

# The Gamma

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## ABSTRACT

TBA

## INTRODUCTION

some background

### Example

put some screenshot here?

### Our Approach and Contributions

We present blah blah. Our contributions are:

- Novel language design based on design principles
- Open source implementation on the web with cool use cases
- Critical evaluation

Long-term goal of making journalism better

## RELATED WORK

**Visual tools.**

**Programming tools.** Notebooks

**Journalism.** Idyll

## OVERVIEW

some walkthrough illustrating thegamma with code and screen-shots

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## DESIGN PRINCIPLES

TheGamma is based on design principles that we identify in this section. We start by careful consideration of our target application domain, i.e. data analyses of open data produced by journalists and published by online media. By considering the users, challenges and typical scenarios in this domain, we derive more technical design principles for our system.

### Principles addressing challenges in journalism

Modern journalism faces many challenges [todo: cite something]. There are many responses to those challenges. To develop a new kind of trust, journalists are increasingly presenting not just outcomes of their analysis, but also the process they used. To develop relationship with readers, journalists are increasingly looking for meaningful ways of engagement. Those developments inform the following design principles of TheGamma system. [todo: rewrite this with more references]

**A1. Trust through transparency.** The system should allow fact checking of the analyses to build trust. This means that viewers should be able to determine what is the source of analysed data and how has the data been transformed.

**A2. Opening the process.** Journalists are increasingly opening the way they work to readers in order to build trust. The ability to view how an analysis has been constructed should not be limited just to experts (say, by running a Jupyter Notebook), but should be available to all interested readers.

**A3. Providing meaningful engagement mechanism.** The system should provide a mechanism through which readers can engage in a meaningful discussion. For example, it should allow modifying parameters of a data visualization in order to show how, e.g. different choice of countries affects the result.

### Principles for open data journalism tool design

One important observation from the above list is that our tool should be accessible to non-expert users such as readers and non-technical journalists, while providing extra capabilities for more technical users. It should be easy to use if one just wants to modify existing code and should encourage experimentation. Considering these challenges, we identify the following technical design principles. [todo: There must be papers on learning programming that can be referenced here.]

**B1. Learning from examples and by experimentation.** We should support two ways of learning. Users of tools such as spreadsheets often learn by looking at existing problem solutions [todo: Advait's PPIG]. Our design should allow this by making it possible to inspect and retrace steps used while solving a problem in an existing application. Another principle of spreadsheets that we want to keep is the ability to experiment and see results immediately. Our design should allow users to try invoking an operation or modifying a parameter and quickly see if this leads to the desired results.

**B2. Choice over construction.** To minimize the amount of information that users have to learn and remember, our system should work in a way that allows constructing programs by choosing from options that can reasonably appear in a current context, rather than requiring users to recall particular syntax or exact identifier name. [todo: recognition over recall?]

### B3. Make simple things easy and complex things possible.

Some users of the system may, over time, become advanced users and the system should support those. In other words, the upper bound on what can be achieved should be well above the most common use cases. At the same time, the complex features that power users might need should not affect the most elementary uses of the system and should remain completely hidden until needed. In other words, the lower bound on what one needs to know to use the system for basic tasks should be as low as possible. [todo: I think I got this idea of "boundaries" on what is possible from some paper, but cannot recall which...]

**B4. Visibility of state.** To support transparency, the system should make its entire state transparent – when reviewing a data analysis, all parameters should be immediately visible and the user should not need to, e.g. navigate through complex user interface to find them.

## SYSTEMATIC DESCRIPTION

Describe in some more systematic detail how things work

### Language

### Type providers

## DESIGN PRINCIPLES EVALUATION

Evaluate the system with respect to the design principles

## SYSTEM EVALUATION

More discussion and evaluation, featuring some numbers and case studies

### Something measurable

### Case studies

### Scalability

## DISCUSSION

### Study limitations

exploratory in nature so we do not make any quantitative claims about effects

not comparing against other systems

### Design principles

How well did we do wrt design principles?

### Design issues

future challenges and limitations of the model - such as issues when modifying code in the middle of the call chain

TODO: Add evaluation according to the evaluating systems paper list