Sterling Survey System

Designing a Multi-Mode, Multi-Platform JavaScript Survey Authoring Framework

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International Field Directors and Technologies Conference
May 23, 2017

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What Is It?

- Survey Administration Software

Overview

- Client / Server Presentations

- Design Decisions

- Features

Design Decisions – Supported Modes

- Division of previous systems
  - Web: PHP, MySQL
  - CATI (Telephone) / CAPI (Face-to-face) / DE (Data Entry) : Cases 5.6

- Originally started as an evolution to our web template

- Wanted to support multi-mode: Web, CATI, CAPI, DE

- CAPI requires offline administration – problematic for a web survey

Design Decisions – Language

- Web-based and offline – two options:
  - Locally hosted database and web server
    or
  - Client-side administration

- JavaScript / HTML5
  - Node.js

Design Decisions – Devices

- Web – mobile, desktop, laptop, etc
  - Administered by web browser

- CATI / DE / CAPI – Managed desktop / laptop
  - Administered by web browser

- CAPI – tablet / phone
  - Administered by Cordova-packaged web app

Design Decisions – Data Storage

- Can save 5 – 10 MB in HTML5's localstorage

- Security restricts filesystem access outside of browser
  - On controlled devices, can use local node.js server to bypass this
  - Page calls to local node.js server
  - Node.js server triggers file execution / modification

Design Decisions – JSON Structures and Going Infinite

- 'Traditional' structure: single key-value pair

csid	pnum	kidlist	code	i1_q1	i1_q2	i1_q4	i1_q5
1000	p1231	aws	1100	1	2	997	997

- JSON structure: nested key-value pairs

Design Decisions – JSON Structures and Going Infinite

- Automatically records date, time, version information, mode, validity, number of changes

- Can easily define any other trackable metadata

```
"csid" : {
    "value" : "9000142"
},
"pnum" : {
    "value" : "p1231prac"
},
"kidlist" : {
    "value" : "aws"
},
"code" : {
    "value" : "1100"
},
"i1_q1" : {
    "onpath" : 1,
    "value" : "1",
    "date" : 1494346172757,
    "version" : 1,
    "accesstype" : "entry",
    "lang" : "eng",
    "mode" : "capi",
    "inum" : 1566,
    "time_itemafterlast" : 2683,
    "change_count" : 1,
    "valid" : true
},
"i1_q2" : {
    "onpath" : 1,
    "value" : "2",
    "date" : 1494346176303,
    "version" : 1,
    "accesstype" : "entry",
    "lang" : "eng",
    "mode" : "capi",
    "inum" : 1566,
    "time_itemafterlast" : 3546,
    "change_count" : 1,
    "valid" : true
},
```

```
"i1_q4" : {
    "onpath" : 1,
    "value" : "997",
    "date" : 1494346177231,
    "version" : 1,
    "accesstype" : "entry",
    "lang" : "eng",
    "mode" : "capi",
    "inum" : 1566,
    "time_itemafterlast" : 928,
    "change_count" : 1,
    "valid" : true
},
"i1_q5" : {
    "onpath" : 1,
    "value" : "997",
    "date" : 1494346177983,
    "version" : 1,
    "accesstype" : "entry",
    "lang" : "eng",
    "mode" : "capi",
    "inum" : 1566,
    "time_itemafterlast" : 752,
    "change_count" : 1,
    "valid" : true
},
```

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Design Decisions – Core Framework

- JavaScript-based single page app

- JSON data structure back end

- Works on all modes

- Works on all devices

- Stores data online or offline, if no connection

Features – Client-side Web

- Transfers data asynchronously whenever an internet connection is available

- Surveys not delayed by communication time

- Dynamically generated content - fills, skips, answer validation, languages

Features - Authoring

- Author specifies core question components
  - Item name, text, answer values, etc.

- System will automatically construct all HTML elements, events, and behavior

- Default layout based on survey best practices from our working group – adapts to mode and device

- Can override layout and use JavaScript / HTML for custom designs

Features - Authoring

- Authoring commands are JS based
  - Supports traditional programming tools, parsing

```
var newQ = new Question('q4',page);
newQ.setVarlabels('Outlet Type');
newQ.setBasetext("~id~. Type of outlet");
newQ.category.setType('radio');
newQ.category.setAnswerLabels(["Gas station only", "Convenience with gas",
newQ.category.addSubItem(13);
```

q4. Type of outlet

- ○ Gas station only
- ○ Convenience with gas
- ○ Convenience with no gas
- ○ Small food store (deli)
- ○ Supermarket
- ○ Drug store/pharmacy
- ○ Liquor store
- ○ Discount store
- ○ Hotel/motel/resort
- ○ Restaurant
- ○ Bowling alley
- ○ Stand alone tavern
- ○ Other:

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Features - Authoring – Question Library

Features – Question Library

- Tracks source code

- Used to construct data documentation

- Stores question information for every question version

Features – Authoring – Question Functions

- Bulk question generation

```
var qtext = ["boring", "thought provoking", "a white knuckle thrill ride"];
for (var i = 0; i < qtext.length; i++) {
    var newQ = new Question('bulk' + (i+1), page, "agreedisagree");
    newQ.setBasetext("~id~. Do you feel that this presentation is...\n" + qtext[i] + "?");
}
```

**bulk1. Do you feel that this presentation is...
boring?**

- ○ Strongly Agree
- ○ Agree
- ○ Disagree
- ○ Strongly Disagree

**bulk2. Do you feel that this presentation is...
thought provoking?**

- ○ Strongly Agree
- ○ Agree
- ○ Disagree
- ○ Strongly Disagree

**bulk3. Do you feel that this presentation is...
a white knuckle thrill ride?**

- ○ Strongly Agree
- ○ Agree
- ○ Disagree
- ○ Strongly Disagree

Features – Authoring – Question Functions

• Randomization

```
var newQ = new Question('random1',page,"yn");
newQ.setBasetext("~id~. Randomized question #1!");
newQ.category.setType("radio");
newQ.category.setAnswers({ '1': 'Yes' , '2': 'No' , '-1': 'Don\'t Know'});

var newQ = new Question('random2',page,"yn");
newQ.setBasetext("~id~. Randomized question #2!");

var newQ = new Question('random3',page,"yn");
newQ.setBasetext("~id~. Randomized question #3!");

randomizer.addGrouping(["random1", "random2", "random3"]);
```

random2. Randomized question #2!

1   Yes

2   No

-1   Don't Know

random3. Randomized question #3!

1   Yes

2   No

-1   Don't Know

random1. Randomized question #1!

1   Yes

2   No

-1   Don't Know

Features – Authoring – Question Functions

- Language variation

langchange. Do you speak English?

- ○ Yes
- ○ No
- ○ Don't Know
- ○ Refused

langchange. Habla usted español?

- ○ Si
- ○ No
- ○ No Sabe
- ○ Rehuso

Toggle Language

```
var newQ = new Question('langchange',page);
newQ.category.setType("radio");
newQ.setBasetext("~id~. Do you speak English?", { 'lang': 'eng' });
newQ.setBasetext("~id~. Habla usted español?", { 'lang': 'es' });
newQ.category.setAnswerLabels(["Yes", "No","Don't Know","Refused"], { 'lang': 'eng' });
newQ.category.setAnswerLabels(["Si", "No","No Sabe","Rehuso"], { 'lang': 'es' });
```

```
var newQ = new Question('langtoggle', page);
newQ.category.setType('button');
newQ.category.setAttributes({ 'value': 'Toggle Language', 'onClick': "(dataobject.getParam('lang')=='eng') ? \
    dataobject.setParam('lang','es') : dataobject.setParam('lang','eng'); conditionaltext();" });
```

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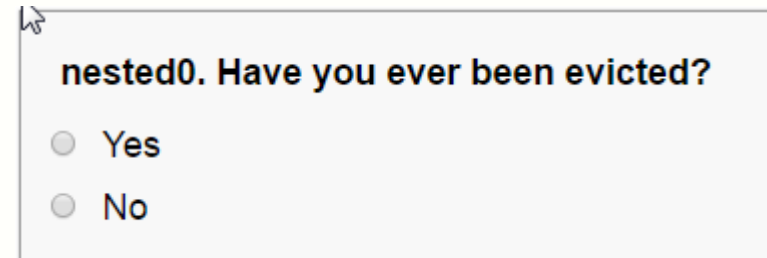
Features – Authoring – Question Functions

- Nested followups

```
var newQ = new Question('nested0', page);
newQ.setBasetext("~id~. Have you ever been evicted?");
newQ.category.setType("radio");
newQ.category.setAnswers({ '1': 'Yes', '2': 'No' });

var newQ2 = new Question(null,null);
newQ2.setBasetext("When were you last evicted?");
newQ2.category.setType("date");

newQ.category.addSubItem(1, newQ2);
```

nested0. Have you ever been evicted?

○ Yes

○ No

nested0. Have you ever been evicted?
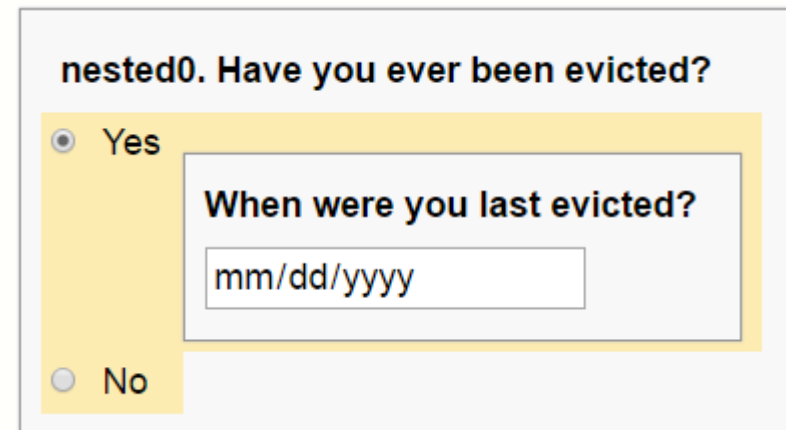
◉ Yes

When were you last evicted?

mm/dd/yyyy

○ No

Features – Authoring – Question Functions

- ## Rosters

```
var newQ = new Question('roster_hhnum',page);
newQ.setBasetext("hhnum. Enter number of people in your household:");
newQ.category.setType("number");
newQ.category.rosterLengthDefine('hhroster');

var newQ = new Question('roster_hhnames', page);
newQ.setBasetext("~id~. Enter the name of each HH member:");
newQ.category.setType("text");
newQ.category.setAttributes({ 'class': 'hhname'});
newQ.setRoster('hhroster',true);
newQ.setDynamic(['roster_hhnum']);
newQ.dynamic = function () {
  this.items = [];
  this.setQuestionLabels('hhroster');
};

var newQ = questionRosterDropdown('hhroster', page);
newQ.setDynamic(['hhnum']);

var newQ = new Question('roster_hh_gender',page);
newQ.setBasetext("~id~. What is ~roster_hhnames~'s gender?");
newQ.setRoster('hhroster');
newQ.category.setType("radio");
newQ.category.setAnswerLabels(['Male', 'Female']);

var newQ = new Question('roster_hh_age',page);
newQ.setBasetext("~id~. What is ~roster_hhnames~'s age?");
newQ.setRoster('hhroster');
newQ.category.setType("text");
newQ.category.setMinMax(0, 130);
```

hhnum. Enter number of people in your household:

2

roster_hhnames. Enter the name of each HH member:

1 Bob

2 Elizabeth

hhroster: 1 ▼

roster_hh_gender. What is Bob's gender?

○ Male

○ Female

roster_hh_age. What is Bob's age?

Features – Authoring – Question Functions

- Multiple-pass data entry and verification

```
dataobject.setParam('mode', 'de', true);
dataobject.setItemValue('depasses', 2, true);
```

Features – Case Selection and Synchronization

- Front end for interviewers
- Contains interviewer's assigned case load and server sync
- Can enter existing cases, spawn new cases or request case from server
- Allows editable fields stored within case
- Selecting addresses launch navigation link

Inum:1566		Study:p1231prac		Enter caseid						Sync: 4-11-2017 14:42
Show 10 ▼ entries									Search:	
Caseid	**Code** ▲	**Ordering**	**Type**	**Hours**	**Phone**	**Name**	**Address**	**City**	**Zip**	**Notes**
9000079			Cigarettes	11am-10pm	608-123-4567	Fake Business Mart	475 N Charter St	Madison	53706	
9000100			Cigarettes	11am-10pm	608-123-4567	Fake Business Mart	475 N Charter St	Madison	53706	
9000121			Disposable E-Cigs	11am-10pm	608-123-4567	Fake Business Mart	475 N Charter St	Madison	53706	
9000142			Cigarettes	11am-10pm	608-123-4567	Fake Business Mart	475 N Charter St	Madison	53706	
9000163			Smokeless tobacco	11am-10pm	608-123-4567	Fake Business Mart	475 N Charter St	Madison	53706	
9000184			Cigarettes	11am-10pm	608-123-4567	Fake Business Mart	475 N Charter St	Madison	53706	
9000205			Disposable E-Cigs	11am-10pm	608-123-4567	Fake Business Mart	475 N Charter St	Madison	53706	
9000226			Cigarettes	11am-10pm	608-123-4567	Fake Business Mart	475 N Charter St	Madison	53706	
9000247			Disposable E-Cigs	11am-10pm	608-123-4567	Fake Business Mart	475 N Charter St	Madison	53706	
9000268			Cigarettes	11am-10pm	608-123-4567	Fake Business Mart	475 N Charter St	Madison	53706	

Showing 1 to 10 of 39 entries   Previous 1 2 3 4 Next

Features – Mobile-Specific

- Easy generation with Cordova

- GPS and Navigation App Integration

- Push notifications

- Swipe navigation

- Auto-updating APK

Conclusion

- Offline single page app survey administration system

- Adapts format and tools to any mode or device

- Author with JS source or question library

- For more information:
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Tech Showcase – Session 10F

- For hands-on demonstration, check out the Tech Showcase!

3:15 pm – 4:30 pm