Keeping up with the Times: A Web Diary Design for the Consumer Expenditure Survey

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Background

Technology dominates fast-paced modern life. To remain relevant, survey research must adapt to the ever-changing technological landscape. Currently, the Bureau of Labor Statistics (BLS) Consumer Expenditure Survey (CE) collects data on small frequently purchased items by asking respondents to hand write all of their household members' expenses in a 44 page paper diary.

By taking advantage of technological advances, particularly the portability and prevalence of mobile devices, a web diary can offer benefits that may help to improve data collection.
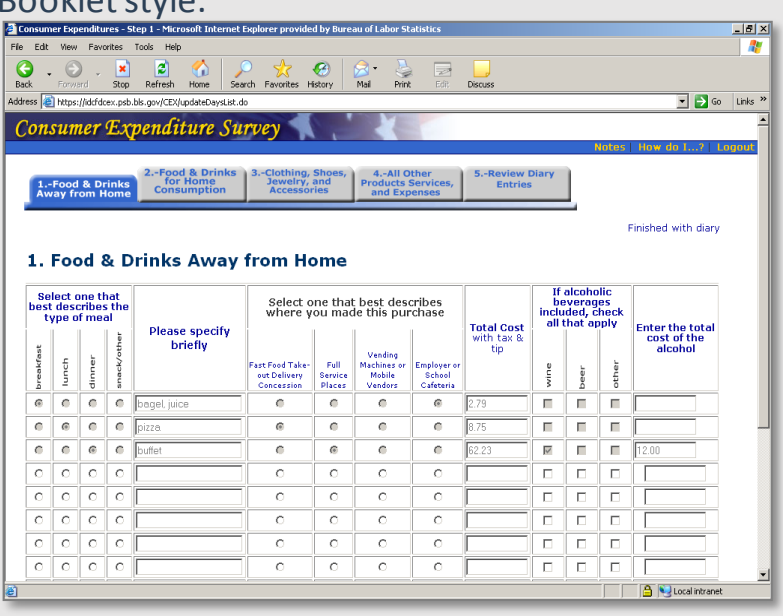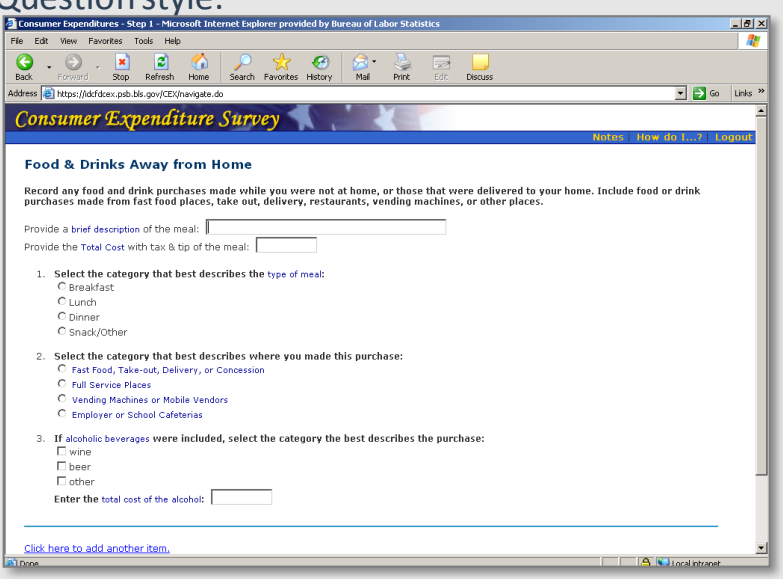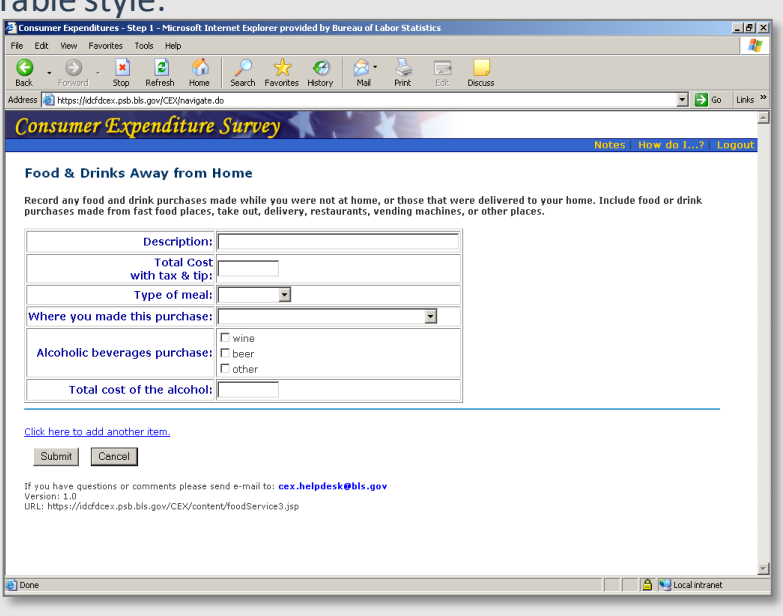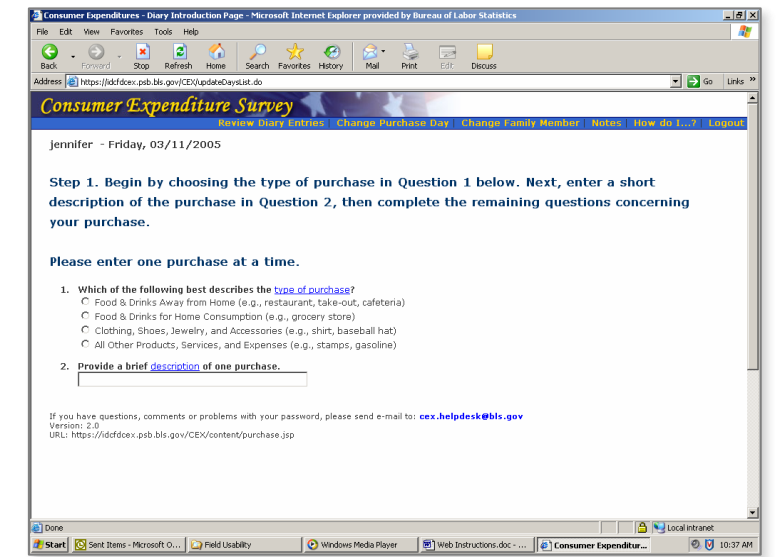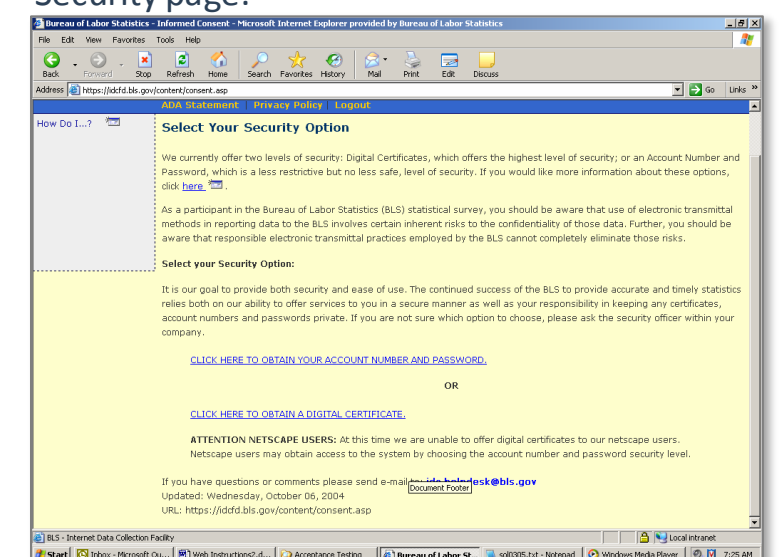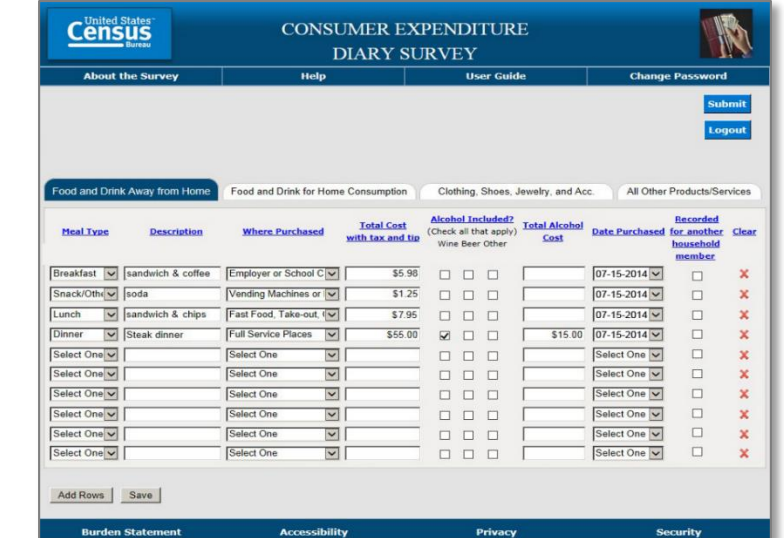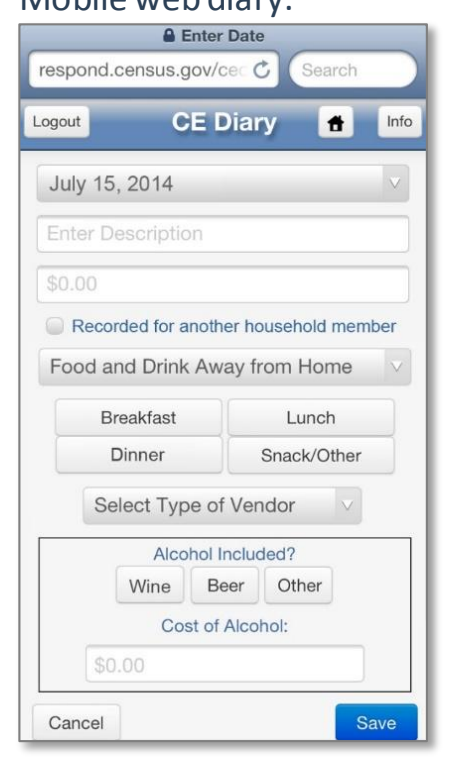
- Individuals in a household can access and report their own expenses, reducing the burden on one household respondent and relying less on proxy reporting;

- respondents can record their expenses as they occur or soon after, reducing recall time;

- data can be entered directly, eliminating transcription errors;

- and respondents have the option to access the diary from multiple platforms, including desktop computers or mobile devices, catering to different preferences.

CE has conducted a series of usability and field tests, leading to a number of change recommendations and multiple design iterations. With very specific data requirements, creating a user-friendly web diary was not easy, but CE has made good progress and is nearing the completion of its web diary development. This poster presentation shows the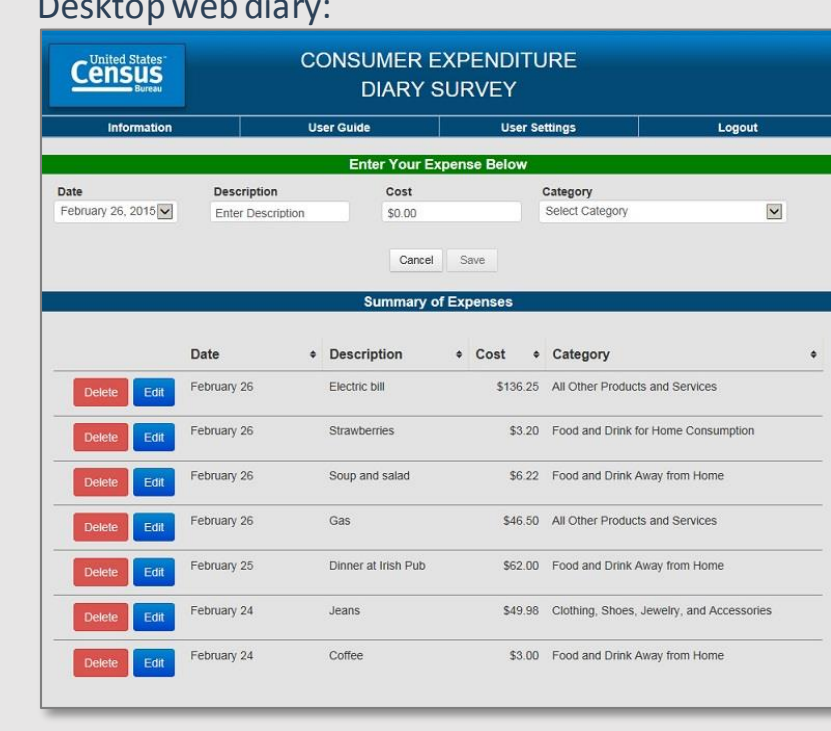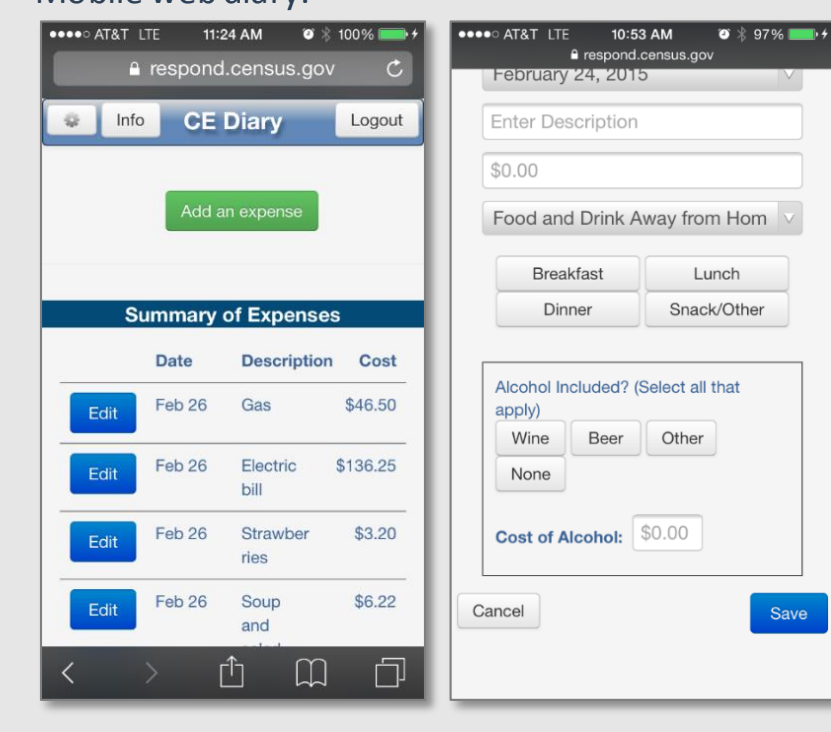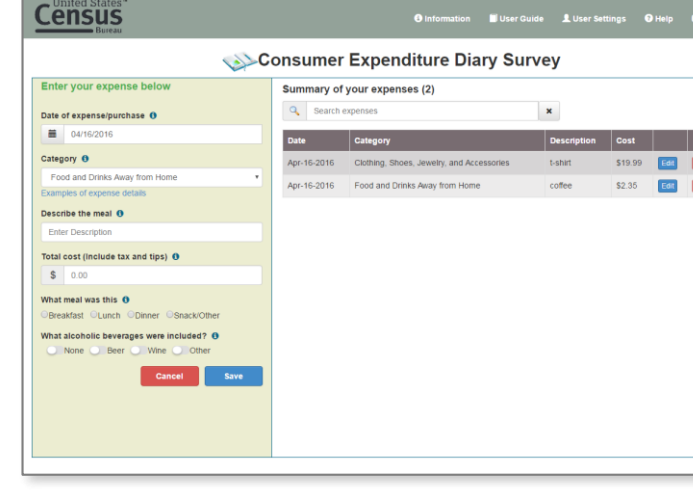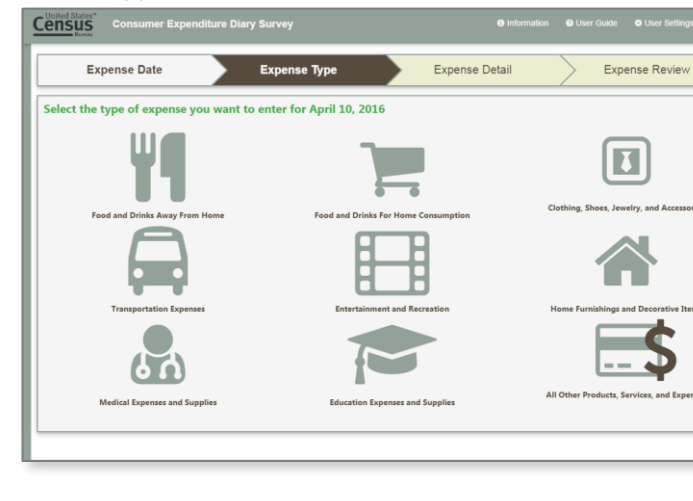 progression of the CE web diary from conception to its current state, sharing findings and lessons learned along the way as well as plans for moving forward.

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History of the CE Web Diary Development

| 2005 | 2006 | 2011-2013 | 2014 | 2015 | 2016 |

Initial Forms Design

Design:
- 3 designs developed by a BLS office working on other BLS web establishment surveys.
- Designs were developed quickly and had to meet the "look and feel (i.e. visual appearance and navigation)" requirements of other BLS surveys.
- Household survey requirements were not considered.

Booklet style:

Question style:

Table style:

Results:
- Few differences were found between the designs during usability testing.
- The booklet style design prevented clear navigation; participants scrolled down past the tabs to the entry fields and didn't scroll back up, missing the other category tabs.
- Participants reported the table style to be easier to enter purchases.

Web vs. Paper

Design:
- A design based on the initial designs was tested.
- For security reasons, BLS required use of a "Gatekeeper." Participants had to create an account with a complicated password.

Expense entry page:

Security page:

Results:
- Usability test offered participants the option of using the web diary or a paper diary.
- Only four participants opened the web diary, with only three entering data into the web diary.
- Participants commented that while they had internet access, it was much easier to just write the expenses down in a paper diary.
- One potential explanation for these results, is the required use of the "Gatekeeper."

Design Refinement

Design:
- The goal was to keep the task as simple as possible; no more difficult than writing down an expense on a piece of paper.
- The design mirrored the production diary while taking advantage of some web features.
- Diaries from different countries and examples in the private sector were reviewed for input.

Web diary design:

Results:
- Heat maps from eye-tracking tests provided evidence that the colorful graphics and the list of examples were not used and could be eliminated or consolidated.
- Participants commented that the layout appeared outdated and overly "busy."
- Participants did not like the red color scheme. There is scientific evidence that blue is the most preferred color and generates the most positive emotional response (Schloss & Palmer, 2009).
- In a 2013 field test, some participants accessed the diary via their mobile devices. Since the diary was designed for desktops, the appearance and functionality was limited. With the increase in usage of mobile devices, it is important to offer a mobile-optimized web diary.

Introduction of Mobile Design

Design:
- The Desktop and Mobile versions of the CE Diary were updated using initial lessons learned from the previous test.
- The instruments functioned separately; respondents were sequentially offered the mobile version and then the desktop version.

Desktop web diary:

Mobile web diary:

Results:
- Suggested improvements for the web diaries included providing scanner functionality, making the login process easier, and permitting access via multiple platforms (e.g. desktop computers or mobile devices).

Integration of Desktop and Mobile

Design:
- The Desktop and Mobile versions of the CE Diary were updated using initial lessons learned from the previous test.
- The instruments functioned together; respondents could enter expenses into the same diary using either the Desktop or Mobile versions. The design of the Desktop version was updated to have the same look and feel as the mobile instrument.

Desktop web diary:

Mobile web diary:

Results:
- The data from this test are currently being analyzed.
- Early results show a limited take-up rate of the web option (~50% of those with internet access and web experience). A larger portion of respondents opted for the paper version over the online version, which was unexpected, but this is consistent with findings from other surveys (e.g. German Bundesbank's Payment Survey and Statistics Korea Household Income and Expenditure Survey).

Current Research and Beyond

Design:
- CE is satisfied with the current general design of the mobile version but feels that improvements could be made to the desktop design to take better advantage of the desktop platform (e.g. larger screen size, use of a mouse and keyboard).
- 2 Designs were proposed by an external contractor for the desktop version.

Prototype 1:

Prototype 2:

Results:
- Usability testing on the two proposed designs are currently in progress.

Key Findings

Multiple Modes:
- Allow access to the same diary via a desktop computer or a mobile device. The design should take advantage of the capabilities of that particular mode (the desktop version should make use of the larger screen size and keyboard usage and the mobile version should cater to the smaller screen size and use of a virtual keyboard) while maintaining a cohesive look and feel to allow respondents to easily switch back and forth between the modes.

Access to the Diary:
- Use a short and memorable URL (e.g., go.usa.gov/CEdiary).
- Email a web link to respondents when possible.
- Recommend that respondents create a bookmark and/or add a link to the instrument to their desktop or home screen and provide instructions on how to do so.
- Work to ensure that the top search result in Google and Bing refers specifically to the CE Diary so that if a respondent types the web address into a search engine, the diary is the first search result to appear.
- Train interviewers to assist respondents in navigating to the site, logging in, and doing the initial setup during placement.

Data Security:
- Simplify the credentialing process to minimize the burden of multiple logins.

Instructions:
- Provide a printed User Guide and a link to a web version within the instrument.
- Create video tutorials and include links to the videos in the User Guide, instrument, and via email.
- Include links to other help, info, and example pages within the instrument.

Data Entry:
- Ensure that navigation throughout is simple and clear.
- Ensure that the design is current and uses a pleasing color scheme.
- Utilize familiar icons (e.g. home, info, settings) and colors (e.g. green = go/proceed, red = warning/stop).
- Use radio/selection buttons versus drop-downs when possible so that options are visible all at once.
- Prefill the date field with the current day.
- Restrict fields to only allow valid entries (e.g. for cost fields only allow numbers, commas, and decimals).
- Auto-format when applicable (e.g. format cost fields using $ and two decimal places) to maintain consistency and accuracy.
- Use pop-up warning screens before allowing items to be deleted.
- Condense all data entry fields onto one screen to avoid the need to scroll.
- Allow the summary of entries to be sorted so that respondents can easily view/search for entries as needed.

Desktop specific:
- Allow tabbing between fields to take advantage of quick keyboard use.
- Allow entry of multiple items per screen to take advantage of the large screen size and ease of data entry with keyboard use.

Mobile specific:
- Ensure that the optimal keyboard appears for each field selected (e.g. when a cost field is selected, the numeric keyboard should appear).
- Provide a QR Code for respondents who may have and are familiar with QR Code readers.

Other:
- Allow interviewers to access paradata to determine which respondents have not logged into the instrument or made entries so that they can follow-up with respondents to offer assistance or remind them to enter their expenses.
- Ensure that interviewers are thoroughly familiar with the instruments.
- Check for consistent appearance across different operating system, browsers, and mobile devices.