

Input Data Comics: Exploring a Narrative Approach to Input Visualization

Ze Zhong Wang*
Simon Fraser University

Sheelagh Cpendale†
Simon Fraser University

ABSTRACT

We explore input data comics as a medium to foster active engagement with data input through visual storytelling. They integrate the richness of human experience, narrative, and visual communication into the data collection process, producing contextualized narratives. Through three examples, we illustrate how input data comics foster engagement, support interpretation, and create space for participatory storytelling experiences between the comic creator and the audience. We explore seven purposes through which input data comics can transform data into participatory and reflective experiences. These purposes parallel those of input visualizations: Individual Reflection, Public Group Reflection, Public Activity Documentation, Data Discussion, Survey, Planning, and Organizing. This suggests the broad potential applications of input data comics in the future.

1 INTRODUCTION

Traditionally, information visualization has centered on uncovering insights from existing datasets. Most contemporary techniques operate under the assumption that data is already available, objective, and ready for analysis. However, this “data-first” paradigm has been increasingly questioned by approaches that view data not as discovered, but as constructed. The concept of *capta*—from the Latin *capere* [5], meaning “to take”, highlighting that data is not simply given, but taken: actively selected, shaped, and contextualized by the individuals and systems involved in its collection. This process is inherently influenced by tools, intentions, environments, and biases. As a result, meaning-making from data is not fixed; it is shaped by context, memory, emotion, and perspective.

In response to this shift from viewing data as objective to recognizing it as constructed and context-dependent, input visualizations have emerged to emphasize participation as the starting point of data creation [3]. Echoing this shift toward contextual meaning, visual data storytelling [8, 6], for example, data comics [12, 1, 10, 2] have gained traction as an expressive format that combines the sequential art style of comics with visualizations and narratives to make data more accessible and engaging. Participatory input, visualization, and expressive narrative formats reflect a growing recognition that data gains additional depth and relevance when understood in relation to the people, contexts, and interpretations that shape it.

We define input data comics as *interactive visual narratives that invite input to co-construct, contextualize, or make sense of data*. Like input visualizations, input data comics shift the focus from telling stories purely based on pre-existing datasets to engaging people in the generation, interpretation, and reframing of data. Input data comics invite user input—quantitative or qualitative—through reflection, emotional response, self-reporting, or branching choices. This input may influence the visual narrative or be used to frame or analyze the viewer’s contributions in context, allowing for more situated, personal, or participatory interpretations

*e-mail: wangzezhong2016@gmail.com

†e-mail: sheelagh@sfu.ca

of data. Rather than being passive recipients, readers become co-authors in shaping both the story and the meaning of the data. Input data comics thus support co-creative storytelling, while also serving as a medium for reflexive, situated data analysis.

In this paper, we explore the concept of input data comics through three examples created by the authors in prior work [9, 11]. We examine the potential of input data comics through the lens of the seven purposes of input visualizations [3]—Individual Reflection, Public Group Reflection, Public Activity Documentation, Data Discussion, Survey, Planning, and Organizing—highlighting relevant use cases and outlining directions for future research in this emerging field. By combining the participatory nature of input visualizations with the storytelling power of data comics, input data comics make the act of “taking” data visible, reflective, and collaborative.

2 EXAMPLE FEATURES OF COMICS AND DATA COMICS IN ENHANCING INPUT DATA

Comics and data comics incorporate a wide range of narrative and visual techniques. In the context of input data comics, certain features are particularly well-suited to support data entry, personal engagement, and narrative interpretation. Drawing on the studies of comics [7, 4], prior research in design patterns for data comics [2], and the author’s own experience designing interactive data comics [9], we highlight a set of features to lay the foundation to explore the potential to support input and co-created storytelling experience. We group example features into three categories: temporal control, visual reasoning, and media flexibility.

Comics begin by offering a strong *narrative* foundation, allowing prompts to be embedded within story contexts, character interactions, or metaphorical environments. This narrative framing encourages participants to view their responses as part of a broader personal or collective story, rather than isolated data points. By anchoring data entry in story, comics invite participants to reflect on why their input matters, building emotional and conceptual engagement from the outset (Narrative).

Once participants are drawn into the comic, the form’s inherent *sequencing* (i.e., panel-by-panel progression) supports a deliberate, structured flow through the input process. This organization allows designers to choreograph the journey, controlling what is revealed and when, helping participants build understanding gradually (Sequencing).

Simultaneously, comics offer pacing flexibility. Unlike video or audio formats that move at a fixed speed, comics are *self-paced*. Participants can linger on a frame, skip ahead, or revisit previous scenes. This autonomy supports personal reflection and accommodates different speeds of comprehension or decision-making, making the data entry feel more thoughtful and less pressured (Pacing).

Beyond narrative and temporal control, comics provide unique opportunities for *visual explanation*. Abstract data concepts or emotional experiences can be expressed metaphorically, spatially, or through diagrammatic visuals embedded in scenes. This visual reasoning layer allows participants to better understand what is being asked, supports accessibility, and enables more intuitive or expressive responses (Visual Explanation).

A further strength of the comic layout is the ability to present multiple responses in shared visual space, enabling *comparison*. Participants might see their past responses alongside current ones,

or their input placed next to that of others. These juxtapositions can highlight changes, patterns, or divergences, fostering reflective engagement with one’s own data or the collective picture (Comparison).

Finally, comics are adaptable in form and medium. Their *flexibility* allows them to exist as printed zines, touchscreen interfaces, or augmented physical installations. Input methods can be tailored—from typing and drawing to dragging tokens or using sliders—making input data comics versatile tools for a range of audiences and settings, from public exhibitions to classroom studies (Flexibility).

These example features illustrate how input data comics can foster engagement, support interpretation, and enable participatory data experiences.

3 INPUT DATA COMICS: THREE EXAMPLES

3.1 Flights and CO₂ Emissions

This input data comic prompts readers to enter the number of flights they took in 2019, initiating a chain of personalized *visual explanations*. Upon submission, the input is immediately visualized through multiple narrative scenes. For example, CO₂ emissions are represented using abstract metaphors like the number of orbits around Earth and symbolic icons such as airplanes and trees. These visual abstractions help situate personal data within meaningful environmental contexts.

To deepen understanding, the comic offers three interpretive scenes: one comparing emissions to the global per capita average, another converting emissions into the number of trees required to offset them, and a third framing them in terms of cow-produced greenhouse gases. These alternatives are generated based on input but follow fixed author-designed paths, creating a structured yet adaptive experience. The layout places these scenes side by side, allowing the viewer to consider multiple comparisons at once (*Comparison*).

Throughout, the comic’s tone and structure aim to make the implications of one’s data personally resonant, encouraging contemplation of environmental responsibility and potential behavior change.

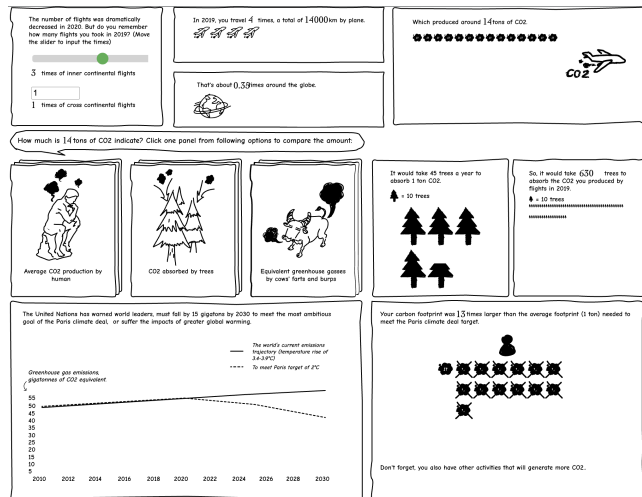


Figure 1: Flights and CO₂ Emissions: Screenshot showing the branch selected for “CO₂ absorbed by trees.” (The comic is created by @Zezhong Wang in [9].) View the interactive version at <https://hugoromat.github.io/interactiveComics/library/dist/CO2.html>.

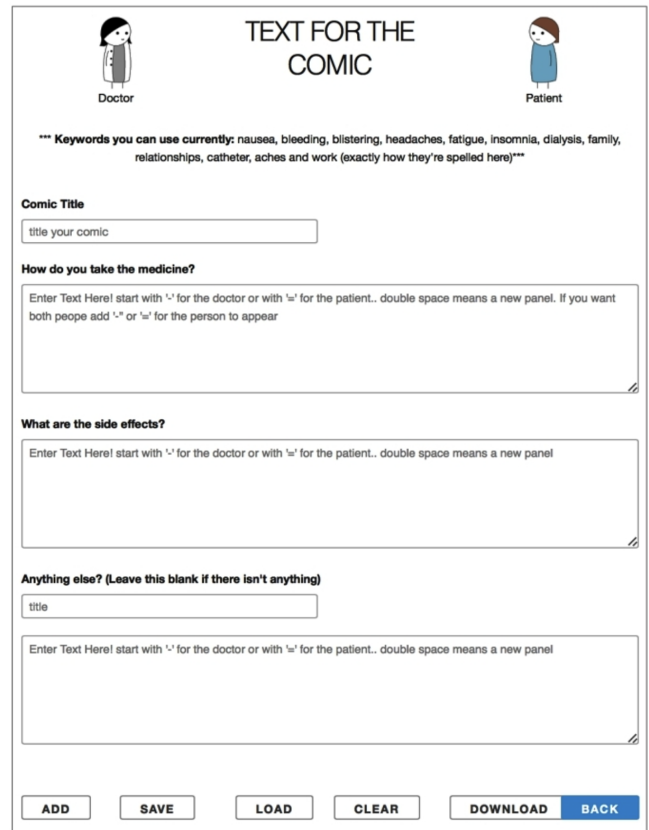


Figure 2: Above: Screenshot shows the interface of the *Doctor Wants a Comic* prototype [11]. Below: Example panels created from the prototype. (The comic is created by ©Komal Waseem.)

3.2 Dr Wants a Comic

Described as a graphic medicine system, *Dr Wants a Comic* is a tool that transforms medical instructions by healthcare professionals and self-reported experiences by patients into a comic format, intended for clinical communication [11] (Fig. 2). Besides the medical instructions such as daily dosage, the data input by patients is rather qualitative that sharing their experiences of undergoing dialysis, personal stories, leveraging the emotional resonance, symbolic meaning, and narrative power of comics. The stories are created by patients or healthcare professionals who input texts in the text editing box, and then the comics will show up on canvas with predefined characters and dialogues (*Flexibility*). Unlike the *Flights and CO₂ Emissions* example, which has a pre-authored narrative structure, the patient’s input directly shapes the narrative, whether it is used for communication with healthcare professionals, for mutual support within the patient community, or as a shared experience for newcomers (*Narrative*). It uses visual illustrations to explain complex medical contexts (e.g., the process of Hemodialysis) or symptom progression (*Visual Explanation*).

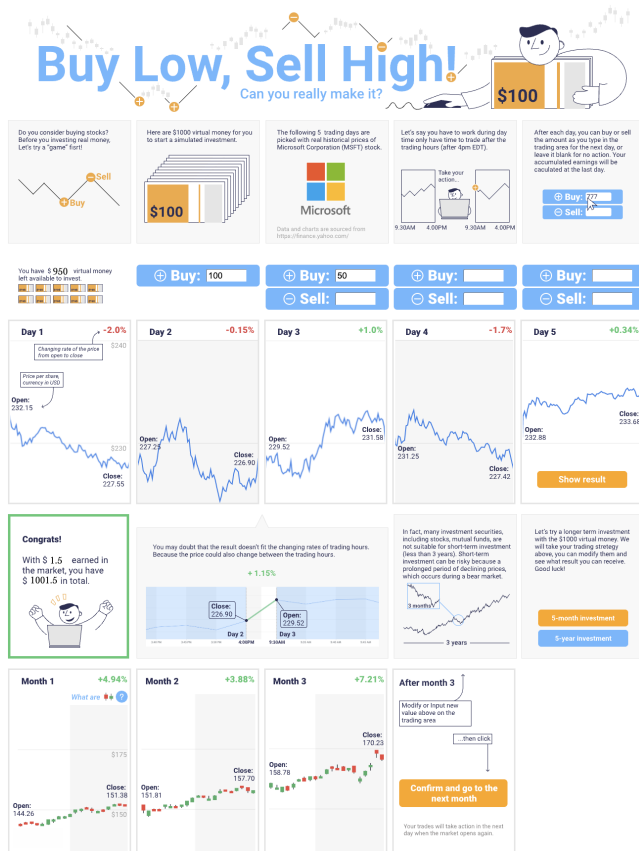


Figure 3: Buy Low Sell High: An input data comic designed to mimic the dynamics of stock market trading. (The comic is created by @Zezhong Wang in [9].) View the interactive version at <https://hugoromat.github.io/interactiveComics/library/dist/Stock.html>.

3.3 Buy Low Sell High

Buy Low Sell High is an interactive data comic game designed to teach financial literacy through trading stock by data input (Fig. 3). This game utilizes sequentially revealed panels to create guided input interactions (*Sequencing*). \$100 token is given to trade, “buy” or “sell” actions are taken via data input, then a button needs to be pressed to show the stock price of the following day (*Pacing*). *Visual explanations* are embedded to provide reading guidance for interpreting the candlestick bar chart, and explaining events causing dramatic changes in stock price.

The gradually revealed comic panels and integrated visual explanation allow viewers to review their financial decisions and their simulated consequences within the comic’s narrative. This example suggests that input data comics have untapped potential in educational and training contexts, particularly for complex, decision-based scenarios where understanding the consequences of actions is crucial.

4 EXPLORING INPUT DATA COMICS THROUGH THE SEVEN PURPOSES OF INPUT VISUALIZATION

The framework of the seven purposes of input visualization, as identified by Bressa et al. [3], provides a lens through which to explore the diverse potentials of input data comics. By aligning the unique capabilities of comics with these established purposes, we envision how input data comics can serve a wide array of data collection, modification, and interaction objectives, fostering deeper

engagement and more meaningful insights.

4.1 Individual Reflection

Purpose: *Individual Reflection focuses on personal data collection by an individual to support self-knowledge [3].*

Application to Input Data Comics: Input data comics can facilitate individual reflection by allowing personal data input (e.g., health metrics, daily activities, financial choices) and immediately see how this information is visually represented as a personalized narrative (*Narrative & Visual Explanation*). For instance, one can track their daily mood by inputting their emotional state, and the comic could depict a character’s evolving expressions or surroundings based on this input, fostering self-awareness.

4.2 Public Group Reflection

Purpose: *Public Group Reflection allows multiple people to collectively reflect on a topic. The data collection process is asynchronous and focuses on gathering subjective judgements like sentiments, opinions, or shared observations [3].*

Application to Input Data Comics: Input data comics can be designed to support asynchronous collective reflection within a group. Participants can contribute data or opinions over time (*Sequencing & Pacing*), and the comic dynamically updates to reflect the aggregated or individual contributions of the group. For example, the example *Flights and CO₂ Emissions* (Sec. 3.1) can be expanded to support Public Group Reflection by enabling individuals to see their personal data in a broader societal context, thereby fostering collective awareness and responsibility. Similarly, a comic could illustrate different community opinions on a proposed development, with each panel evolving as more input is received. The visual narrative can highlight areas of consensus or divergence (*Visual Explanation & Comparison*), fostering constructive discussion among participants, even when they are not interacting in real-time.

4.3 Public Activity Documentation

Purpose: *Public Activity Documentation examples document ongoing group activities. The data collection process is synchronous and focuses on accumulating time and activity data [3].*

Application to Input Data Comics: For synchronous group activities, input data comics can serve as a dynamic and engaging record. As participants engage in an activity such as a collaborative workshop, a public art installation, or a citizen science project, their contributions or progress can be fed into the comic in real-time (*Sequencing & Narrative*). Similar to the approach for doctors giving medical instructions using the *Dr Wants a Comic* tool (Sec. 3.2). This creates a live visual narrative of the event, documenting collective effort and outcomes. For instance, in a collaborative brainstorming session, each idea contributed could manifest as a new panel or a character’s thought bubble, visually building the collective output. The sequential nature of comics naturally represents the flow of an activity over time, making the process more transparent, engaging, and memorable for all involved. This can transform a simple record into a compelling story of collective action.

4.4 Data Discussion

Purpose: *Data Discussion examples operate asynchronously and allow ongoing collective discussions mediated by the input visualization [3].*

Application to Input Data Comics: Input data comics can act as a medium for ongoing collective discussions around data. People can input their perspectives, arguments, or additional data points, and the comic can visually integrate these contributions, providing a shared context for dialogue. The visual metaphors, characters, and narrative within the comic can help to humanize complex

data, making it more relatable and encouraging broader participation in data-driven conversations (*Visual Explanation & Narrative*). For example, a comic could present a data-driven argument, and viewers could add their counter-arguments or supporting evidence through new panels or speech bubbles, fostering a dynamic and visually rich debate.

4.5 Survey

Purpose: *Survey examples aim to collect data from a group of people. The existing data is hidden during input and only shown afterwards, reducing the likelihood that prior entries will influence the data currently being collected [3].*

Application to Input Data Comics: Input data comics can revolutionize traditional surveys by transforming them into more engaging and interactive experiences. Participants can provide input through comic panels (*Sequencing & Pacing*), where their responses immediately influence the unfolding narrative or visual representation within the comic (*Visual Explanation & Narrative*). The principle of hiding existing data during input can be maintained, with collective results revealed only after submission, making the process more playful and encouraging honest responses. This approach can potentially increase survey completion rates and yield richer qualitative data due to the immersive and less formal nature of the interaction.

4.6 Planning

Purpose: *Planning examples often bring an explicit focus on time and logistics, helping people make sense of ongoing time use, develop plans, and forecast future events [3].*

Application to Input Data Comics: Input data comics can serve as visual planning tools, especially for tasks involving time and logistics. People can input their schedules, preferences, resource allocations, or task dependencies, and the comic could visually represent the plan, highlighting potential conflicts, bottlenecks, or opportunities. For example, a comic could help an individual plan their daily routine, with each panel representing a time slot and characters performing the planned activities (*Sequencing & Pacing*). For group planning, a comic could visually map out project tasks, deadlines, and team member responsibilities, making project management more collaborative (*Visual Explanation*). The visual-narrative structure can guide the planning process.

4.7 Organizing

Purpose: *Organizing examples focus on sorting and categorizing, often allowing viewers to change data points, attributes, or even data dimensions [3].*

Application to Input Data Comics: Input data comics could assist in sorting and categorizing information. Viewers can interact with comic elements such as characters, objects, or panels to classify data points, assign attributes, or even rearrange visual elements to create new organizational structures (*Flexibility*). The visual and spatial arrangement within comic panels can provide an interface for organizing datasets. For instance, like sorting toys into different boxes, a comic could present a collection of items, and viewers could drag and drop them into different panels representing different categories. This could be used for tasks like categorizing research findings, organizing personal collections, or structuring information for presentations, transforming a potentially tedious task into a playful experience.

5 CONCLUSION AND FUTURE WORK

Input data comics represent a compelling and innovative medium at the intersection of participatory visual storytelling and contextualized data visualization. They offer a narrative-driven medium that links personal stories to collective and big data, enabling new ways of co-creating and interpreting information. We have highlighted

how example features of comics, including guided reading order, self-paced interaction, integrated visual explanations, synchronized presentation, and hybrid media, imply huge potential to enrich the process of data input, interpretation, and reflection.

Our exploration through the lens of the seven purposes of input visualization demonstrates the broad applicability of input data comics. Ranging from fostering individual self-knowledge to facilitating public group reflection, documenting collective activities, mediating data discussions, revolutionizing surveys, streamlining planning processes, and simplifying data organization, input data comics offer a versatile and engaging platform. They promote people to actively engage in their data narratives, fostering deeper understanding, emotional connection, and more meaningful engagement with complex information. As we move forward, further research and development in this area are crucial to explore new interaction paradigms, input narrative structure, refine design patterns, and study their long-term impact on data literacy and public engagement.

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