

- Congress: Help America Vote Act 2002
 - Funds to replace older technology with optical scan and computer-based technology (DRE)
- IEEE Standards Project 1583
 - Voting Equipment Standards
 - Standard evaluation for *accessibility**, accuracy, confidentiality, reliability, security, and *usability**
 - *Sections developed by *Human Factors and Ergonomics Society*
 - Out for ballot

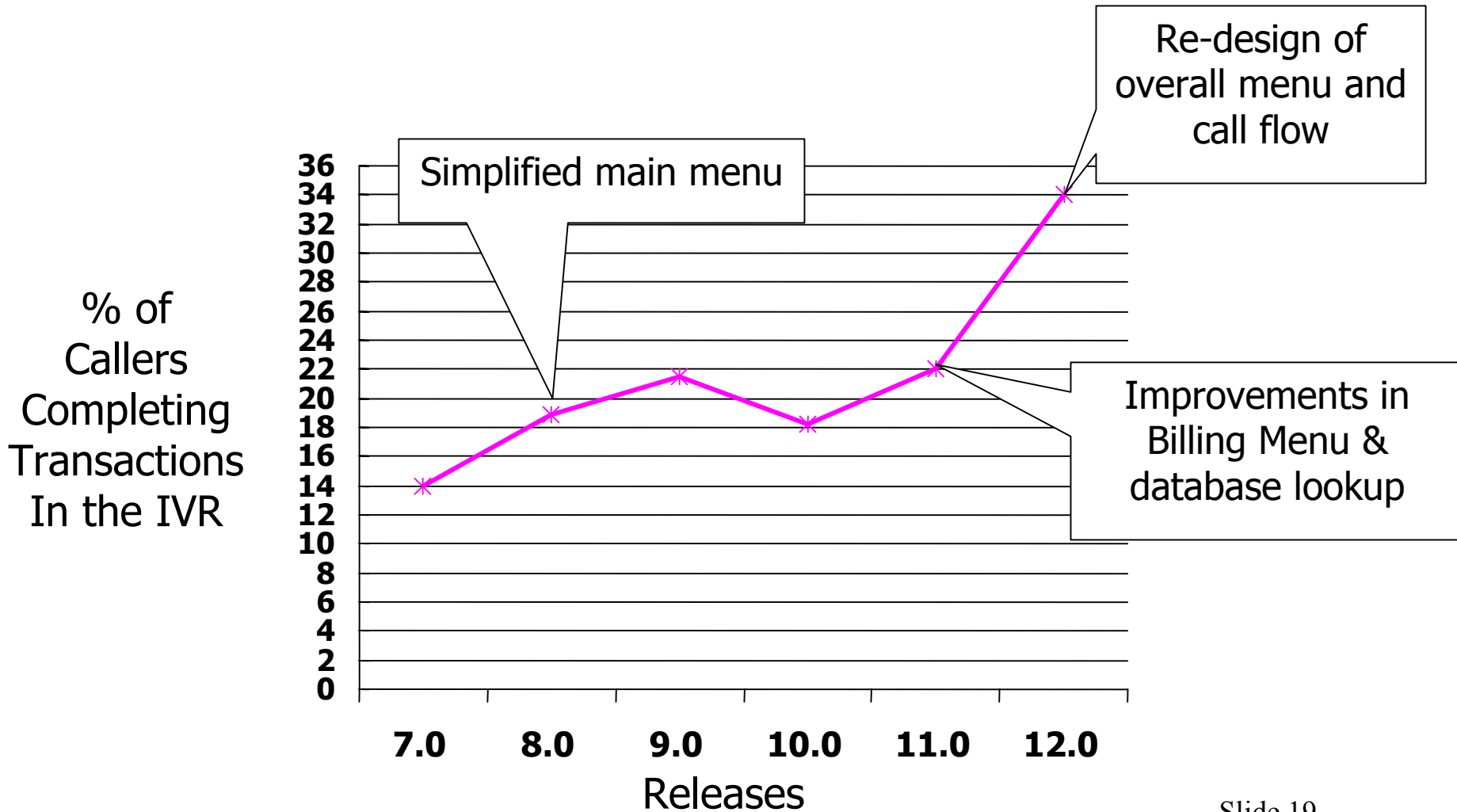
O'Hara (2002) "Improving Voting Systems"

- Halo effect of new technology
 - It's not punch card, therefore, all problems are solved
- Florida trial
 - New York Times – voter comment: "If they took out something that wasn't working, why did they put in something that works even worse"
- Old problems disappear, new problems appear
- Voting system: all elements must work
- All components and their *interaction*
 - Hardware, software, database, communication, *human*

Business Significance of UI Design

- Usability can make money
- Examples from IVR Design
- Cost-Justification

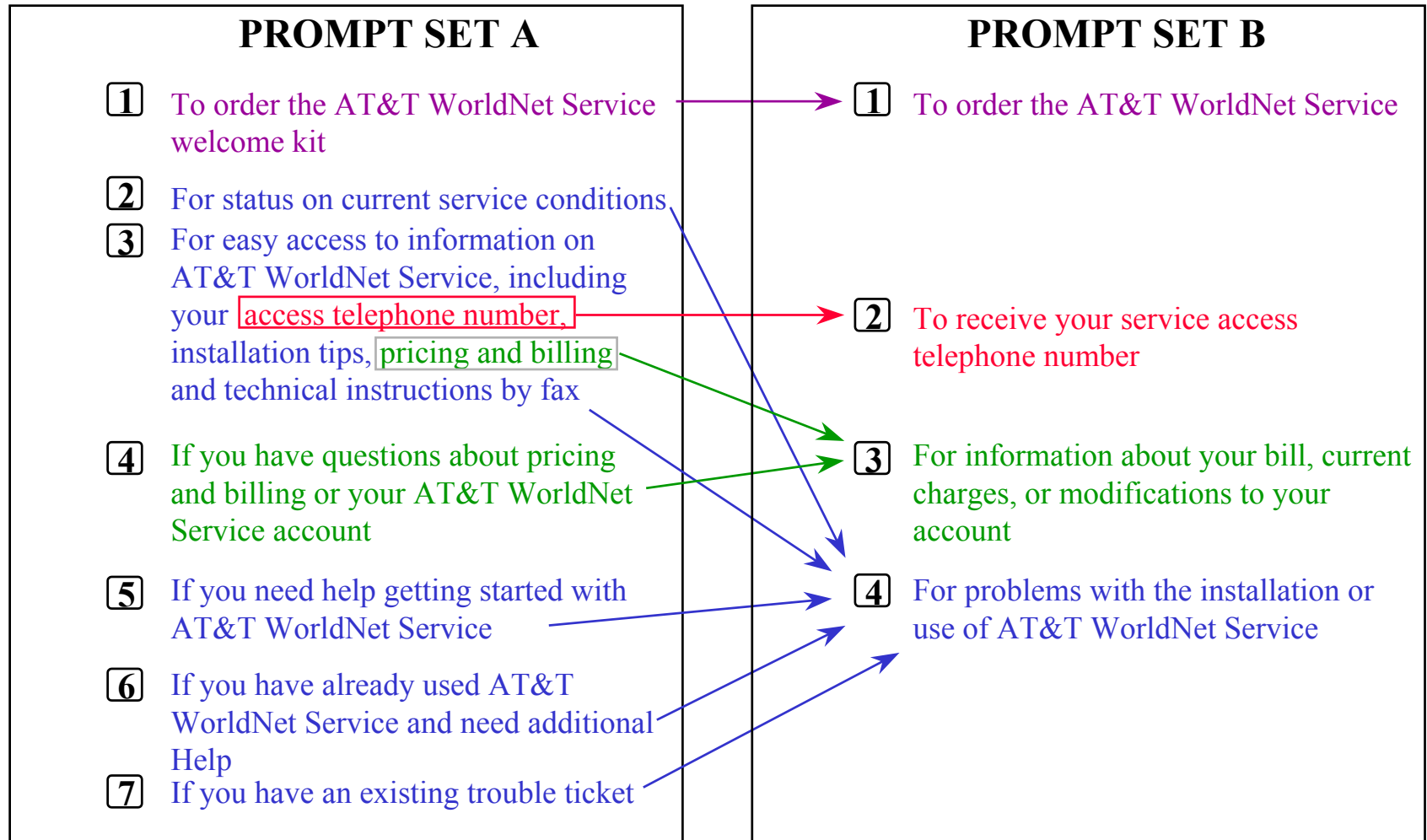
*Business Significance of UI Design: Example
IVR Complete Rates Rise Over Time*



Interactive Voice Response (IVR) Customer Care System

Small Changes - Big Savings

10% Increase in automation = \$\$M savings



IVR Example

- **Improvements**
 - Eliminated redundancy and conceptual overlaps
 - Selected and ordered words for brevity and clarity
 - Balanced breath & depth of menus
 - Match human memory characteristics
- **Business Impact**
 - Automated system answered 10% more questions
 - Millions of dollars in savings

Cost Justifying Human Factors (1)

- Increase product/service revenues due to increased marketability
 - Issues: how to “sell” usability vs. features
- Decreased costs for customer support
- Decreased costs from increased productivity or efficiency
 - Example: prompts which reduce hold time may save telephone company literally millions of dollars
- Decreased expenses from product liability

Cost Justifying Human Factors (2)

- Advantages for internal information systems:
 - Increased employee productivity and satisfaction
 - Decrease costs for training, support, service, personnel, and maintenance
 - Decrease financial impact of errors
 - Example: rerouting telephone service due to cable cuts
- Decrease cost of development cycle, shorten development time for products and services
 - Early user interface design involvement catches bad errors early in design cycle, where things are easy to change. Mistakes found in system test or after product is sold is costly.

Example: From Mauro (1994)

- Printer manufacturer – serious usability problem
 - printer driver installation & operation
- 50% of first 100,000 customers called customer care
 - \$.5 million per month
- Poor reputation
 - Overloaded customer care phone system
- Delivered fix on new diskettes to 200,000 customers
 - \$ 900,000
- Problem could have been fixed in usability testing
 - Tested internally by engineering group – found no problems