

# Incorporating User-Centered Design into the Lifecycle of an Online Household Survey

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# User-Centered Design (UCD)

- UCD is a process used to make products (including online Web Surveys) usable
- Methods focus on
  - Identifying user goals and tasks
  - Supporting users' mental models
  - Bringing in users and having them work with survey
- UCD leads to more usable products

# Where UCD Fits in the Project Life Cycle



# User Centered Design in Practice

- While bringing in the user perspective early in the process is beneficial to final design....
- Often users are brought in after the design is set/hard coded
  - Too late in the process
  - Design problems are more costly to fix
  - Changes for user do not get implemented before release

# Case Study: National Household Education Survey

- Expert Review on survey screens
  - Identify early the obvious design problems
  - Give feedback on ways to redesign screen or reword question
- Usability testing of survey on desktop and mobile devices.
  - With real users, identify issues & assess satisfaction
  - Satisfaction Questionnaire
    - Modified Questionnaire for User Interaction Satisfaction (QUIS) survey

# National Household Education Survey

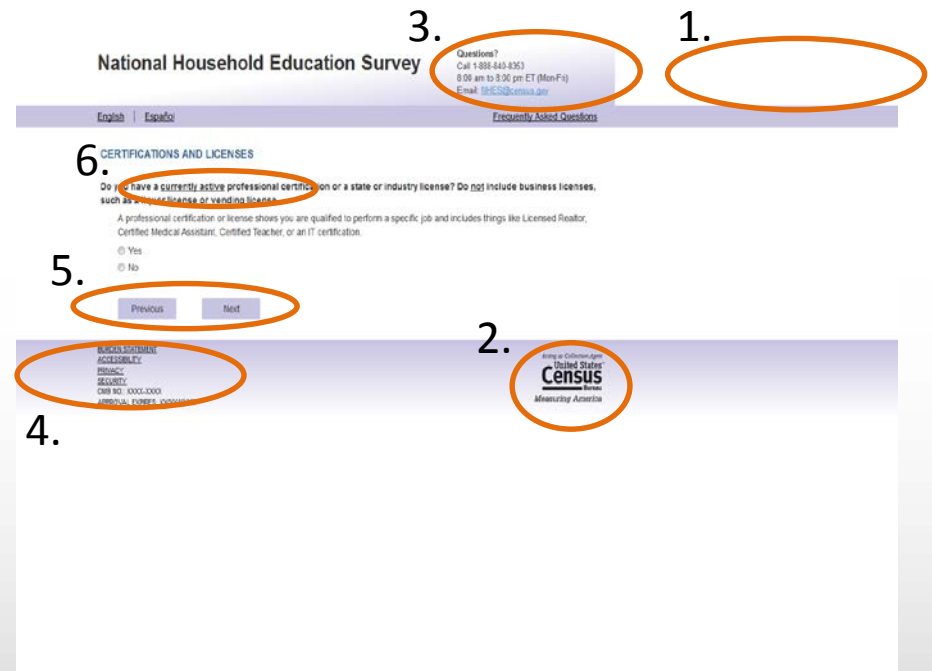
- 1 screener & 4 modules
  - Screener – Demographic and background questionnaires to place respondent into correct follow-up module
  - Module 1 – Adult job certifications and training
  - Module 2 – Early childhood education – preschool
  - Module 3 – Children in grades K-12 in public or private school
  - Module 4 – Children in grade equivalent to K-12 but that are homeschooled

# Expert Review for NHES

- Iterative Expert Review (Heuristic Review)
  - Independent review by 2 reviewers per module
  - Follow a set path - “vignettes” or “scenarios”
  - Document issues
    - Nielsen’s 10 Usability Heuristics
  - Team of reviewers met to discuss issues & solutions
    - Time consuming process to meet as team and de-duplicate / agree on issues & solutions
    - Send issues & solutions to program team / survey sponsor

# Example of Early Issues found in Round 1 Expert Review

- Design formatting issues:
  1. Header did not extend across screen
  2. Branding was missing in header - may not look legitimate
  3. “Questions?” – too prominent, could result in increased calls
  4. Footer too prominent – Links are distracting to task at hand and all caps hard to read
  5. Format of previous/next buttons
  6. Use of underline for emphasis





# Expert Review Round 1: Grid Issues

- Grids on PC were non-standard and inconsistent across modules
  - Difficult to see which label attaches to the radio buttons
  - Usability team provided examples of how online grids could look

## CERTIFICATIONS AND LICENSES

How useful has your second-most important certification or license been for each of the following?

Select one response for EACH ITEM below.

	Not useful	Somewhat useful	Very useful	Too soon to tell
a. Getting a job	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
b. Keeping a job	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
c. Keeping you marketable to employers or clients	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
d. Improving your work skills	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

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## FAMILY ACTIVITIES

In the past week, has anyone in your family done the following things with this child?

Please select one response for EACH ITEM below.

a. Told him/her a story (Do not include reading to this child)	<input type="radio"/> Yes	<input type="radio"/> No
b. Done activities like arts and crafts, coloring, painting, pasting, or using clay	<input type="radio"/> Yes	<input type="radio"/> No
c. Played board games or did puzzles with him/her	<input type="radio"/> Yes	<input type="radio"/> No
d. Worked on a project like building, making, or fixing something	<input type="radio"/> Yes	<input type="radio"/> No
e. Played sports, active games, or exercised together	<input type="radio"/> Yes	<input type="radio"/> No
f. Discussed with him/her how to manage time	<input type="radio"/> Yes	<input type="radio"/> No
g. Talked with him/her about the family's history or ethnic heritage	<input type="radio"/> Yes	<input type="radio"/> No

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# Expert Review Round 1

EDUCATION

What is the highest degree or level of school you have completed?

- Elementary or high school, but no high school diploma or GED®
- High school diploma
- GED® or alternative high school credential
- Some college credit but less than one year of college
- 1 or more years of college credit, no degree
- Associate's degree (for example, AA, AS)
- Bachelor's degree (for example, BA, BS)
- Master's degree (for example, MA, MS, MEng, MEd, MSW, MBA)
- Professional degree beyond a bachelor's degree (for example, MD, DDS, DVM, LLB, JD)
- Doctorate degree (for example, PhD, EdD)

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BACKGROUND

Based on your household's previous response, you are years old. Is that correct?

- Yes
- No

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BURDEN  
ACCESSIBILITY  
PRIVACY  
SECURITY  
OMB NO.: XXXX-XXXX  
APPROVAL EXPIRES:  
XXXXXXXX

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- Static screens
  - Couldn't do true Mobile review
  - Had to use “Responsive design” view in “Firefox developers tools”
- Some of the issues we noticed:
  - Navigation buttons
  - Radio buttons too close
  - Footer too prominent

# Expert Review Round 2

- For mobile design: Radio buttons too small and too close together

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National Household Education Survey

### EDUCATION

What is the highest degree or level of school you have **COMPLETED**?

- Elementary or high school, but no high school diploma or GED®
- High school diploma
- GED® or alternative high school credential
- Some college credit but less than one year of college
- 1 or more years of college credit, no degree
- Associate's degree (for example, AA, AS)
- Bachelor's degree (for example, BA, BS)
- Master's degree (for example, MA, MS, MEd, MEd, MSW, MBA)
- Professional degree beyond a bachelor's degree (for example, MD, DDS, DVM, LLB, JD)
- Doctorate degree (for example, PhD, EdD)

OMB NO.: XXXX-XXXX APPROVAL EXPIRES: XXXX/XXXX

[SURVEY LENGTH](#)  
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4:41 PM 95% mobile.respond.qa.census.gov

National Household Education Survey

### CERTIFICATIONS AND LICENSES

Do you have a **CURRENTLY ACTIVE** professional certification or a state or industry license? **Do NOT** include business licenses, such as a liquor license or vending license.

A professional certification or license shows you are qualified to perform a specific job and includes things like Licensed Realtor, Certified Medical Assistant, Certified Teacher, or an IT certification.

- Yes
- No

OMB NO.: XXXX-XXXX APPROVAL EXPIRES: XXXX/XXXX

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# Expert Review Round 2

- Error message has centered text – more difficult to read
- The answer box is too large for the question response text

## CHILDHOOD CARE AND PROGRAMS: CARE YOUR CHILD RECEIVES FROM RELATIVES

We noticed your answer is out of range. Please check and make sure your answer is correct.

How many DAYS each WEEK does child receive care from this grandparent?

days each week



## CHILDHOOD CARE AND PROGRAMS: CARE YOUR CHILD RECEIVES FROM RELATIVES

How old is the grandparent who provides the most care to child?

years old



# Expert Review Round 2

- Simple Quick Fixes: misspellings
- Bugs found early on – three error messages appear on a page and the text boxes were not lined up

We would like to ask some additional questions about Jilly Doe's care and education and about your education. How are you related to Jilly Doe?

Mother (birth, adoptive, step, or foster)  
 Father (birth, adoptive, step, or foster)  
 Brother  
 Sister  
 Aunt  
 Uncle  
 Cousin  
 Grandmother  
 Grandfather  
 Parent's girlfriend/boyfriend/partner  
 Other relationship — Specify

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Questions?  
Call 1-888-840-8353  
8:00 am to 8:00 pm ET (Mon-Fri)  
Email: [NHESES@census.gov](mailto:NHESES@census.gov)

English | Español | FAQs Save and Continue Later

We would like to ask some additional questions about your education and job training.  
Before we take you to the questions about education and job training, would you please give us your email address in case we need to contact you further?

email address  Please enter a valid email address.

confirm email address  Please enter a valid email address.

Please enter a valid email address.

[SURVEY LENGTH](#) | [ACCESSIBILITY](#) | [PRIVACY](#) | [SECURITY](#) | OMB NO. XXXX-XXXX | APPROVAL EXPIRES XXXXXXXX

# Expert Review Round 2

- Header is “Employment” when question is about the number of class credits for a certification or license

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**National Household Education Survey**

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Email: [NHES@census.gov](mailto:NHES@census.gov)

English | Español | FAQs [Save and Continue Later](#)

**EMPLOYMENT**

About how many hours did you spend in classes or training to prepare for your certification or license?

- 1 or more full-time school years (30 or more credit hours; 900 or more clock hours)
- Half a full-time school year to less than 1 year (15-28 credit hours; 450-899 clock hours)
- 160-449 clock hours
- 41-159 clock hours
- 1-40 clock hours

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# Expert Review Round 3

- In Round 2 we recommended that for mobile - all fields that require a number should open the keypad
- In Round 3 we see recommendation was implemented

## Round 2

needed so that we can ask questions that are right for your household.

Enter the 8-digit User ID found on the letter or email we sent you.

User ID:-

Login

q w e r t y u i o p  
a s d f g h j k l  
z x c v b n m  
123 space Go

## Round 3

Survey. You will need the materials we sent you to start the survey. The questions are needed so we can ask questions that are right for your household.

Enter the 8-digit User ID found on the letter or email we sent you.

User ID:

Login

The National Center for Education Statistics (NCES), within the U.S. Department of Education, is authorized to conduct this study by the Education Sciences Reform Act of 2002 (ESRA 2002; 20 USC § 9543). Your answer may be used only for statistical purposes and may not be used for any other purpose.

1 2 3  
4 ABC 5 6  
GHI JKL MNO  
7 8 9  
PQRS TUV WXYZ  
+ \* # 0

# Expert Review Round 3

- Box was resized (based on earlier Round II feedback) some became slightly too small for two digits to entirely fit

T-Mobile 12:45 PM 38%

mobile.respond.qa.census.gov

PROGRAM: CARE FOR CHILD  
RECEIVES FROM RELATIVES

How many total HOURS each WEEK does Jolly die spend in those other care arrangements with relatives?

30 hours each week

< >

OMB No.: 1850-0803 Survey Le  
Approval Expires: 7/31/2019 Access  
Done

1 2 3 4 5 6 7 8 9 0  
- / : ; ( ) \$ & @ "  
#+= . , ? ! ' < >  
ABC globe microphone space Go



# Expert Review Round 3

- Mobile – Grids make it difficult to see all response options. We recommended moving to individual questions on a long vertical scroll

**FAMILIES & SCHOOL**

How well has **Son's** school been doing the following things during this school year?

Please select one response for EACH ITEM below.

	Very well	Just okay	Not very well	Does not do it at all
a. Letting you know how <b>Son</b> is doing in school between report cards	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

National Household Education Survey

**WORK EXPERIENCE PROGRAMS**

Do any of the following statements describe your last work experience program?

	Yes	No
a. I was evaluated by a co-worker or supervisor.	<input type="radio"/>	<input type="radio"/>
b. I got college credit.	<input type="radio"/>	<input type="radio"/>
c. I had to sign an employment contract.	<input type="radio"/>	<input type="radio"/>
d. I received journeyman status at the end of an apprenticeship.	<input type="radio"/>	<input type="radio"/>
e. I got a state or federal	<input type="radio"/>	<input type="radio"/>

# What to do with Grids

## Desktop

CHILD'S HOMESCHOOLING

Thinking about sources of curriculum or books you use to homeschool Ariana, please tell us about ALL the sources that apply to you. Since September 2016, have you used materials from...

Please select one response for EACH ITEM below.

	Yes	No
a. A public library	<input checked="" type="radio"/>	<input type="radio"/>
b. A homeschooling catalog, publisher, or individual who specializes in homeschooling materials	<input type="radio"/>	<input checked="" type="radio"/>
c. Another educational publisher	<input checked="" type="radio"/>	<input type="radio"/>
d. A homeschooling organization	<input checked="" type="radio"/>	<input type="radio"/>
e. A church, synagogue, or other religious organization	<input type="radio"/>	<input checked="" type="radio"/>
f. Your local public school or school district	<input type="radio"/>	<input checked="" type="radio"/>
g. A private school	<input type="radio"/>	<input checked="" type="radio"/>
h. A bookstore or other store (including on-line)	<input checked="" type="radio"/>	<input type="radio"/>
i. Websites, excluding retailers	<input checked="" type="radio"/>	<input type="radio"/>
j. Other source — Specify	<input type="radio"/>	<input type="radio"/>

## Mobile

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a. A relative of this child outside your household who provides money SPECIFICALLY for that care, not including general child support

Yes  
 No

b. Temporary Assistance for Needy Families, or TANF

Yes  
 No

c. Another social service, welfare, or child care agency

Yes  
 No

d. An employer, not including a tax-free spending account for child care

# Expert Review Process

- Issues and recommendations from Rounds 1, 2, & 3 given to survey sponsor
- Program team & survey sponsor reviewed recommendations
  - Software team implemented recommendations that survey sponsor agreed with

# Usability Testing for NHES

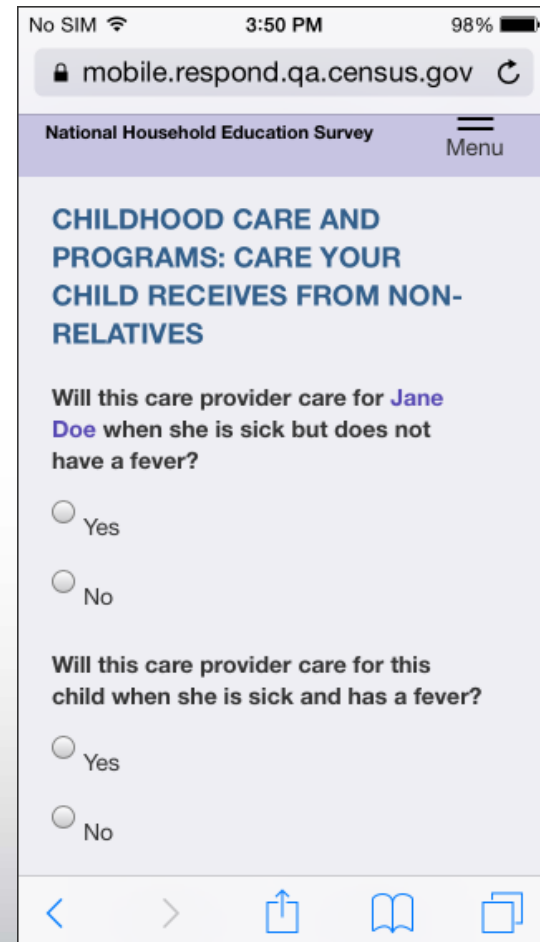
- After three rounds of expert review
- Conducted one round of usability testing
  - 24 participants
- Each participant worked with one “screener” & two “modules” of the survey
  - Get more “eyes” on the screens
  - 1/2 take survey on PC, 1/2 on mobile device

# Highlights from User Testing

- No show stoppers
- Some issues that software developers did not have time to fix prior to testing were spontaneously commented on by users
  - Design of small screen for mobile
  - Mobile – small size of touchable area (radio buttons)
    - Usability lab has since come up with a research based standard on optimal size of square and circle touch targets
- Repetition of questions asked in the screener

# Highlights from User Testing

- One of the more noticeable design changes in the expert review process was to recommend that for mobile devices - stop using grids and instead use a scrollable list with multiple question on the scroll.
  - Usability testing showed that this design worked for users



# Usability Testing Results: Screen Design

- Left image - Radio buttons on iPhone are small and hard to see
- Right image - Example of 6mm sized radio buttons

Other than the people listed below, does ANYONE ELSE live in this household?

For example, anyone who usually lives here who is temporarily away from home or living in a dorm at school, any babies or small children, roommates, foster children.

- Rebecca
- Ryan
- Andy
- Mary

Yes

No

< >

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Approval Expires: 7/31/2019

[Survey Length](#)  
[Accessibility](#)  
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Your neighborhood:

1 = no trust at all

2

3

4

5

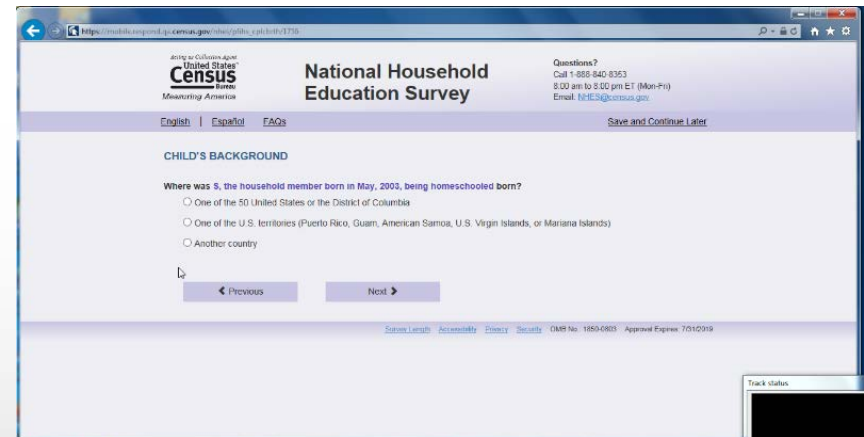
6

7 = complete trust

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# Usability Testing Results: Question Wording

- “One of the 50 United States or the District of Columbia”
- A number of users spontaneously commented that they did not like the way it was worded. One user said “sounds like DC is not a part of the U.S.”

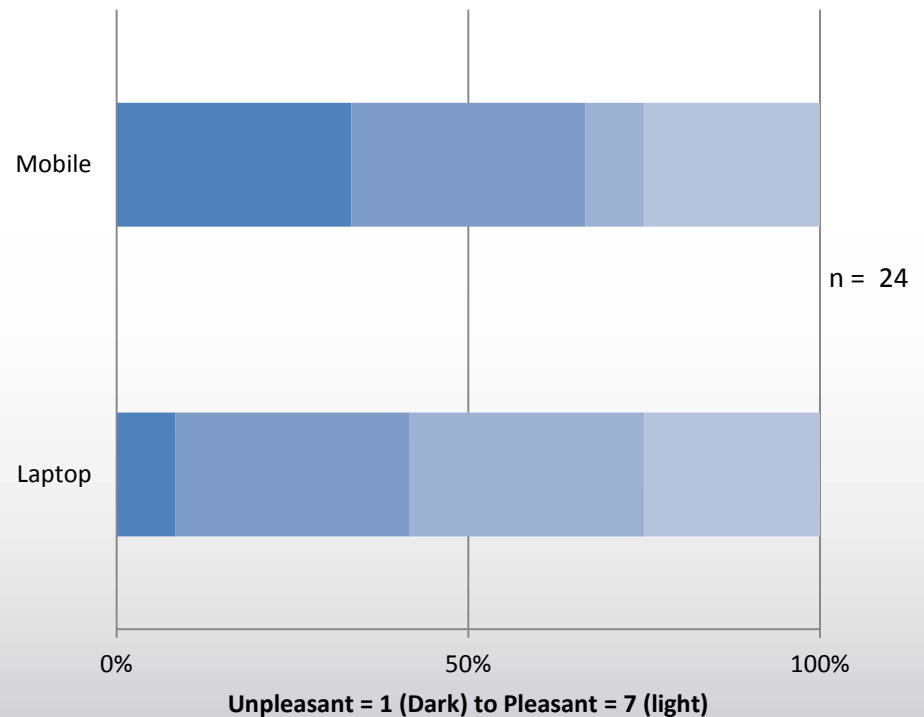




# User Satisfaction

- Participants who answered survey on laptop were slightly more satisfied than those who answered the survey using their mobile devices

## Overall Experience with the Survey



Source: 2016 NHES Usability Satisfaction Questionnaire

# Survey Sponsor Constraints

- Survey sponsor has final say on what changes to implement
- Survey sponsor constraints include:
  - Mode consistency concerns – paper & web instrument
  - Time series on key items – survey has been conducted over a number of previous years
  - Limited number of reviews to evaluate big changes
  - Limited schedule for implementing changes and ensuring that they were implemented as desired

# Communicating Changes

- In a perfect world, recommended changes would be implemented and retested
- In reality there are multiple steps...
  - Step 1: Communicate usability findings to program team / survey sponsor
  - Step 2: Survey sponsor determines, based on their constraints, if they agree to the change
  - Step 3: Program team or survey sponsor communicate changes to software developers
  - Step 4: Verify that changes implemented by designer was what had been intended by survey sponsor
- Budget and schedule constraints impact all steps

# Conclusion

- During expert review stage of development we were able to identify “low hanging fruit” that software developers could fix early on in the process
- Easy and noticeable problems fixed prior to showing the design to users
- Not all identified issues could be fixed – depended on sponsor needs and constraints

# Conclusion

- Vetting the screens in three rounds of expert review – usability testing built upon heuristic feedback
- Allowed for more focused usability study
- Could test whether design recommendations provided in the expert review actually worked for real users

# User Centered Design – Improved the Process

- Using the concepts of UCD –
  - Testing early with heuristic reviews
  - Followed by testing with real users
- Led to a better overall design prior to survey being fielded.

# Acknowledgements

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