BudgetWiser: Gamification Design Opportunities in the Government Budget Domain

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Abstract

In our research project, dubbed BudgetWiser, we focus on the government budget, one of the most important policy documents of a government. Our goal is to increase public interests in the budget and encourage public participation in the budgeting process by leveraging open government data. We envision interactive tools in which taxpayers' budget navigation and sensemaking activities lead to meaningful resources for future taxpayers. A primary design goal is incentivizing taxpayers – often with low interests and awareness of the budget – to engage in such activities. We believe gamification can provide a viable solution to our challenge. We share some design lessons from our exploration in the budget domain with two prototype systems: Factful and BudgetMap. In the workshop, we hope to discuss various ways to incorporate gamification into our systems to encourage public participation.

Author Keywords

Open government data; Crowdsourcing; Gamification; Government budget.

ACM Classification Keywords

H.5.m [Information interfaces and presentation (e.g., HCI)]: Miscellaneous.

Introduction

With the recent E-Government movement in many countries and government organizations, there are opportunities to improve the public awareness of important government operations and to elicit public participation in discussions and decision making. For example, open access to a government budget helps the public understand and evaluate how a government spends taxpayers' money, which is fundamental to a democracy [2]. In our research project, dubbed BudgetWiser, we focus on the government budget, which is considered as the single most important policy document of a government [1]. Our goal is to increase public interests in the budget and encourage public participation in the budgeting process.

Despite recent efforts in opening government data, designing interactive channels for taxpayers to make sense of extensive and multi-faceted budget data remains an open challenge. Even though the budget proposals and plans are available online in many countries, the existing resources suffer from two main drawbacks: 1) they fail to reduce the complexity of the budget in their way of delivery, and 2) their static format cannot accurately reflect public interests that dynamically evolve over time. In addition, while taxpayers are capable of understanding complex issues and making informed decisions, government organizations lack suitable tools for leveraging the wisdom of crowds [5, 6]. We envision interactive tools in which taxpayers' budget navigation and sensemaking activities lead to meaningful resources for future taxpayers. A primary design goal is incentivizing taxpayers – often with low interests and awareness of the budget – to engage in such activities. We believe gamification can provide a viable solution to our challenge.

Gamification has been proven effective in motivating desired behaviors in non-game contexts, including education (Khan Academy), science (Foldit), and user-generated content (Quora) [3]. A few serious games have been introduced in the government budget domain. The New York Times[1] asked readers to solve the federal budget deficit problems by laying out budget priorities. The LA Times[2], Next 10[3], and the city government of San Jose, CA[4], built similar systems for the state and local governments' budgets. While these systems are more 'serious' games with less focus on entertainment, Budget Hero[5], created by American Public Media and the Woodrow Wilson Center, introduced more game-like components as its primary goal is to educate the public about the federal budget and the budget tradeoffs. While our research shares design goals with Budget Hero, we envision applying gamification for crowdsourced budget labeling and navigation enhancement. We are currently exploring various incentives for participating taxpayers.

Lessons from Factful and BudgetMap

We began our exploration in this space with two prototype systems: Factful [4](Figure 1) is an annotative news reading application powered by taxpayers' fact-checking and discussion activities; BudgetMap (Figure 3) is an interactive budget navigation tool powered by taxpayers' labeling data. We designed human computation tasks in

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[1]The New York Times' Budget Puzzle: You Fix the Budget, http://www.nytimes.com/interactive/2010/11/13/weekinreview/deficits-graphic.htm

[2]LA Times' You balance the budget, http://www.latimes.com/local/la-statebudget-fl-2-htmlstory.html

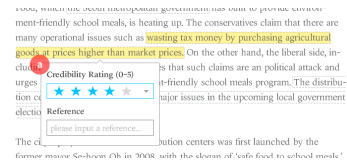[3]California Budget Challenge, http://www.nextten.org/california-budget-challenge

[4]San Jose budget prioritization games, http://www.innovationgames.com/2011/01/engaging-citizens-through-games-san-jose-ca-budget-prioritization-games

[5]http://www.publicinsightnetwork.org/budgethero/

both systems, in which natural fact-checking or labeling activities can yield useful information for future taxpayers.
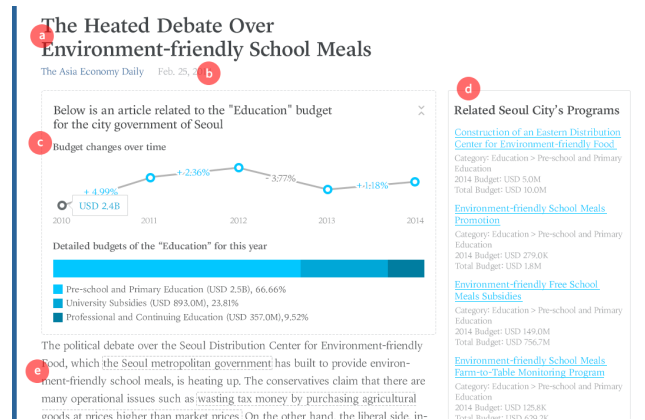
Figure 1: Overview of Factful powered by open budgetary data from the Seoul metropolitan government: (a) title of the article, (b) posted date and news outlet, (c) contextual budget category panel (education), (d) individual budget programs relevant to the article, (e) article content.

In our lab study, we found that the fact-checking support in Factful helped people hold more critical views. However, participants were sometimes reluctant to perform fact-checking (Figure 2), as it requires significant expertise and effort in searching for references, comparing multiple resources, and making the final judgment. We believe the barrier to contribution can be lowered, as there are bite-sized tasks and multiple ways even novice taxpayers can easily contribute.

BudgetMap (Figure 3) is an interactive tool for navigating budgets of government programs through a lens of social issues of public interests. It elicits the public to tag government programs with public-generated social issues

Figure 2: Annotative fact-checking interactions: clicking on the fact-check button opens a popup (a), so that a user can evaluate the credibility of the highlighted phrase in a 5-point scale, and add a URL reference that verifies the phrase.

via active and passive tagging methods. In our preliminary live deployment of BudgetMap in September 2014, many users commented that they appreciated the ability to view and navigate the policy programs and their budgets. This shows that presenting the budget data in a publicly accessible way provides value to the public. However, we discovered challenges in guiding the public to actively engage in tagging tasks (Figure 4) while making meaningful contributions. While taxpayers' reactions to tagging were overall positive, casual users on the web have not participated in the tagging as actively as we initially expected. We speculate that it may be due to the inherent complexity and difficulty in budgetary information. Overcoming these challenges will be crucial for BudgetMap to have broader social impact.

Gamification Opportunities
With the working prototypes and promising initial results from lab studies, we plan to deploy these systems to real taxpayers. We now describe some gamification ideas for encouraging continuous participation from taxpayers.
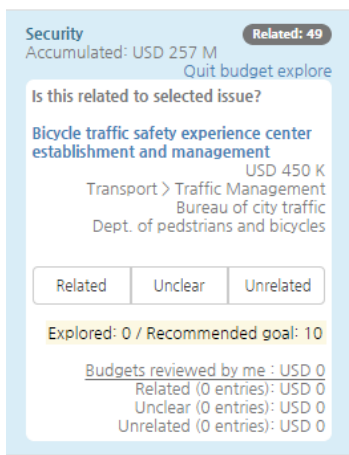
Decompose fact-checking activities into quiz-like microtasks: Inspired by multi-stage crowd workflows (e.g., three-stage in-video prompts for learners [7]), a fact-checking workflow can be presented as multiple microtasks: finding references, comparing multiple resources, scoring the found references, and reaching the final consensus. Each type of microtasks can be presented as quiz questions with some scores, and users can become an ''expert'' in each fact-checking activity or subject area (e.g., childcare, transportation, environment) of their contribution scores.

Map exploration to exploit the map features of BudgetMap: Inspired by map-based arcade games whose

goal is to claim all areas on the map, we plan to visualize parts of BudgetMap that a user has explored and encourage navigating to nearby (e.g., semantically related) budget items. For the user to be able to claim an area, certain amount of budgetary exploration and tagging can be required. Since many budget items span multiple areas, which was commonly found by participants in our lab study, we also plan to explore collaborative play: a team of taxpayers covering different areas on the map can join forces to discover overlapping items for bonus points.

Figure 4: Passive tagging: a user is presented with a randomly chosen program and asked to determine the relationship with the selected issue.
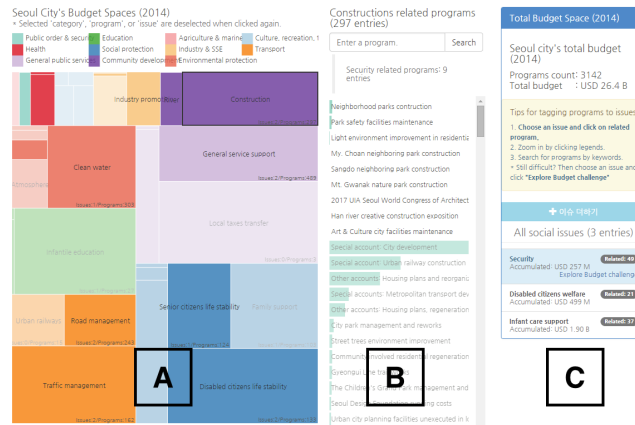
Figure 3: Overview of the BudgetMap Interface: (A) budget category information of Seoul city, (B) a list of programs sorted by the budget size, (C) a list of social issues

Question & Answering game for budget tagging: In information literacy, question asking & answering plays a central role in demonstrating understanding of a text, which is essential for information retrieval to achieve higher-level comprehension. An idea is to incorporate the Q&A mechanism into a role-playing game where a user can choose to be a teacher or a student. Alternatively, the teacher can be an intelligent agent that automatically generates tagging questions.

In all these ideas, we plan to explore common game design elements such as badges, levels, points, and leaderboards. Moreover, we would like to address political bias and quality issues in designing interactive systems for civic participation. In the workshop, we hope to share design lessons from building Factful and BudgetMap, and discuss ways to incorporate gamification into our systems to encourage public participation.

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