Sterling Survey System

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

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What Is It?

- Survey Administration Software

What is your phone number?

Thinking of three of the most recent Ph.D. students you mentioned above, which of the following best describes their positions in the first jobs each of them obtained after completing their academic studies?

<table>
<thead>
<tr>
<th>Position</th>
<th>In your discipline/field</th>
<th>Is this a science position?</th>
</tr>
</thead>
<tbody>
<tr>
<td>PhD Student 1</td>
<td>Yes • No ○</td>
<td>Yes • No ○</td>
</tr>
<tr>
<td>PhD Student 2</td>
<td>Yes • No ○</td>
<td>Yes • No ○</td>
</tr>
<tr>
<td>PhD Student 3</td>
<td>Yes • No ○</td>
<td>Yes • No ○</td>
</tr>
</tbody>
</table>

Position options:
- Teacher (primary/secondary)
- Post-doctorate
- Research scientist at university
- Lecturer/non-tenure track faculty
- Assistant/associate tenure-track professor
- Private industry
- Public institution (non-university)
- Non-governmental organization
- Start-up
- Continuing in higher education
- Other
- Not working/unemployed
- Don't know
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

<table>
<thead>
<tr>
<th>csid</th>
<th>pnum</th>
<th>kidlist</th>
<th>code</th>
<th>i1_q1</th>
<th>i1_q2</th>
<th>i1_q4</th>
<th>i1_q5</th>
</tr>
</thead>
<tbody>
<tr>
<td>1000</td>
<td>p1231</td>
<td>aws</td>
<td>1100</td>
<td>1</td>
<td>2</td>
<td>997</td>
<td>997</td>
</tr>
</tbody>
</table>

• 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
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

```javascript
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',
                               '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:']);
```
Features - Authoring – Question Library

```javascript
// Code snippet

var newQuestion = new Question("langsGGLE", "surveyPage1");
newQuestion.setDisplayValue("lang1", "lang2");
newQuestion.setDisplayValue("lang3", "lang4");
newQuestion.setDisplayValue("lang5", "lang6");
newQuestion.setDisplayValue("lang7", "lang8");
newQuestion.setDisplayValue("lang9", "lang10");
```

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**ToggleButton Example:**

- This is a Toggle button

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**Radio Button Example:**

1. **Yes**
2. **No**

---

**Checkbox Language Example:**

- First
- Second

---

**Return to Selector**
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

```javascript
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("As you review this presentation...\nqtext[i] + "?");
}
```
Features – Authoring – Question Functions

• Randomization

```javascript
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']);
```
Features – Authoring – Question Functions

• Language variation

```javascript
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' });
```

```javascript
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());' });
```
Features – Authoring – Question Functions

• Nested followups

```javascript
var newQ = new Question('nested0', page);
newQ.setBasetext("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");
newQ2.category.addSubItem(1, newQ2);
```
Features – Authoring – Question Functions

• Rosters

```javascript
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

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

```javascript
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
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:
  August.salick@wisc.edu
Tech Showcase – Session 10F

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

3:15 pm – 4:30 pm