Chapter 15

IVR: Interactive Voice Response

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ADDITIONAL WEB MATERIAL

On the next pages follows additional material accompanying Chapter 15 Note that the numbering refers to the corresponding sections in Chapter 15.

Exhibit A: KEY FEATURES AND COMPONENTS OF A SUCCESSFUL IVR SYSTEM (*Section 15.2.1 What is IVR*)

The following are key features and components to a successful IVR system:

- ✓ Industrial grade computer platforms and components. The highest quality components minimize failures to ensure uninterrupted service.

- ✓ High level of redundancy and fault tolerance. If a particular component fails, its backup will take over.

- ✓ "Hot-swappable" dual power supplies in each platform. If one power supply fails, the backup can handle the load and the failed unit can be replaced without having to shut down the whole platform.

- ✓ Hardware RAID1 (mirrored) hard drives. Data is written to two hard drives simultaneously, if either drive fails the other one will function independently without any service interruption.

✓ Large capacity intelligent battery backup and line conditioner. In case of a power loss the battery backup should keep the whole system operational, if the power is not restored before the batteries are drained a notification (pager and email) should be sent prior to the system shutting down multiple platforms and T1 trunks.

✓ Multiple platforms and incoming trunk used for load sharing and redundancy. All the platforms should be identical and each one should be able to handle a high-level of simultaneous callers.

✓ Automatic call re-routing to backup trunks and platforms for call overflow and in case of failure of primary trunks and/or platforms.

✓ Switch diversity. If the primary switch fails the traffic will be re-routed to a secondary switch without service interruption.
✓ System should be engineered to handle 100% of peak hour traffic and still provide at least one level of trunk and platform redundancy.

✓ Platforms connected with 100 Mbit Ethernet (or equivalent) network allowing for fast file transfers, backups and client-server communications 24 hour per day unattended operation.

✓ Real-time application changes without any service interruptions.

Exhibit B: CONSTRUCTION OF QUESTIONS ACROSS MODES
(*Section 15.3.1.b Questionnaire bias/error*)

Type of Question	IVR	Phone	Paper/Web
Yes/No Behavior Question	In the past 30 days, have you shopped at Wal-Mart? If yes, press "1." If no, press "0."	In the past 30 days, have you shopped at Wal-Mart? 1 Yes 2 No 3 (DK) 4 (Refused)	In the past 30 days, have you shopped at Wal-Mart? __Yes __No
Likert Scale Attitudinal Question With Anchored Labels	How much was completing this survey like taking part in an ordinary conversation? Please use a scale from one to five, where 1 means it was not at all like taking part in an ordinary conversation and 5 means it was very much like participating in an ordinary conversation. You may use any number along the scale.	How much was completing this survey like taking part in an ordinary conversation? Please use a scale from one to five, where 1 means it was not at all like taking part in an ordinary conversation and 5 means it was very much like participating in an ordinary conversation. You may use any number along the scale.	How much was completing this survey like taking part in an ordinary conversation? __1 not at all like taking part in an ordinary conversation. __2 __3 __4 __5 very much like participating in an ordinary conversation.
Likert Scale Attitudinal Question, Fully Labeled	How well has this interview allowed you to describe yourself? On a scale of one to five, if exactly, press "5." If	How well has this interview allowed you to describe yourself? (READ 5-1) 5 Exactly 4 Very Well	How well has this interview allowed you to describe yourself? (Mark one box) __Exactly __Very Well __To some extent __Not much

Type of Question	IVR	Phone	Paper/Web
	very well, press "4." If to some extent, press "3." If not much, press "2." If hardly at all, press "1." How would you rate how well you were able to describe yourself?	3 To some extent 2 Not much 1 Hardly at all	__Hardly at all
Demographic question with single response option.	What is your marital status? Press "1" if you have never been married. Press "2" if you are married. Press "3" if you are separated. Press "4" if you are widowed. Press "5" if you are divorced.	What is your marital status? (Open-ended and use precodes) 1 Never married 2 Married 3 Separated 4 Widowed 5 Divorced	What is your marital status? (Mark one box) __Never married __Married __Separated __Widowed __Divorced
Demographic with multiple response options	What is your race? Please press "1" for one or more races to indicate what races you consider yourself to be. Are you white? If yes, press "1." If no, press "0." Are you Black or African American? If yes, press "1."	Which of these categories best describes your racial background? (Read 1-5, allow for up to 3 responses.) 1 White 2 Black or African American 3 Asian or Pacific Islander 4 Eskimo, Aleutian, or American Indian 5 Other	Which of these categories best describes your racial background? (Mark all that apply.) __White __Black or African American __Asian or Pacific Islander __Eskimo, Aleutian, or American Indian __Other (specify)

Type of Question	IVR	Phone	Paper/Web
	If no, press "0." Are you Asian or Pacific Islander? If yes, press "1." If no, press "0." Are you Eskimo, Aleutian, or American Indian? If yes, press "1." If no, press "0." At the tone, please say what other race or races you are. Press the pound key when you are finished.	(specify)	
Demographic using an unfolding technique	9. What is the highest degree or level of school you have completed? If less than high school diploma, press "1." If high school diploma or higher, press "2." **_(If "1" is pressed in #9, Continue; If "2" is pressed in #9, Skip to_**	9. What is the highest degree or level of school you have completed? (Read categories if necessary. Work with respondent to fit into specific category. 1 No school 2 Nursery school to 4th grade 3 5th-6th grade 4 7th-8th grade	9. What is the highest degree or level of school you have completed? (Mark one box.) __No school __Nursery school to 4th grade __5th-6th grade __7th-8th grade __9th grade __10th grade __11th grade __12th grade but no diploma __HS graduate, HS diploma or equivalent __ Some college, but less than 1 year. __ 1 or more years of

Type of Question	IVR	Phone	Paper/Web
	#9b: Otherwise, Skip to #10) 9a. ***(If "1" is pressed in #9, ask:)*** If no school completed, press "1." If nursery school to fourth grade completed, press "2." If fifth grade or sixth grade, press "3." If seventh or eighth grade, press "4." If ninth grade, press "5." If tenth grade, press "6." If eleventh grade, press "7." If twelfth grade, but NO DIPLOMA, press "8." (All in #9a, Skip to #10) 9b. ***If "2" is pressed in #9, ask:)*** If high school graduate—high school diploma, or the equivalent, enter "1." If some college credit, but less	5 9th grade 6 10th grade 7 11th grade 8 12th grade but no diploma 9 HS graduate, HS diploma or equivalent 10 Some college, but less than 1 year. 11 1 or more years of college, but no degree. 12 Associate's degree 13 Bachelor's degree 14 Master's degree 15 Professional degree 16 Doctorate degree.	college, but no degree. __ Associate's degree __ Bachelor's degree __ Master's degree __ Professional degree __ Doctorate degree.

Type of Question	IVR	Phone	Paper/Web
	than one year, enter "2." If one or more years of college, but no degree, enter "3." If Associate's degree, enter "4." If Bachelor's degree, enter "5." If Master's degree, enter "6." If Professional degree, enter "7." If Doctorate degree, enter "8."		

Exhibit C: SAMPLE IVR DEFAULT SCENARIOS FOR CONVEYING INSTRUCTIONS TO RESPONDENTS (Section *15.3.1.c*)

START

Please press "1" on your phone to continue.
_____(   )

- ***1st no response?***
    Wait 4 seconds, caller hears> "I did not understand your response. Please try again." **[   ]** ***(Question repeated)***

- ***1st invalid response?***
    Caller hears> "I'm sorry, that is an invalid entry. Please try again." **[   ]** ***(Question repeated)***

- ***2nd no response?/2nd invalid response?***
    Caller hears> "We're sorry, the system is unable to understand the responses from the phone you are currently using. Thank you for your time. Goodbye." **[   ]** ***(Disconnect) (DI=01)***

SURVEY QUESTION DEFAULT SCENARIOS

- ***1st no response?***
    Wait 5 seconds, caller hears> "I did not understand your response. Please try again." **[0]** ***(Repeat question)***

- ***1st invalid response?***
    Wait 5 seconds, caller hears> "I'm sorry, that is an invalid response. Please try again." **[   ]** ***(Repeat question)***

- ***2nd no response?/2nd invalid response?***
    Wait 5 seconds, a "9" or "99" is coded and goes on to next question)

**Add one second pause after response before next question is read.

READ:)   You may press the star key at any time to have me repeat the question. You may press the pound key at any time if you want to skip a question. Remember, press the STAR key to REPEAT a question, and press the POUND key to SKIP a question.

Exhibit D: SUMMARY OF RESPONSE RATES ON IVR STUDIES (*Section 15.3.2.a Unit nonresponse*)

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Study	Method	Topic	Target Population	Response Rate
Frankovic and Arnedt (1994)	Inbound: Interviewer recruit to dial into IVR at specified time.	Reactions to State of the Union speech	Householders	53%
O'Connell, Rosen and Clayton (1996)	Inbound: (Fax/postcard notice, with phone/fax reminder to dial into IVR.	Reporting of expenditure data	Businesses	80% (vs. 90% CATI)
Tourangeau, Steiger and Wilson (2002)	Outbound: Interviewer recruit with immediate transfer.	Customer Satisfaction	Bank customers	24% (vs. 49% mail)
Tourangeau, Steiger and Wilson (2002)	Outbound: Interviewer recruit with immediate transfer.	Customer satisfaction	Fast food customers, aged 13 to 74	45% (vs. 34% CATI)
Nyman, Roman and Turner (2001)	Outbound: Interviewer recruit with immediate transfer.	Drug use, sexual history, and behaviors.	Householders	61% (vs. 72% CATI)
Currivan, Nyman, Turner and Biener (2004)	Outbound: Interviewer recruit with immediate transfer.	Smoking behaviors	Students aged 12 to 17	79% completion rate (vs. 86% CATI)
Dillman, et al (2002)	Outbound: Interviewer recruit with immediate transfer.	Long distance service	Householders	29% (vs. 44% CATI)

EXTENDED GLOSSARY OF KEY CONCEPTS

Acquiescence. The tendency of respondents to agree with questions or statements using an agree/disagree format.

Break offs. Occur when a respondent fails to complete the survey request. The break off is determined to be at the last question the respondent answered before hanging up or exiting the survey. This results in a partial interview that may or may not be counted towards the final dataset, depending on the researcher's decision.

CATI. The acronym for Computer Assisted Telephone Interviewing, in which a questionnaire to be administered by telephone interviewers is programmed into a computer system that manages the data collection and eliminates the need for interviewers to use paper and pencil to record responses.

Closed-ended questions. Provide the respondent with a set of response alternatives from which to choose an answer.

Coverage error. Occurs when some people are systematically excluded from the sampling frame or are not given an opportunity to participate in the survey. Examples include lack of telephone in a CATI survey, lack of Web access on a Web survey, or lack of a touchtone phone in an IVR survey.

Inbound studies. Those in which the sample member dials into an IVR system at his or her convenience.

IVR. The acronym for Interactive Voice Response, which is a data collection technology in which the computer plays a recording of the question to the respondent over the telephone, and the respondent indicates the response by pressing the appropriate keys on his or her touchtone telephone keypad.

Measurement error. Refers to error in survey responses arising from the method of data collection, the respondent, or the questionnaire (or other instrument).

Nonobservational errors. Arise because part of the population failed to be measured, for reasons such as being excluded from the sample frame, not having the technology to participate in the survey, or choosing not to respond for other reasons.

Nonresponse. Occurs when some sample members cannot be located, refuse to participate, or are otherwise unavailable to participate in the survey during the data collection period (unit nonresponse) or when some sample members either skip or provide unusable data to a particular survey question (item nonresponse). When nonrespondents are different than respondents, this can affect the survey statistics.

Observational errors. Measurement errors that arise when survey responses differ from the true statistic, stemming from interviewer bias, bias in question wording, or bias related to the mode of data collection.

Open-ended questions. Ask respondents to answer in their own words.

Outbound studies. Those in which an interviewer dials out to the sample member to recruit respondents to participate and then transfers them directly into the IVR system.

PAPI. The acronym for Paper and Pencil Interviewing, which can take several forms, but is typically a mailed questionnaire in which the respondent is asked to write in their responses and mail their completed questionnaire back to the data collection organization.

Primacy effects. Occur when items presented early in a list of response options receive higher endorsements than items presented later in the list.

Recency effects. Occur when items presented late in a list of response options receive higher endorsements than items presented earlier in the list.

Reliability. The extent to which answers to a question provide consistent results at different times or for different respondents when the values of a construct are the same.

Respondent burden. A measure of the amount of time and effort it takes a respondent to respond to a question or a survey.

Social desirability bias. Occurs when the respondent attempts to portray himself or herself in a positive light to the interviewer.

T-ACASI. The acronym for Touchtone-Audio Computer Assisted Self-Interviewing (see IVR).

TDE. The acronym for Touchtone Data Entry (see IVR).

Validity. The extent to which the answer to a question corresponds to the "true value" for the construct that is being measured

VRE. The acronym for Voice Recognition Entry (see IVR).

Web-based data collection. A methodology in which the respondent logs on to a designated Internet site, often logging on using a unique identifier. Survey questions appear on the computer screen, several at a time. The respondent clicks on the appropriate responses, navigates through the web survey, and submits the survey electronically, at which point it is immediately compiled by the data collection organization.