



Factful: Engaging Taxpayers in the Public Discussion of a Government Budget

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Jihee Kim (KAIST)

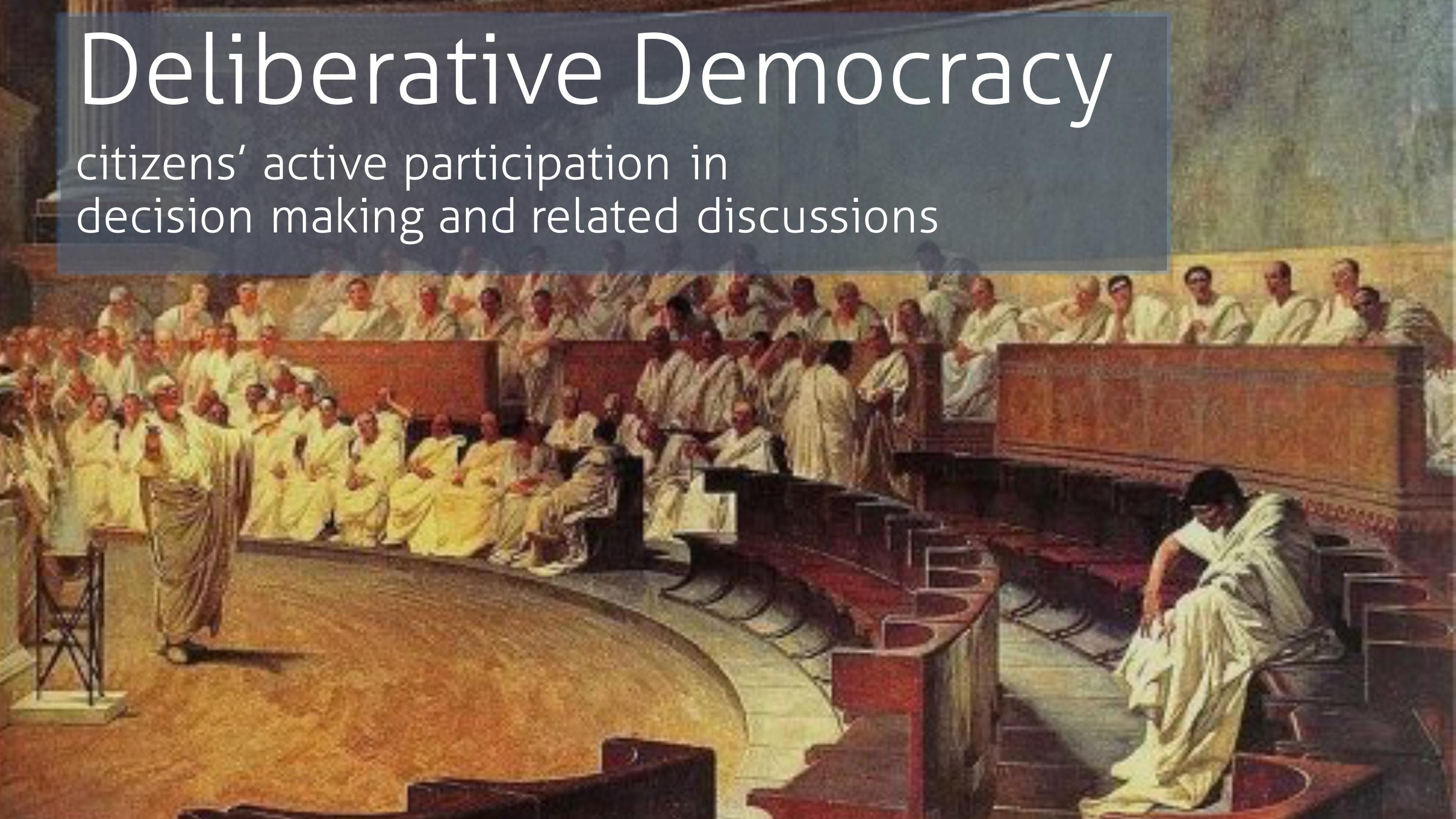
 **BUDGETWISER**

POLICY MAKING AS A PUBLIC-DRIVEN PROCESS



Deliberative Democracy

citizens' active participation in
decision making and related discussions

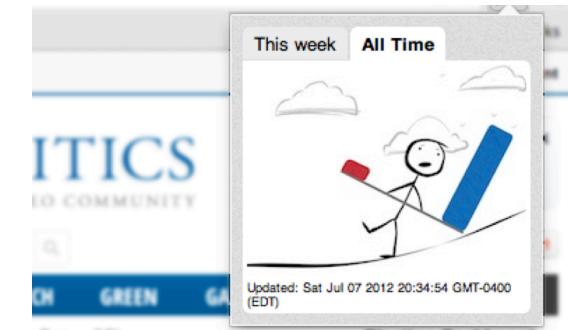


Deliberative Democracy Online

Open Government Data UI for Discussion Support

Agency Code, Agency Name, Bureau Code, Bureau Name, Account Code, Account Name, Treasury Agency Code, Subfunction Code, Subfunction
001, Legislative Branch, 00, Legislative Branch, "Receipts, Central fiscal operations", 803, Central fiscal operations, Mandat
001, Legislative Branch, 00, Legislative Branch, "Receipts, Central fiscal operations", 908, Other interest, Net interest, On-b
001, Legislative Branch, 00, Legislative Branch, 241400, Charges for services to trust funds, 803, Central fiscal operations, Ma
001, Legislative Branch, 05, Senate, 0000, Senate, 00, 801, Legislative functions, Discretionary, On-budget, "126,428", "36,115", "154
001, Legislative Branch, 05, Senate, 0100, "Compensation of Members, Senate", 00, 801, Legislative functions, Mandatory, On-budget,
001, Legislative Branch, 05, Senate, 0101, Mileage of the Vice President and Senators, 00, 801, Legislative functions, Discretio
001, Legislative Branch, 05, Senate, 0107, "Expense allowances of the Vice President, President Pro Tempore, Majority and Min
001, Legislative Branch, 05, Senate, 0108, Representation allowances for the Majority and Minority Leaders, 00, 801, Legislative
001, Legislative Branch, 05, Senate, 0110, "Salaries, Officers and Employees", 00, 801, Legislative functions, Discretionary, On-bu
001, Legislative Branch, 05, Senate, 0115, Payments to widows and heirs of deceased members of Congress, 00, 801, Legislative fu
001, Legislative Branch, 05, Senate, 0123, Miscellaneous Items, 00, 801, Legislative functions, Discretionary, On-budget, 0, 0, 0, 0, 0,
001, Legislative Branch, 05, Senate, 0126, Secretary of the Senate, 00, 801, Legislative functions, Discretionary, On-budget, 0, 0, 0,
001, Legislative Branch, 05, Senate, 0127, Sergeant at Arms and Doorkeeper of the Senate, 00, 801, Legislative functions, Discret
001, Legislative Branch, 05, Senate, 0128, Inquiries and Investigations, 00, 801, Legislative functions, Discretionary, On-budget,
001, Legislative Branch, 05, Senate, 0129, Expenses of United States Senate Caucus on International Narcotics Control, 00, 801, I
001, Legislative Branch, 05, Senate, 0130, Senators' Official Personnel and Office Expense Account, 00, 801, Legislative function
001, Legislative Branch, 05, Senate, 0132, Official mail costs, 00, 801, Legislative functions, Discretionary, On-budget, 0, 0, 0, 0, 0,
001, Legislative Branch, 05, Senate, 0140, Stationery (revolving fund), 00, 801, Legislative functions, Discretionary, On-budget, 0,
001, Legislative Branch, 05, Senate, 0171, Office of Senate Legal Counsel, 00, 801, Legislative functions, Discretionary, On-budget
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001, Legislative Branch, 05, Senate, 0183, Office of Senate fair employment practices, 00, 801, Legislative functions, Discretion
001, Legislative Branch, 05, Senate, 0184, "Settlement and awards reserve, Senate", 00, 801, Legislative functions, Discretionary,
001, Legislative Branch, 05, Senate, 0185, Office of the Legislative Counsel of the Senate, 00, 801, Legislative functions, Discr
001, Legislative Branch, 05, Senate, 0188, "Congressional Use of Foreign Currency, Senate", 00, 801, Legislative functions, Mandat
001, Legislative Branch, 05, Senate, 4052, Senate office of public records revolving fund, 00, 801, Legislative functions, Discr
001, Legislative Branch, 05, Senate, 4062, Senate gift shop revolving fund, 00, 801, Legislative functions, Mandatory, On-budget, 0,
001, Legislative Branch, 05, Senate, 9911, Senate Items, 00, 801, Legislative functions, Discretionary, On-budget, 0, 0, 0, 0, 0, 0, 0,
001, Legislative Branch, 10, House of Representatives, 0000, House of Representatives, 00, 801, Legislative functions, Discretion
001, Legislative Branch, 10, House of Representatives, 0200, Compensation of Members and Related Administrative Expenses, 00, 80
001, Legislative Branch, 10, House of Representatives, 0208, Mileage of Members, 00, 801, Legislative functions, Discretionary, On-
001, Legislative Branch, 10, House of Representatives, 0215, Payment to Widows and Heirs of Deceased Members of Congress, 00, 80
001, Legislative Branch, 10, House of Representatives, 0215, Payment to Widows and Heirs of Deceased Members of Congress, 00, 80
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001, Legislative Branch, 10, House of Representatives, 0488, "Congressional Use of Foreign Currency, House of Representatives"
001, Legislative Branch, 10, House of Representatives, 388540, Undistributed Intragovernmental Payments and Receivables from C
001, Legislative Branch, 10, House of Representatives, 4006, Beauty shop (revolving fund), 00, 801, Legislative functions, Mandat
001, Legislative Branch, 10, House of Representatives, 4007, House barber shops (revolving fund), 00, 801, Legislative functions,
001, Legislative Branch, 11, Joint Items, 0174, Capitol Guide Service and Special Services Office, 00, 801, Legislative functions
001, Legislative Branch, 11, Joint Items, 0180, Joint Committee on Printing, 00, 801, Legislative functions, Discretionary, On-bud
001, Legislative Branch, 11, Joint Items, 0181, Joint Economic Committee, 00, 801, Legislative functions, Discretionary, On-budget,
001, Legislative Branch, 11, Joint Items, 0186, Joint Congressional Committee on Inaugural Ceremonies of 2013, 00, 801, Legislati
001, Legislative Branch, 11, Joint Items, 0190, Office of Congressional Accessibility Services, 00, 801, Legislative functions, Di
001, Legislative Branch, 11, Joint Items, 0420, Legislative Branch emergency response fund, 00, 801, Legislative functions, Discr
001, Legislative Branch, 11, Joint Items, 0425, Office of the Attending Physician, 00, 801, Legislative functions, Discretionary, C
001, Legislative Branch, 11, Joint Items, 0460, Joint Committee on Taxation, 00, 801, Legislative functions, Discretionary, On-bud
001, Legislative Branch, 11, Joint Items, 322000, All Other General Fund Proprietary Receipts Including Budget Clearing Accou

data.gov.uk, data.gov, data.seoul.go.kr



Balancer
[Munson et al., 2011]

- Are you saying that you believe this law would not be applied to wealthy and poor defendants equally? *Vin Hill*
 - I meant that the CURRENT law does not treat the wealthy and the poor equally, since the wealthy can afford levels of bail that the poor cannot. *James B.*
- What do you hear James saying?



Reflect
[Kriplean et al., 2012]

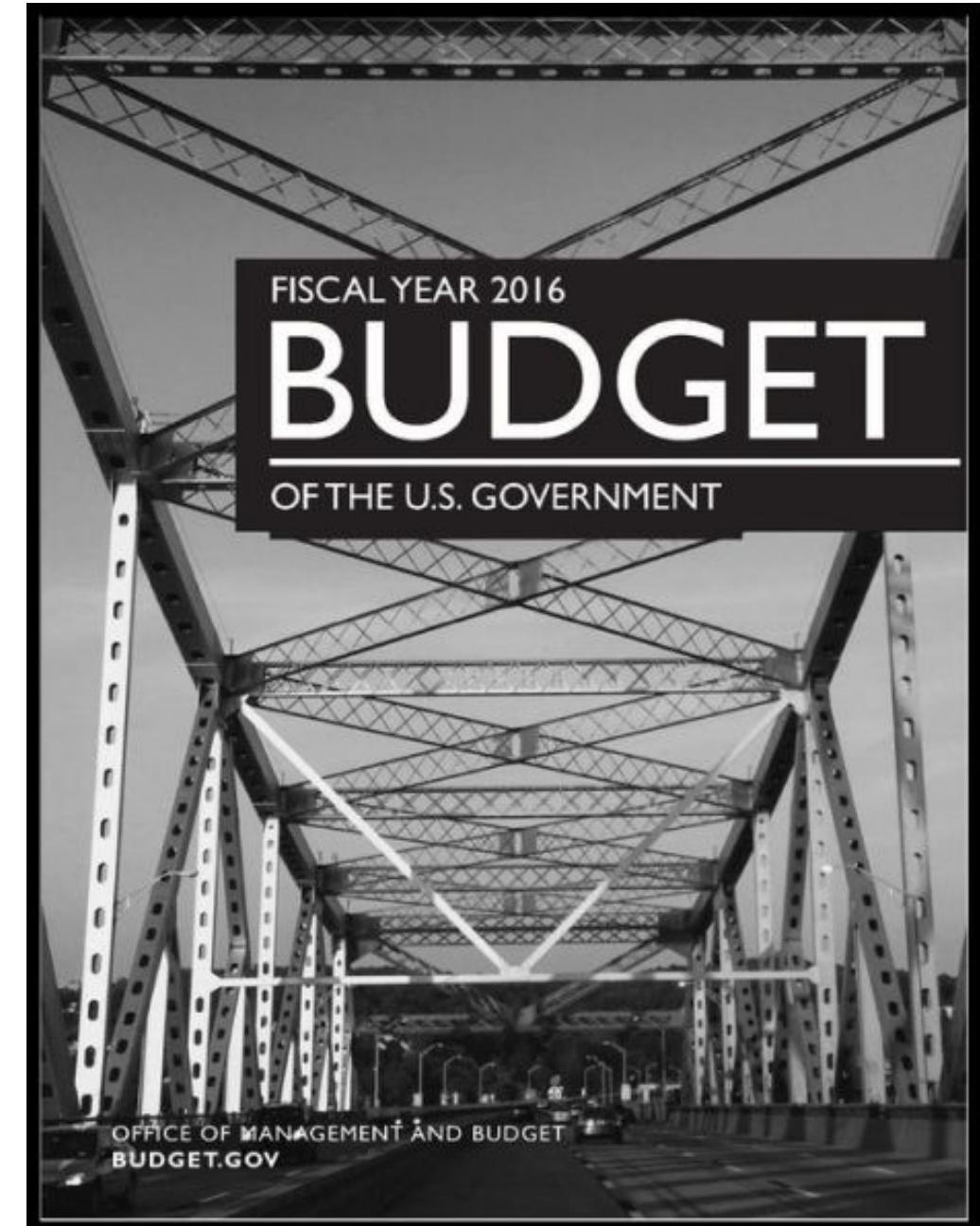
ConsiderIt
[Kriplean et al., 2012]

Government Budget

plan for government to
best allocate resources

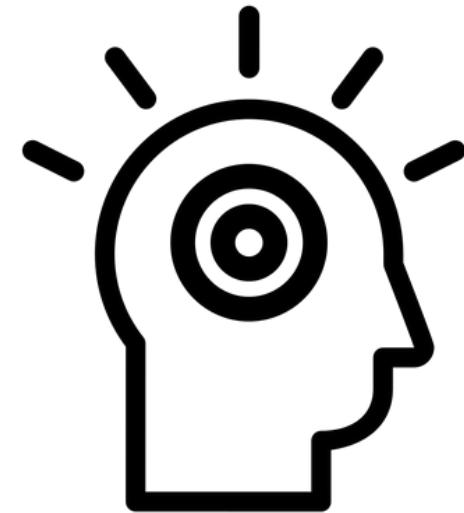
But...

- hard to comprehend
- extremely complex
- low interest & awareness





Improve awareness & understanding of budgetary issues



Build interactive systems for civic engagement



Leverage open government data

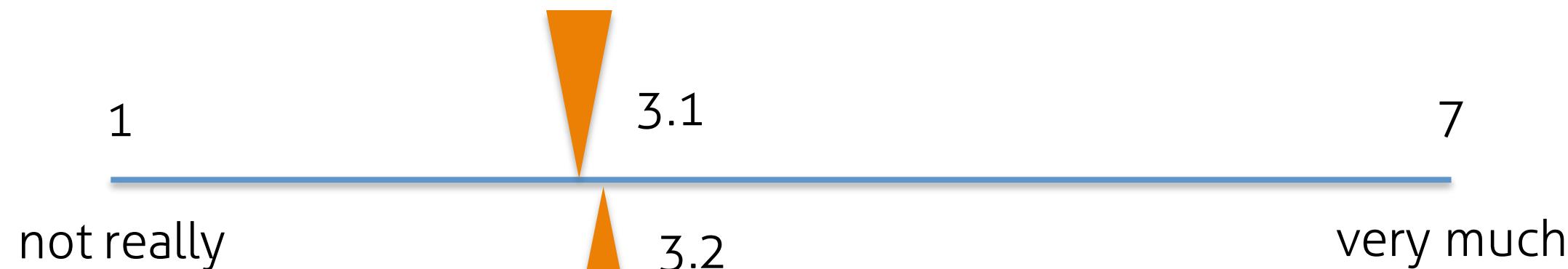


Understanding Taxpayers' Challenges

- Survey
 - 182 respondents in Korea
 - Perception of the government budget + estimation quiz
- Semi-structured interviews
 - 5 taxpayers
 - 3 experts

1. Low awareness and interest in budgetary issues

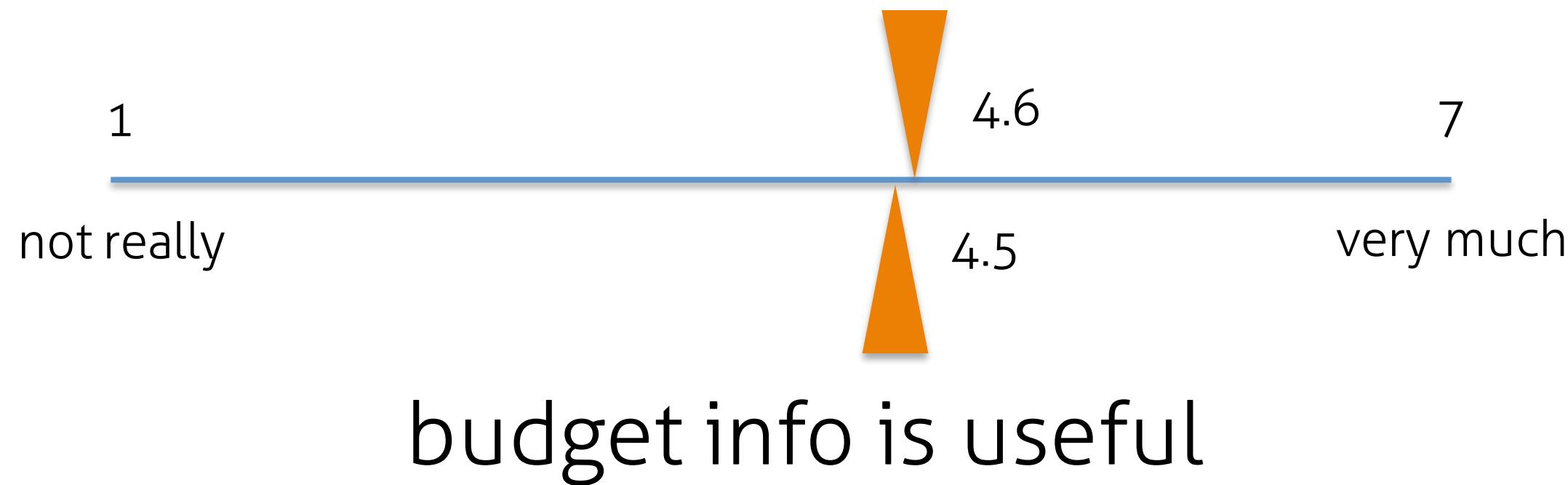
knowledgeable about budget info



search for budget info

1. Low awareness and interest in budgetary issues

interest in the budget



1. Low awareness and interest in budgetary issues

- Federal police budget estimation
[Mean: \$800B, Median: \$11B, Stdev: 2114]

\$8.8B

"I feel distant from all the big numbers that don't really mean anything to me."

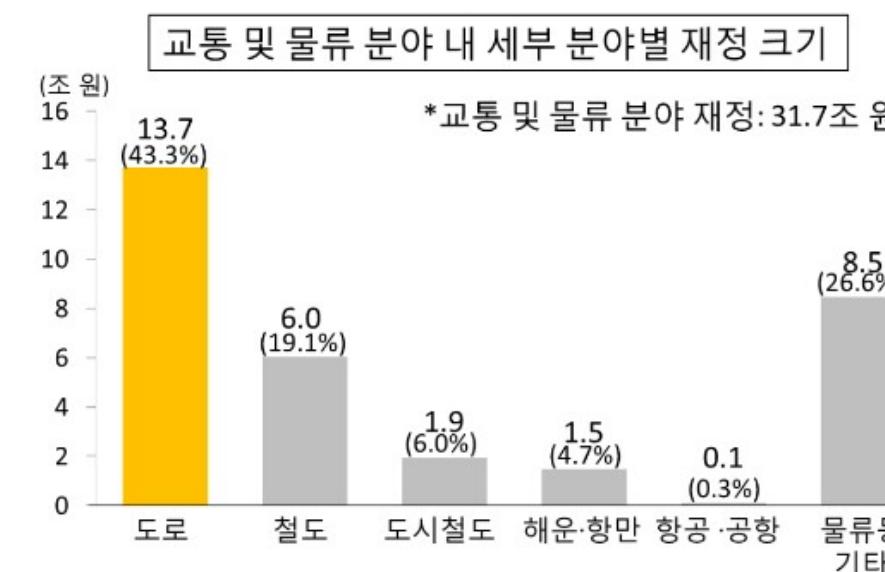
2. Contextual information matters in opinion formation.

“(Taxpayers) sometimes only see their own interests and fail to realize that compromises need to be made.”

2. Contextual information matters in opinion formation.

교통 및 물류 분야에 배정된 2014년 국가재정(중앙과 지방의 모든 재정) 지출액은 약 31.7조 원이고 그 중 '도로' 분야에 배정된 재정 지출액은 약 13.7조 원입니다. 이 분야에 배정된 재정 지출액이 어떻게 변했으면 좋겠나요?

2014년 교통 및 물류 분야의 전체 재정 지출액은 약 31.7조 원이고 그 중 '도로' 분야에 배정된 지출액은 약 13.7조 원으로 전체 교통 및 물류 분야 지출액의 10.6%입니다. 교통 및 물류 분야 전체 재정 지출액은 일정하다고 가정할 때, '도로' 분야에 배정된 재정 지출액이 어떻게 변했으면 좋겠나요?



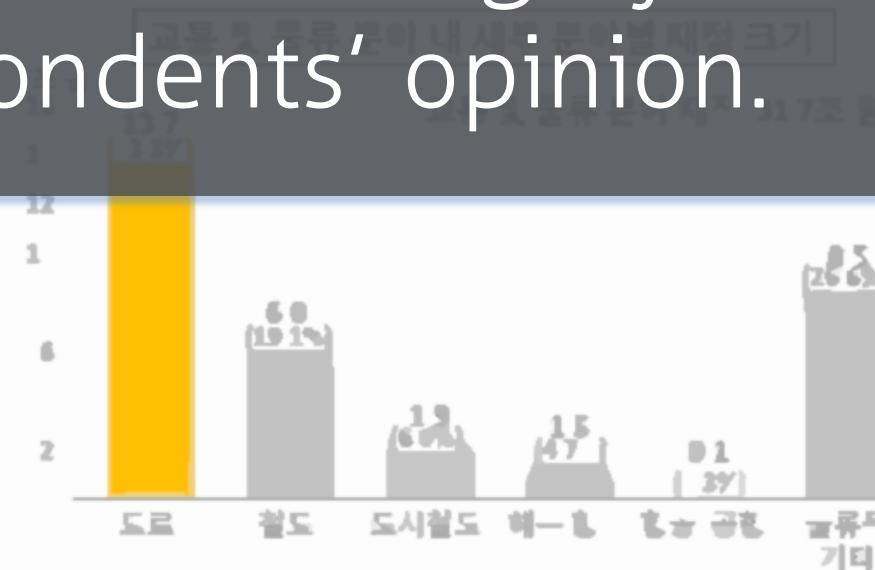
2. Contextual information matters in opinion formation.

교통 및 물류 분야에 배정된 2014년 국가재정(중앙
과 지방의 모든 재정) 자줄액은 약 317조 원이고 그
중 도로 분야에 배정된 재정 자줄액은 약 137조 원
입니다. 이 분야에 배정된 재정 자줄액이 이렇게 빤
랫으면 좋겠나요?

Seeing other programs in the category
sometimes affected respondents' opinion.

2014년 교통 및 물류 분야의 전체 재정 자줄액은 약
317조 원이고 그 중 도로 분야에 배정된 자줄액은
약 137조 원으로 전체 교통 및 물류 분야 자줄액의
10.6%입니다. 교통 및 물류 분야 전체 재정 자줄액

은 일정하다고 가정할 때 도로 분야에 배정된 재정
자줄액이 어떤가요? 빤으면 좋겠나요?



3. News Outlets: Primary source for learning about budgetary issues

- 74% regularly read articles online
 - U.S. [Purcell et al., 2012]: 50% via news sites, 10% social networks
- News articles: more comprehensible, engaging
- NONE had attempted to read govt. reports

3. News Outlets: Primary source for learning about budgetary issues

- Concerned about media biases
- Others' comments help recognize the potential subjectivity, bias, or error in an article
- U.S. survey [Purcell et al., 2012]
 - 37%: commenting important feature to have
 - 25%: commenting experience

Federal budget proposal includes \$37 million F-35 simulators at Eielson

Proposed Federal Budget Seeks to Eliminate \$45.5 Billion in 'Oil and NatGas Preferences' Over the Next Decade

The Washington Post

Federal Eye

White House budget

As Climate Change Strains Federal Funds, FY16 Budget Request Invests in Resilience

White House seeks \$534 billion base defense budget, \$51 billion for wars

WASHINGTON | Tue Jan 27, 2015 8:02pm EST

POLITICS

ines

percent spending
eral budget

Budget dysfunction calls for a sea change

Federal budget proposal includes millions for U.S. hydroelectric power, dams

WASHINGTON, D.C.

02/10/2015

By Michael Harris

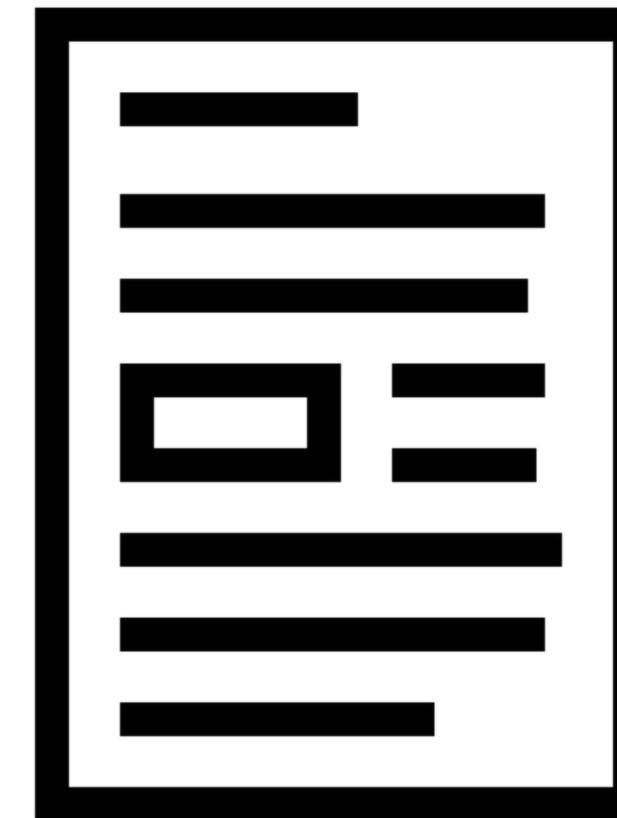
Associate Editor

safety money in ne

Factful: Fact-Oriented Budgetary Discussions Online

enhanced news reader application

contextual
budgetary facts



reader-initiated
fact-checking



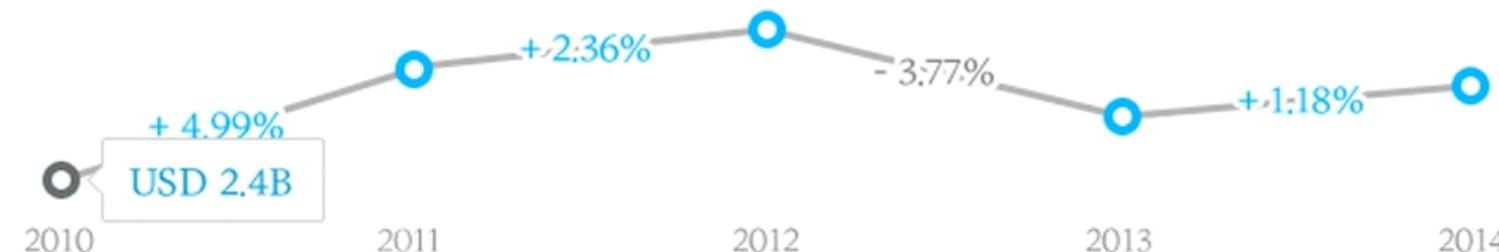
Article list

The Heated Debate Over Environment-friendly School Meals

The Asia Economy Daily Feb. 25, 2014

Below is an article related to the "Education" budget for the city government of Seoul

Budget changes over time



Detailed budgets of the "Education" for this year



- Pre-school and Primary Education (USD 2.5B), 66.66%
- University Subsidies (USD 893.0M), 23.81%
- Professional and Continuing Education (USD 357.0K), 9.52%

Related Seoul City's Programs

[Construction of an Eastern Distribution Center for Environment-friendly Food](#)

Category: Education > Pre-school and Primary Education
2014 Budget: USD 5.0M
Total Budget: USD 10.0M

[Environment-friendly School Meals Promotion](#)

Category: Education > Pre-school and Primary Education
2014 Budget: USD 279.0K
Total Budget: USD 1.8M

[Environment-friendly Free School Meals Subsidies](#)

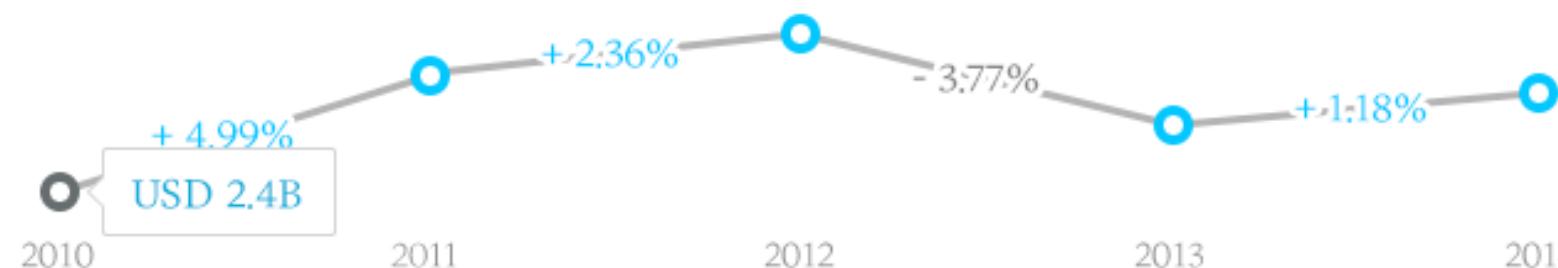
Category: Education > Pre-school and Primary Education
2014 Budget: USD 149.0M

LAYER #1: CONTEXTUAL BUDGET FACTS

Embedding Contextual Budget Facts

Below is an article related to the "Education" budget for the city government of Seoul

Budget changes over time



Detailed budgets of the “Education” for this year



- Pre-school and Primary Education (USD 2.5B), 66.66%
- University Subsidies (USD 893.0M), 23.81%
- Professional and Continuing Education (USD 357.0M), 9.52%

The political debate over the Seoul Distribution Center for Environment-friendly Food, which [the Seoul metropolitan government] has built to provide environment-friendly school meals, is heating up. The conservatives claim that there are many operational issues such as [wasting tax money by purchasing agricultural goods at prices higher than market prices]. On the other hand, the liberal side, in-

Related Seoul City's Programs

[Construction of an Eastern Distribution Center for Environment-friendly Food](#)

Category: Education > Pre-school and Primary Education
2014 Budget: USD 5.0M
Total Budget: USD 10.0M

[Environment-friendly School Meals Promotion](#)

Category: Education > Pre-school and Primary Education
2014 Budget: USD 279.0K
Total Budget: USD 1.8M

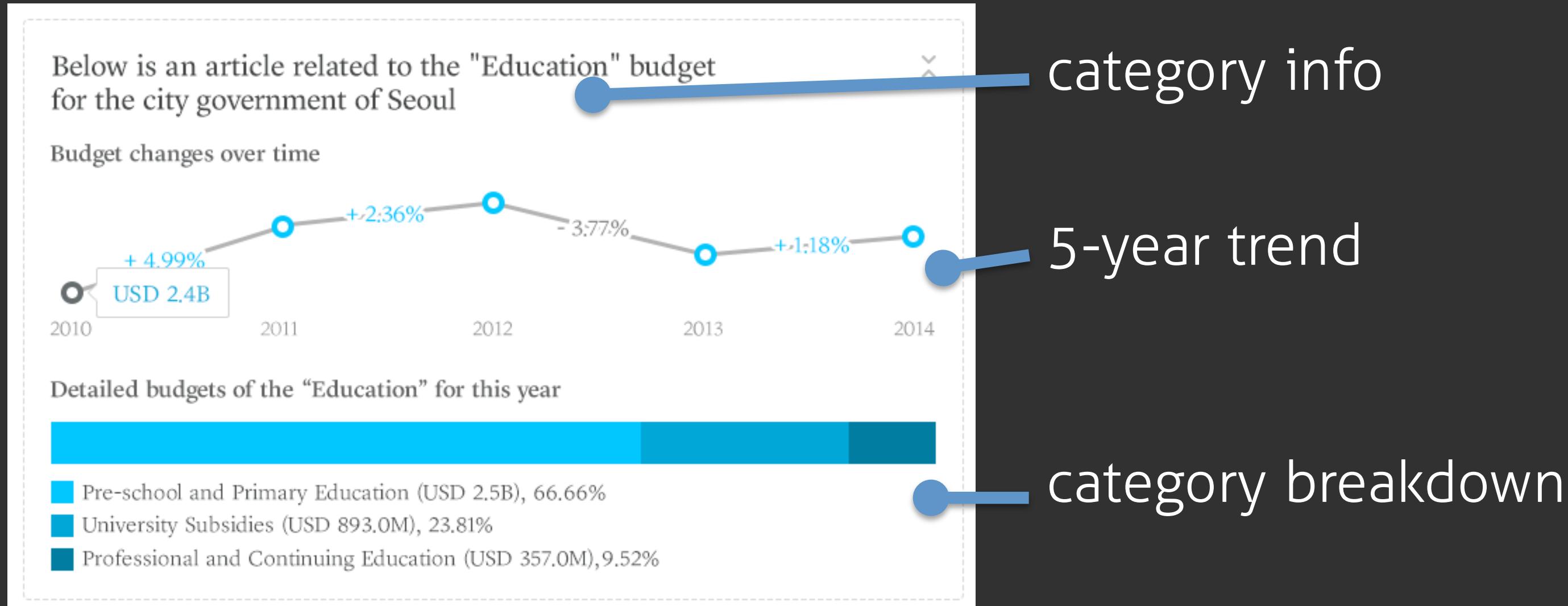
[Environment-friendly Free School Meals Subsidies](#)

Category: Education > Pre-school and Primary Education
2014 Budget: USD 149.0M
Total Budget: USD 756.7M

[Environment-friendly School Meals Farm-to-Table Monitoring Program](#)

Category: Education > Pre-school and Primary Education
2014 Budget: USD 125.8K
Total Budget: USD 629.2K

Automatically Inserted Overview



category detection: fit score based on word hit count

Most Relevant Budget Programs

link to budget
program webpage

budget name,
category, amount

program suggestion:

for each word in the article,
compute TF-IDF score
against each program

Related Seoul City's Programs

[Construction of an Eastern Distribution Center for Environment-friendly Food](#)

Category: Education > Pre-school and Primary Education

2014 Budget: USD 5.0M

Total Budget: USD 10.0M

[Environment-friendly School Meals Promotion](#)

Category: Education > Pre-school and Primary Education

2014 Budget: USD 279.0K

Total Budget: USD 1.8M

[Environment-friendly Free School Meals Subsidies](#)

Category: Education > Pre-school and Primary Education

2014 Budget: USD 149.0M

Total Budget: USD 756.7M

[Environment-friendly School Meals Farm-to-Table Monitoring Program](#)

Category: Education > Pre-school and Primary Education

2014 Budget: USD 125.8K

Total Budget: USD 629.2K

Automatic Annotation

and second distribution centers for food safety inspection and distribution in the Gangseo wholesale market, spent 9.6B Korean won (USD 9.6M) and 7.6B Korean won (USD 7.6M) respectively, and is currently constructing the third center for 14.7 billion Korean won (USD 14.7M). The distribution centers began operating in 2011, follow  environment-friendly Free School Meals Act which was enacted by the city council in August 2010. The distribution centers had supplied environment-friendly agricultural products to 867 schools until early 2013, covering 66% of the schools in Seoul.

monetary value annotation
with **rule-based detector**

Seoul City's Programs
w/ a Budget ~ USD 14.7M

- Welfare Support for Firefighters (USD 15.8M)
- Remodeling of Traditional Marketplaces (USD 13.4M)
- Maintenance of the City Water Filter System (USD 15.2M)

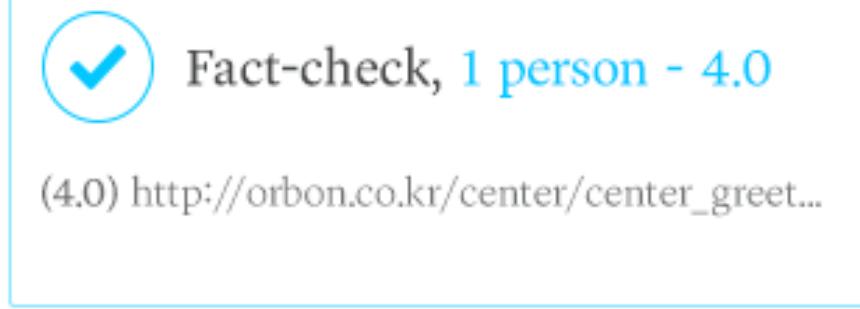
programs of
similar size

LAYER #2: READER-INITIATED FACT-CHECKING

Reader Activities

Gangseo wholesale market, spent 9.6B Korean won (USD 9.6M) and 7.6B Korean won (USD 7.6M) respectively, and is currently constructing the third center for 14.7 billion Korean won (USD 14.7M). The distribution centers began operating in 2011, follow  environment-friendly Free School Meals Act which was enacted by the government in August 2010. The distribution centers had supplied environment-friendly agricultural products to 867 schools until early 2013, covering

add a
comment do
fact-checking request
fact-checking



Annotative Threaded Discussion

urges to stop killing the environment-friendly school meals program. The distribution center has risen as one of the major issues in the upcoming local government election on June 4th.

The city's project to build the distribution centers was first launched by the former mayor Se-hoon Oh in 2008, with the slogan of 'safe food to school meals.' The first centers were built in March 2010 and has been supplying environment-friendly agricultural products to schools in Seoul. The city has built the first and second distribution centers for food safety inspection and distribution in the Gangseo wholesale market, spent 9.6B Korean won (USD 9.6M) and 7.6B Korean won (USD 7.6M) respectively, and is currently constructing the third center for 14.7 billion Korean won (USD 14.7M). The distribution centers began operating in 2011, follow [comment icon] [checkmark icon] [checkmark with question icon] nment-friendly Free School Meals Act which was enacted by the city council in August 2010. The distribution centers had supplied environment-friendly agricultural products to 867 schools until early 2013, covering 66% of the schools in Seoul.

System (USD 15.2M)

Alice

2014.07.16. 18:14

I'm wondering why we need another distribution center. It requires almost the same budget as the welfare support program for firefighters. There's a recent media coverage on the poor working environment for firefighters. As their lives seem to be exposed at great risk, I think we may instead increase the budget for the firefighter's welfare support program rather than building another distribution center given no further information about its immediate need.

Agree 5 Comment 1

Sarah

2014.07.16. 18:14

I also think so, too. And I feel so sad about the amount of budget for firefighters.

cancel Agree 2

Fact-Checking Embedded in the Article

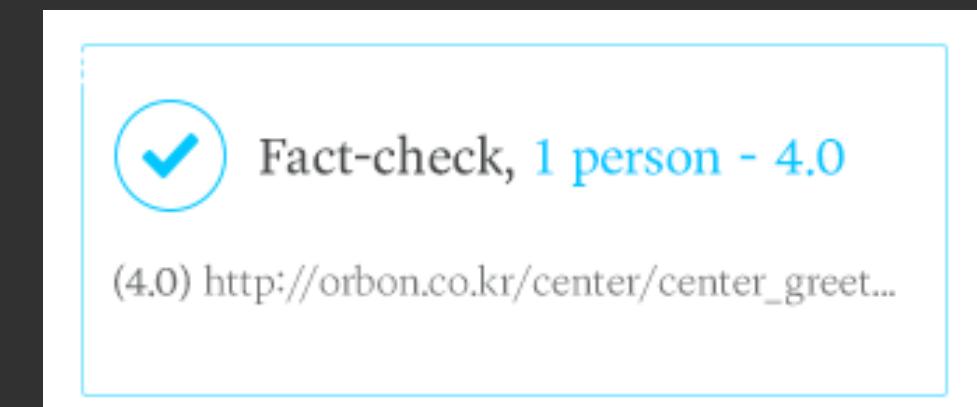
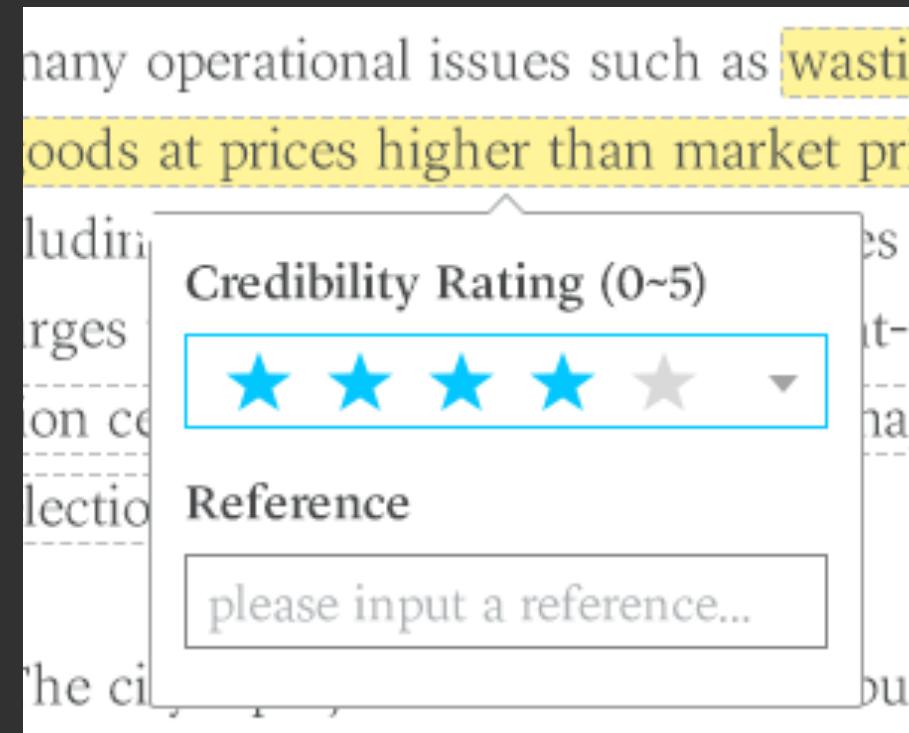
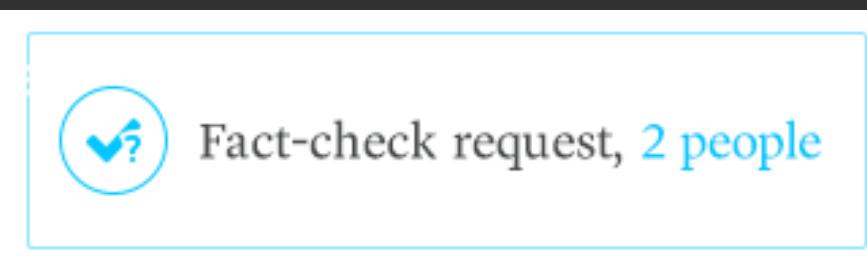
request
fact-checking



do
fact-checking



read w/ fact-
checked result



Budget Data Processing Pipeline

Open Government Data



- opengov.seoul.go.kr
- 76% of all internal documents publicly accessible
- 2014: \$24B,
13 1st level categories,
4629 individual programs

Article Text Analysis



- Article text parsing
- Category detection
- Program suggestion
- Monetary value detection

Evaluation: with Factful...

- H1. Readers will discuss with more fact-based statements.
- H2. Readers will discuss with more evidence, and more kinds of evidence.
- H3. Readers will become more critical about the article.

Evaluation Setup

Between-subjects, 38 participants

Baseline

Commenting

Fact-checking
only

Commenting

Fact-checking

Factful

Commenting

Fact-checking

Contextual Info

Tasks and Procedures

Pre-Q → Read → Discuss → Post-Q

Three articles about Seoul's budget & policies



Discourse Analysis

- 404 comments
- Discussion coding:
each comment is coded with
one of the 25 categories
[Unweighted Cohen's κ : 0.613]

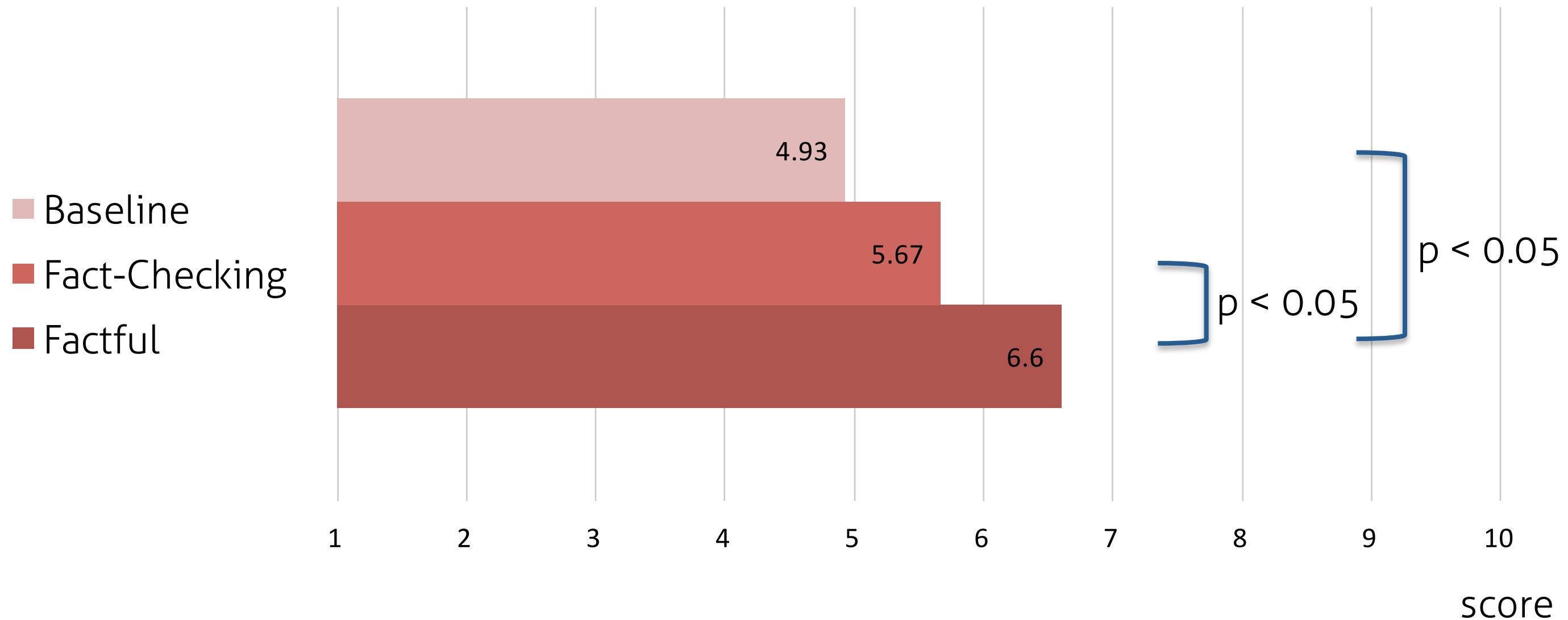
1. **Topic:** Budget, Policy, Others
2. **Intention**

Opinion	w/ objective basis
	w/ subjective basis
	w/ no basis
Information	new & verifiable
	confirming existing
	unverifiable
Question /Info request	objective
	subjective
Simple statement	

Discussion Quality Assessment

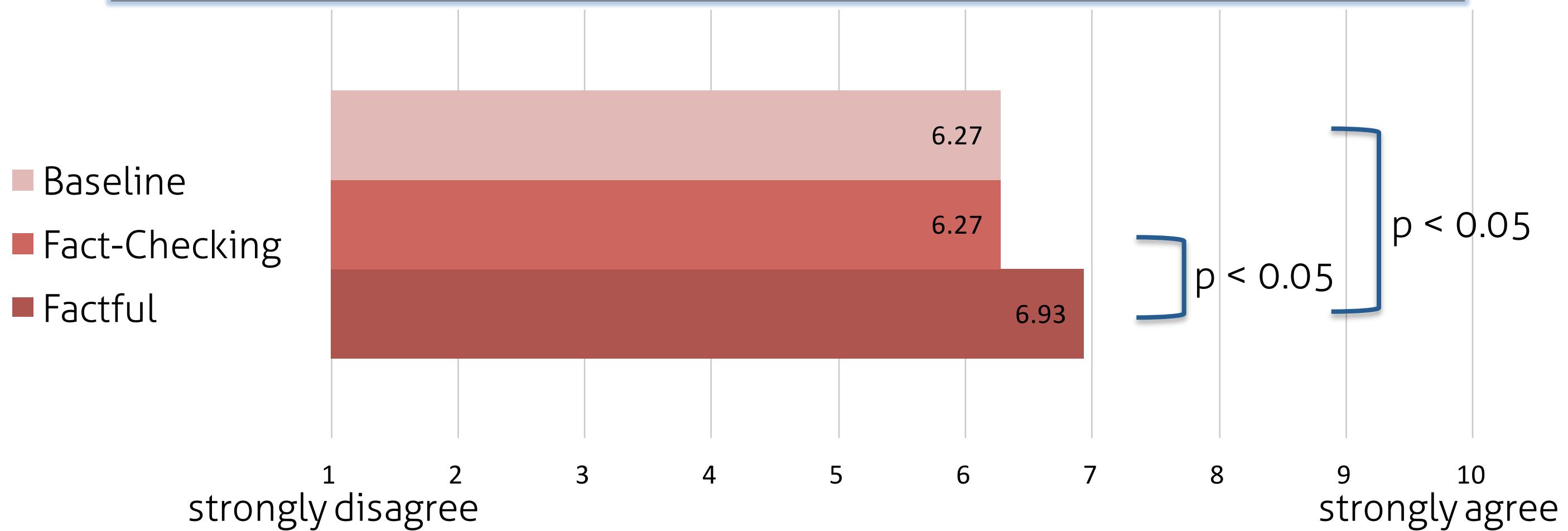
- 5 external raters
- 10 questions about discussion quality (score between 1-10)
 - Overall quality
 - Criteria derived from deliberation lit. [Fishkin & Luskin, 2005]
informed, balanced, conscientious, substantive, comprehensive

With Factful, overall discussion quality was higher.



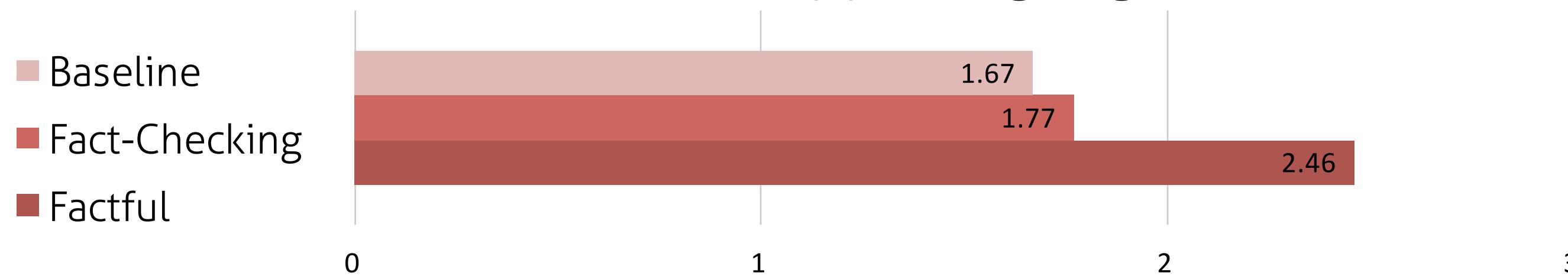
H1. With Factful, discussions contained more relevant, accurate information.

Discussants participated in the discussion with more relevant, accurate information.

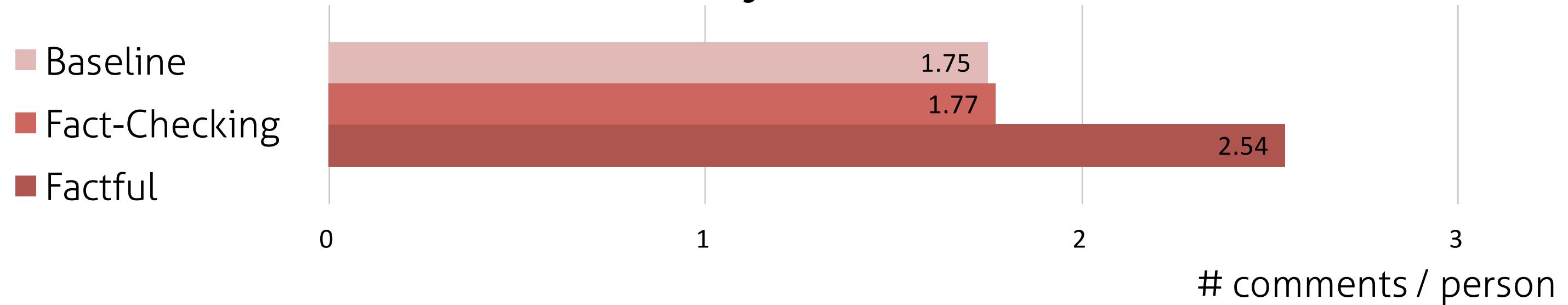


H1. With Factful, participants added more fact-oriented comments...?

comments with objective supporting arguments

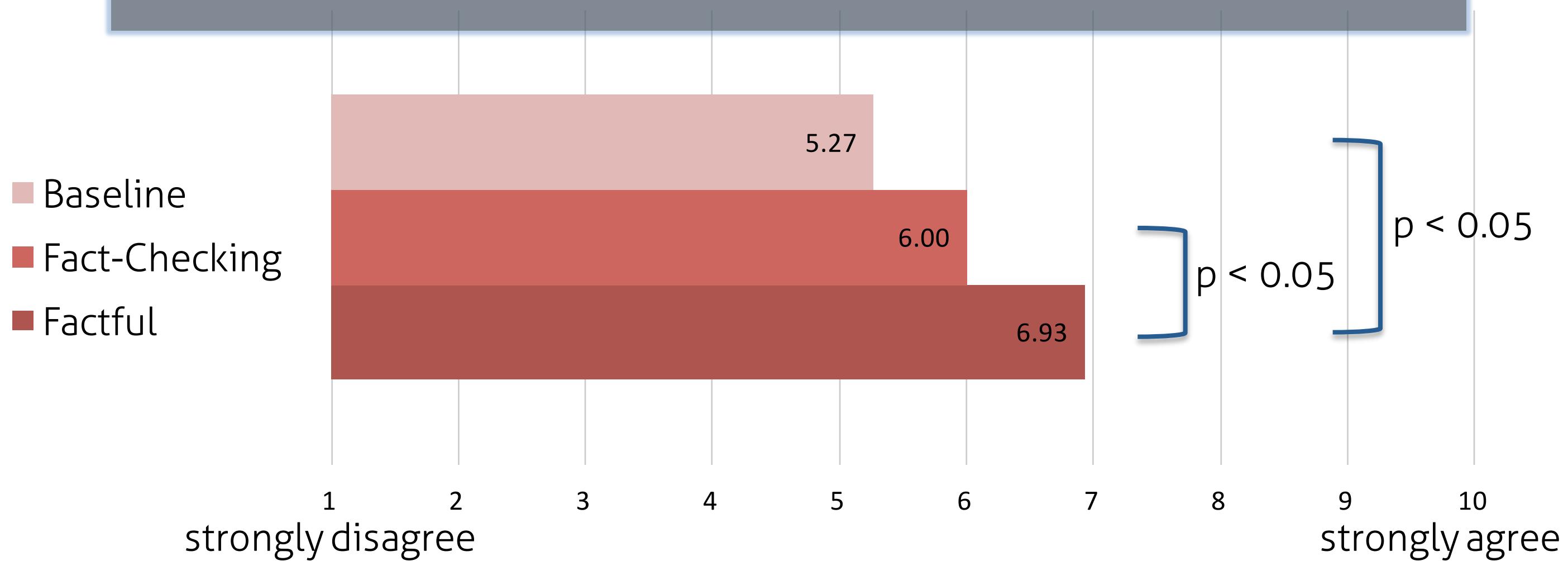


comments that asked for objective information



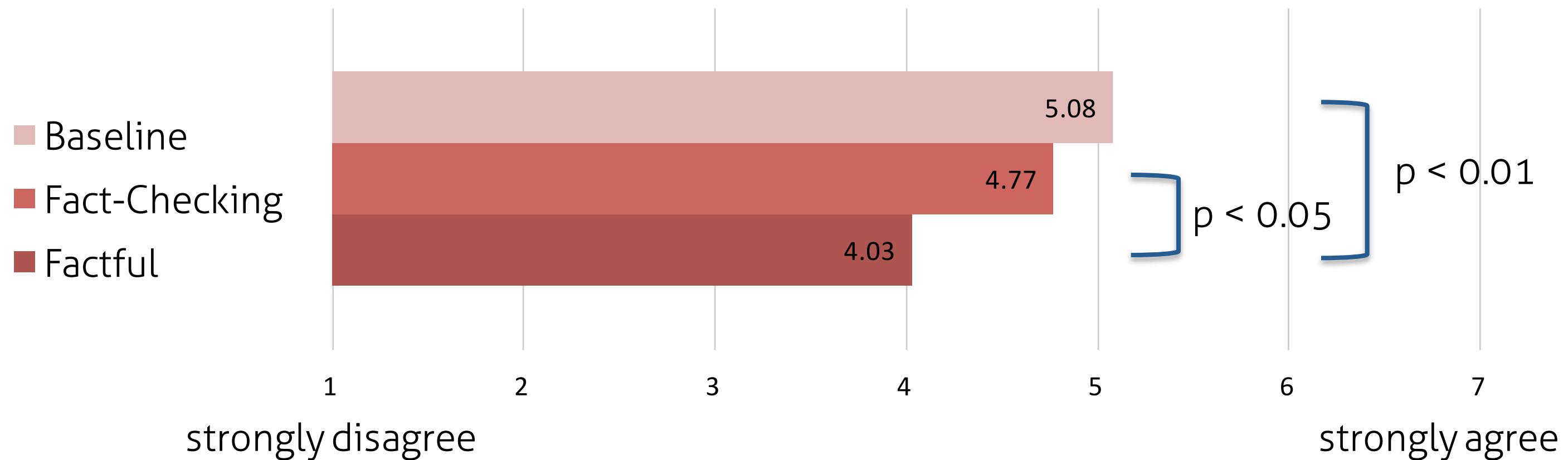
H2. Factful discussions contained more diverse perspectives and supporting evidence.

Discussants participated in the discussion with more diverse perspectives and supporting evidence.



H3. With Factful, participants became more critical about the article.

I trust the content of the article.

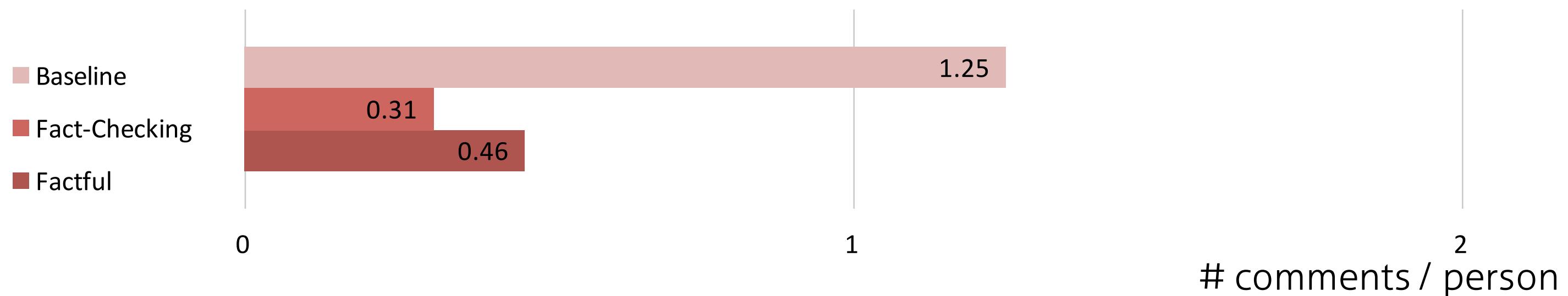


H3. With Factful, participants held a more critical view on the article.

comments criticizing the article

- 0.8 / person in Factful vs 0 in Baseline

comments criticizing other participants



Role of Contextual Information

Automated annotations w/
similar sized programs

*“Without such information,
it would be hard to
determine if the given
government spending is
worth or not.”*

Category overview

*“It made reading through
the article easier, because
the budget terms and
numbers in the article
felt less obscure.”*

Future Work

- Live deployment
- Crowdsourced fact-checking methods
- Generalization
 - different countries
 - other datasets

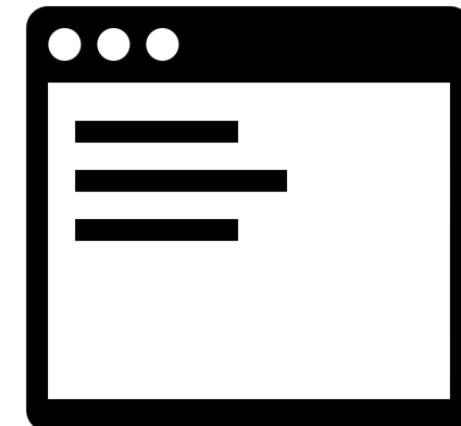


Data-driven, social, crowdsourced mechanisms

Improve awareness & understanding of budgetary issues



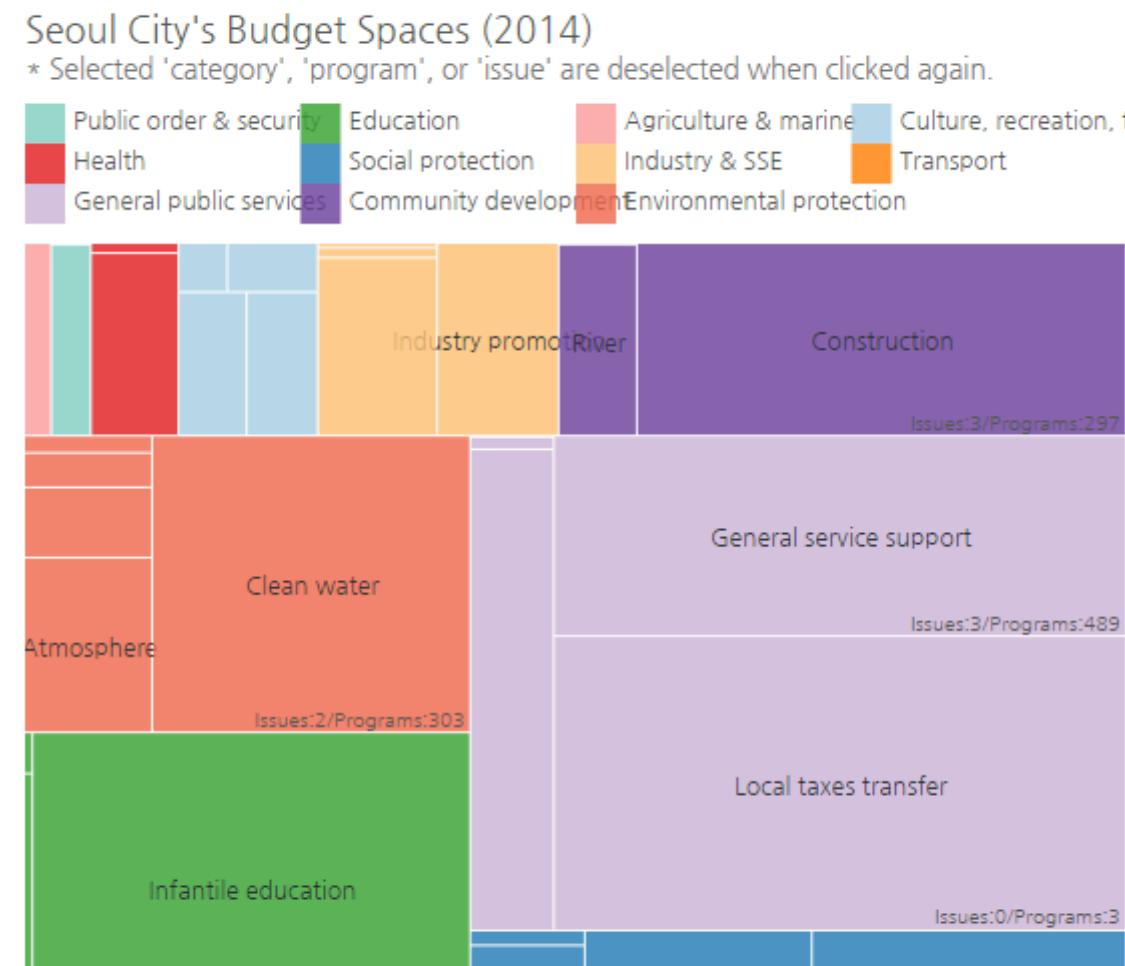
Build interactive systems for civic engagement



Leverage open government data



BudgetMap: Issue-Driven Budget Navigation



Programs List (3142 entries)

Enter a program.	Search
Ajustment grants	
Local education transfers	
Fiscal compensation	
Local tax transfer	
Human resources (overall)	
Infantile care (subsidized)	
Basic senior pensions	
Medical care assistance	
Special accounts fund: Loan support	
Special accounts: City development transfers	
Basic living securities	
Special accounts: Traffic transfers	
Special accounts: Medical care assistance	
Special accounts: Urban railways (city develo	
Transportation industry oil price support	

Total Budget Space (2014)

Seoul city's total budget (2014)

Programs count: 3142
Total budget : USD 26.4 B

Tips for tagging programs to issues

1. Choose an issue and click on related program.
 2. Zoom in by clicking legends.
 3. Search for programs by keywords.
- * Still difficult? Then choose an issue and click "Explore Budget challenge"

+ Add Issue

All social issues (3 entries)

Security
Accumulated: USD 2.90 B
Related: 97

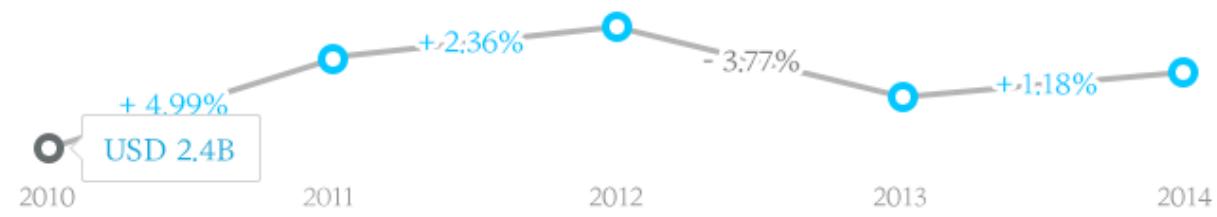
BudgetMap: Issue-Driven Navigation for a Government Budget.
Nam Wook Kim, Chang Won Lee, Jonghyuk Jung, Eun-Young Ko, Juho Kim, Jihee Kim.
CHI 2015 Extended Abstracts.



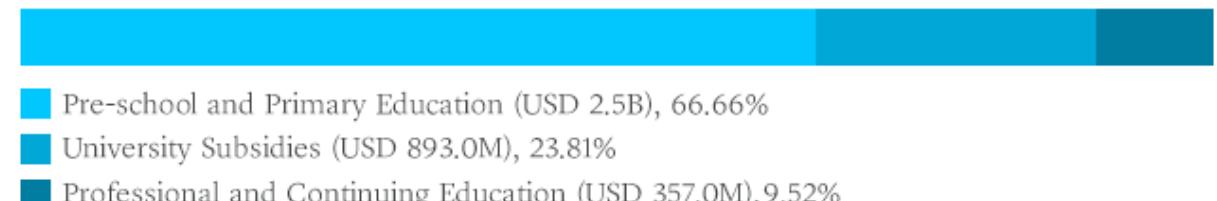
Factful: Engaging Taxpayers in the Public Discussion of a Government Budget

Below is an article related to the "Education" budget for the city government of Seoul

Budget changes over time



Detailed budgets of the "Education" for this year



The political debate over the Seoul Distribution Center for Environment-friendly Food, which [the Seoul metropolitan government] has built to provide environment-friendly school meals, is heating up. The conservatives claim that there are many operational issues such as [wasting tax money by purchasing agricultural goods at prices higher than market prices]. On the other hand, the liberal side, in-

Related Seoul City's Programs

[Construction of an Eastern Distribution Center for Environment-friendly Food](#)

Category: Education > Pre-school and Primary Education
2014 Budget: USD 5.0M
Total Budget: USD 10.0M

[Environment-friendly School Meals Promotion](#)

Category: Education > Pre-school and Primary Education
2014 Budget: USD 279.0K
Total Budget: USD 1.8M

[Environment-friendly Free School Meals Subsidies](#)

Category: Education > Pre-school and Primary Education
2014 Budget: USD 149.0M
Total Budget: USD 756.7M

[Environment-friendly School Meals Farm-to-Table Monitoring Program](#)

Category: Education > Pre-school and Primary Education
2014 Budget: USD 125.8K
Total Budget: USD 620.2K

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POLICY MAKING AS A PUBLIC-DRIVEN PROCESS


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