If you had 5 seconds to read a story, which would you read first?

A.

Manchester City returned to form with a deserved victory over Sunderland thanks to goals from Aleksandar Kolarov, Sergio Aguero and James Milner.

The Premier League champions had won just one of their previous six matches in all competitions but were fine value for this victory.

Kolarov's free-kick gave City an early lead and substitute Aguero made it two with a neat finish after half-time.

Milner's set-piece was deflected in by Craig Gardner to seal the points.

Roberto Mancini's men had numerous chances to improve the scoreline but they will be delighted with the result.

It was City's first clean sheet of the season and moves them up to second in the table, four points behind leaders Chelsea.

Mancini admitted the quick turnaround from Wednesday's Champions League draw with Borussia Dortmund was "a problem".

But despite making seven changes to the line-up, his side had little trouble inflicting a first loss of the season on Sunderland.

One of those changes saw Carlos Tevez come into the side and it was a menacing run from him that led to the opener.

The Argentine surged down the left only for Carlos Cuellar to arrive with a reckless challenge.

Left-back Kolarov stepped up to curl an unstoppable free-kick past Simon Mignolet at his near post - the in-form Serb's fourth goal in five games for club and country.

It was the first time Sunderland had gone a goal behind this season and they briefly pressed forward in an attempt to hit back.

Stephane Sessegnon volleyed over but the visitors lacked creativity and Steven Fletcher found himself isolated up front.
City were dominating possession and Mignolet denied Pablo Zabaleta before Tevez screwed wide from the follow-up.

The one team to come away from Etihad Stadium last season unbeaten were Sunderland - they drew 3-3 having led 3-1 after 85 minutes - and it was inevitable they would improve after half-time.

Sebastian Larsson began to find more space and his floated cross was volleyed towards goal by Fletcher, only for the excellent Micah Richards to arrive with a crucial block.

But as Sunderland improved, so did City, and the Black Cats' greater ambition made for a more open and expansive encounter.

Toure saw a powerful drive tipped over the bar after David Silva's superb flick and Danny

B.

In the digital age, teens and young adults spend more time online but less time truly consuming news. News readers are placing higher preference on scannable, shorter chunks of data instead of longer articles, but do so at the expense of losing context and the overall narrative of the story.

To increase young adults and teens' awareness and interest in current events, a novel yet familiar medium can be explored: comics.

Creating high-quality comic strips is not easy for everyone because it requires a comprehensive knowledge of the topic at hand. In addition, it requires storytelling and artistic skills, both which require years of practice to perfect.

Making comic strips can be simplifed with technology. Online comic makers like BitStrip.com have already began exploring the possibility of removing the artistic requirements by providing premade templates and visual components for the user to piece together.

We want to take online comic makers one step further by designing an online community of people who come together to make comics based on existing news articles. This results in creative, informative content that can be harnessed in a practical and socially useful way.

Existing Research & Projects

CrowdForge

CrowdForge is a research project that delves into crowdsourcing complex tasks by building an open-source framework to organize the task breakdown structure. The research revealed that high-quality results can be obtained by breaking down a complex task, such as writing a product comparison table, so that each contributor only needs to tackle a simpler subtask.

The idea of breaking down complex tasks from CrowdForge can be applied to comic creation, which traditionally requires various skills like storytelling and drawing.

Kittur, A., Smus, B., Khamkhar, S., & Kraut., R. 2011. CrowdForge: Crowdsourcing Complex Work. In Proc. of the 2011 Conference of User Interface Software and Technology, Santa Barbara, CA, October 2011, ACM Press, New York, NY, 43-52.

Parallel Prototyping

Parallel Prototyping research conducted by Steven Dow et al. shows that people who explore multiple options before getting feedback have more creative and diverse solutions than people who receive feedback for only one design. In addition, the contributors who prototyped in parallel became more confident in their own abilities.

The benefits of parallel prototyping can be effectively applied to news comics by encouraging multiple comics for the same article in order to explore different ways to communicate the same information.

Dow, S. P., Glassco, A., Kass, J., Schwarz, M., Schwartz, D. L., and Klemmer, S. R. 2010. Parallel prototyping leads to better design results, more divergence, and increased self-efficacy. ACM Trans. Comput.-Hum. Interact. 17, 4, Article 18 (December 2010), 24 pages.

Expert Interviews

To understand the most reasonable and effective way to create comics, we decided to solicit the perspectives of experts in the field. Interviewing them would also help us identify any typical setbacks in their process that could be accounted for in our design.

Interviews

Professions: 13 editorial cartoonists, 2 comic journalists
Years in profession: 1.5 - 35 years
Nationalities: 12 (Belgium, USA, Italy, South Africa, Spain, Costa Rica, Netherlands, Italy, Argentina, Cuba, Sri Lanka, Ireland)
Age: 28-54

During the interview, we asked about the interviewee's background, the creation process (or lack thereof) that they followed while working on their most recent project, and what they liked and disliked about their profession. Keeping in mind our inability to conduct contextual inquiries over video chat and phone, we asked specific questions about the exact tools that they use as well as any collaborations that occurred. Doing so allowed us to collect a large amount of context-rich data.

Below are some questions we have about your process for creating a cartoon.

Consider the last political cartoon project that you worked on...
What was your process of creating the cartoon, from receiving the prompt from an editor (or thinking of the idea) to submitting the final result?
Did you do research before starting the sketch?
Did you repeat certain steps when creating the cartoon?
Did you think about how to best communicate the story to the viewers?
What are some tools that you used, either on paper or on the computer?

In general...
How long have you been a professional cartoonist?
What do you like about being a cartoonist? What don't you like about it?
Which step of the cartooning process do you find most frustrating? Most repetitive?
Do you collaborate with others on cartoons? How do you feel about collaboration?

There might be follow-up questions for you based on your responses. Please let me know if prefer to not receive those. Thank you for your time.

Above: Example of interview questions that we loosely followed as guidelines.

Expert Interviews: Key Findings

Researching a Topic

What We Learned
The ideation part of the comic creation process is very time-consuming and involves research and idea explorations.

What Comic Circuit Can Do
To help save time, the system can provide easy access to related news articles as well as related comics for the user to research and be inspired by.

Ideating and Executing

What We Learned
Comics artists follow two main steps when creating a comic: ideation and execution. When ideating, the person quickly explores different ways to represent the topic before deciding on one. When executing, the person draws the final version of the selected idea. Some artists do not follow any definite process, and constantly switch back between ideating and executing.

What Comic Circuit Can Do
A system can guide the user through the comic creation process in two distinct steps in order to encourage the user to focus on one task at a time and not be overwhelmed. The user should have the option to skip the first step as well, allowing for creative freedom and a tailoring to the individual's personal process.

Drawing Skills

What We Learned
When the professional has decided on an idea, s/he draws the idea into a comic. Most professionals have already mastered the skills needed to visualize their thoughts on paper and sometimes consider this part of the process time-consuming, irritating, and redundant.

What Comic Circuit Can Do
Since it takes years of practice to become a skilled artist, the system can use premade visual components for non-professionals to piece together into components.

Expression of Creativity

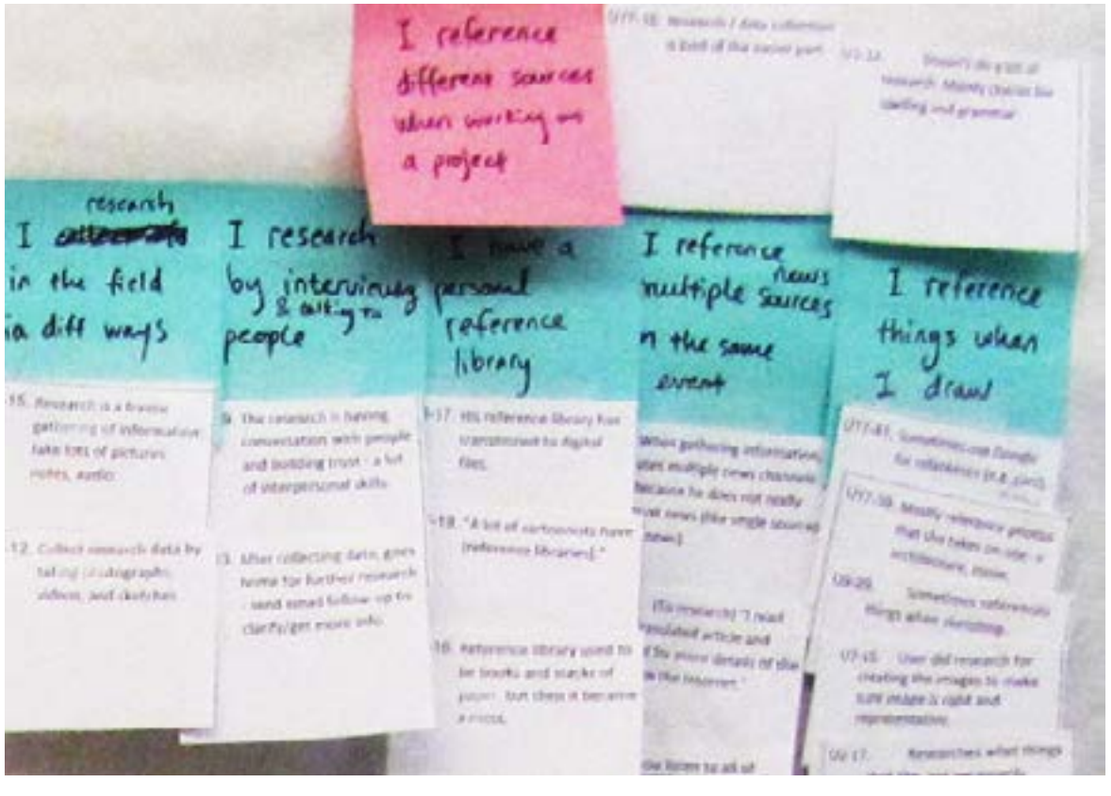
What We Learned
Cartoonists consider the expression of creativity very important in what they do. Some follow personal guidelines to come up with creative and unique work.

What Comic Circuit Can Do
The system should encourage creativity by not limiting the contributor to overly strict guidelines to follow.

Working With Editors

What We Learned
Working cartoonists often work closely with an editor to get feedback and approval on publications. The collaboration is iterative and helps validate the cartoonist's ideas.

What Comic Circuit Can Do
To ensure a high quality published product, the system should have a similar setup of a comic creator working with editors for feedback and improvement.



Personas

"I'm all about new ideas!"

Personal Information
Age: 23
Location: Boston
Education: College graduate, major in Media Studies
Profession: Digital Strategist at GE Healthcare

Goals
- Keep updated on current events
- Utilize and improve her proficiency in digital tools to offset lack of artistic talent
- Contribute her voice and energy to a new media outlets

Jill Catran,
New Media Enthusiast

"History repeats like an impending echo."

Personal Information
Age: 16
Location: Ann Arbor, Michigan
Education: 11th grade in high school

Goals
- Build a solid online portfolio for college applications
- One day attend Vassar University
- Make comics and stories about her favorite history topics to supplement her strong writing abilities in college applications

Alexandra Gutierrez,
World History Buff

"Events in China are very personal to me."

Personal Information
Age: 25
Location: Cupertino, California
Profession: Programmer at a stealth mode startup

Goals
- Know current events outside of his tech bubble
- Know what's going on in China, where most of his extended family lives
- Work hard, get promoted
- Do everything very efficiently

Peter Wu,
International News Reader

"I doodle in class every chance I get."

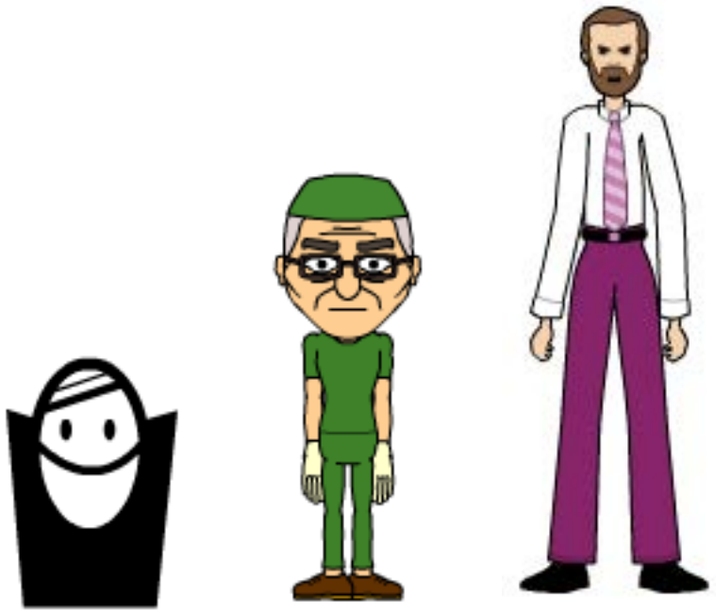
Personal Information
Age: 15
Location: New York, New York
Education: 9th grade in high school

Goals
- Improve his reading comprehension
- Pass reading and writing classes
- Find the next great comic book to read
- Have a creative profession when he grows up

Scott Davis,
Visual Thinker

Design Inspirations

Comic Circuit is inspired by features from several related projects that can be found online or downloaded.



Strip Generator BitStrip Pixton

This Exquisite Forest The Johnny Cash Project

There are several prominent comic creation tools online that we researched and compared. Initially, we were drawn to the simplicity of Strip Generator characters, but soon realized that they were not at the level of fidelity we were looking for to portray figures in news articles.

We then tried BitStrip, which is more powerful and even included premade characters for politicians and celebrities. BitStrip also filtered the comics that people created into different categories, including one for “News/Politics”--a similar concept utilized by Comic Circuit. We prototyped and tested using BitStrip due to its functionality, but found many of the available characters to be jarring and distracting.

Pixton is an even more powerful online comic creation tool that also inspired some of our design features, such as our consideration of the browsing list view layout. Pixton allows customization of very fine details (e.g. a character’s eyebrow positions), which is important for visually conveying emotion in a story.

We conducted research using the above tools, with the knowledge that we still needed to design our own to truly make news articles a primary focus for the application.

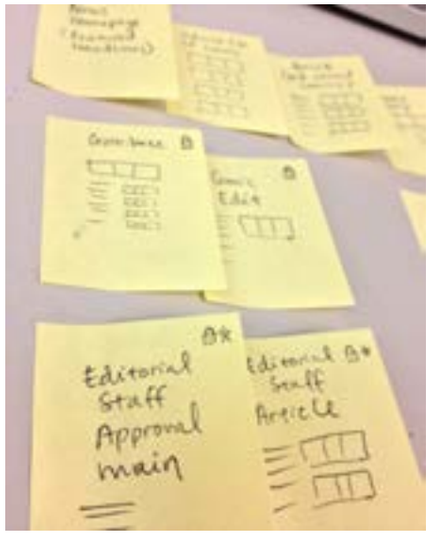
This Exquisite Forest is an online collaborative art project that allows users to create short animations that can be built on by others. Users are encouraged to be creative within the constraints of the theme’s set of guidelines and its existing progress. We were inspired by the piecemeal approach to this project and the successful way it designed the experience of contributing to someone else’s work.

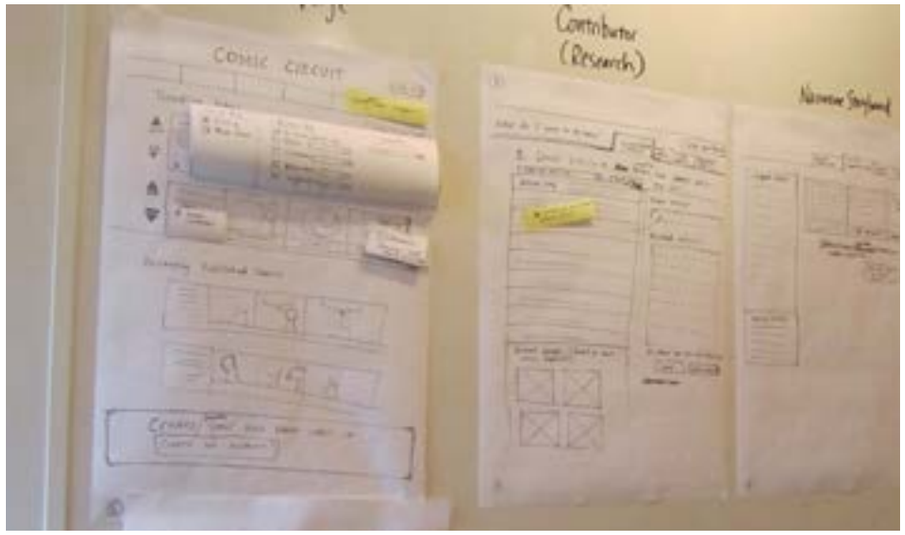
The Johnny Cash Project is another inspiring visual project that involves collaboration. It asks each contributor to rotoscope one frame from a music video, which is later combined with all the other frames to form a cohesive, crowd-generated music video. This demonstrates the feasibility of a crowdsourced visual project, despite the lack of artistic skills.

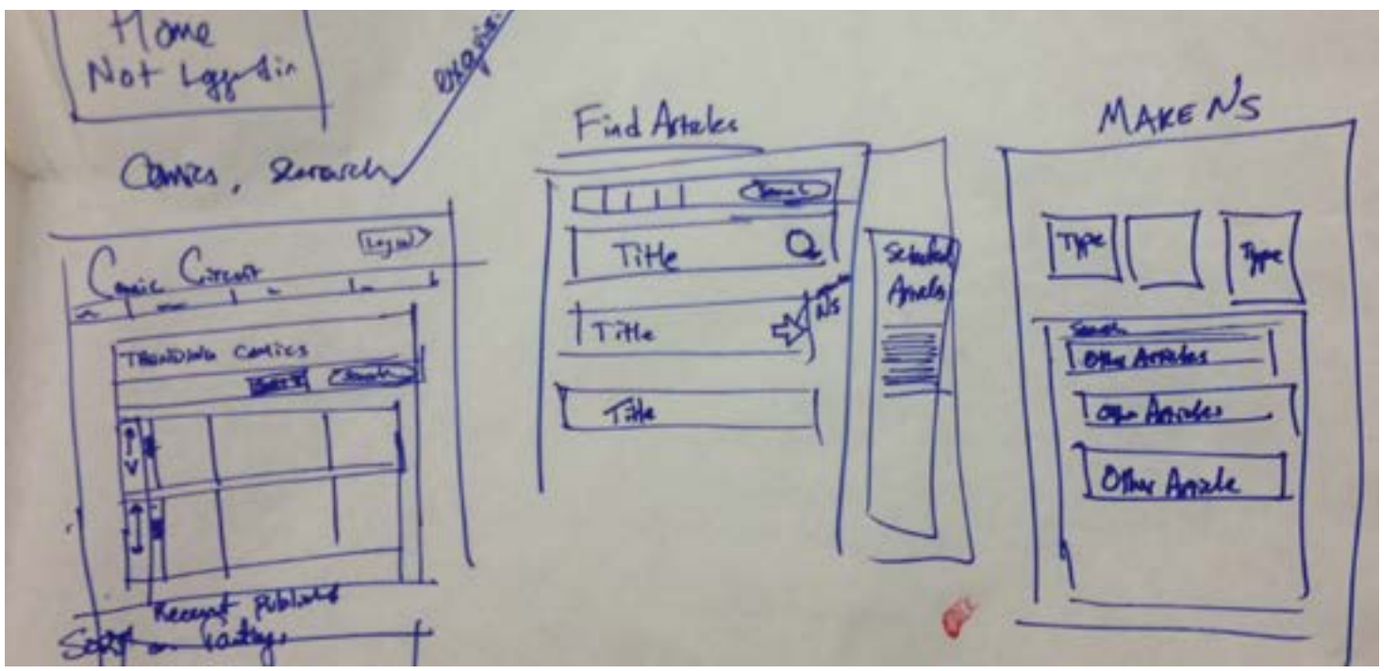
Mid-Fi Prototype

After sketching out ideas and exploring layouts with index cards, we created a mid-fidelity prototype in Balsamiq that could be exported to an interactive PDF for user testing.

Shown below are whiteboard and paper versions of screens in the Balsamiq prototype, such as the one to the right.







User Testing

We conducted user tests using the RITE method (rapid iterative testing and evaluation) and updated the prototype based on feedback from each session.

Tests

Professions: 8 full-time students
Gender: 4 males and 4 females
Age: 17 - late 20s

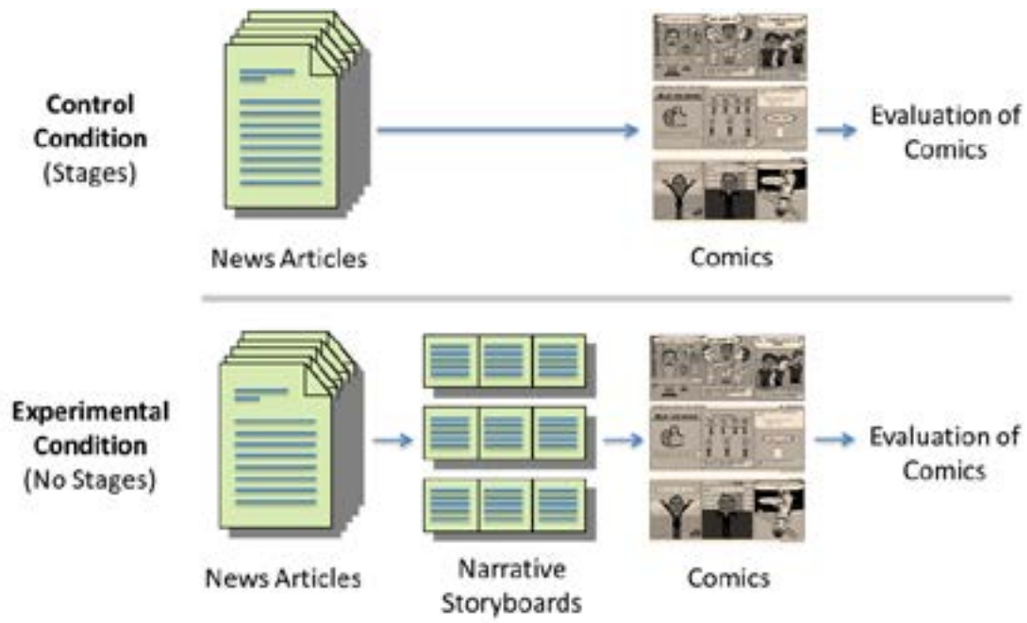
Each participant was asked to think aloud while performing two tasks in the clickable prototype:
1. Find the “Ketamine” article and leave a comment for it.
2. Create your own comic for the article.

Findings

1. Sorting news events by recency is a more intuitive mental model than sorting by popularity.
2. The visual layout of related comics should be consistent across pages.
3. Some people were interested in using the site to create comics, while others claimed they would simply use it to read the news.
   U1 stated: “It’s fun to create comics. I would probably be on here all day just making things!”
   U8 stated: “It’s a cool site. I would use it to read the news, but wouldn’t make my own comics.”

Concept Evaluation

We evaluated the effect of breaking the comic creation process down into stages, inspired by findings from the experts who sometimes struggled with ideating and executing. We conducted crowdsourced experiments on Amazon Mechanical Turk which evaluated the quality of user-generated comics made from various news articles, with or without the use of a middle stage of narrative storyboarding (using text to describe the scene for someone else to build).



Below are examples of 2 of the tasks completed by MTurks. The task on the left was to create a comic based on the narrative storyboard previously made. The task on the right was to evaluate the quality of a crowd-generated comic strip.

Comic Creation Instructions
Read the comic strip description below
Go to www.bitstrips.com
Login with the email xxxx@gmail.com and password: ******
Click on "create comic" on the left.

Create a comic based upon the description below. You can make changes to the strip if you need to; it does not need to be an exact copy. Focus on making a good, readable, informative comic.
If you need to get more information from the original article, you can.
Follow the prompts to publish the comic.
When you finish making the comic, paste in the URL in the response below. The URL should look like www.bitstrips.com/r/XXXXX

Comic Evaluation Questions
Please select the following about the comic strip:
- The comic strip did not capture the main details of the article
- The comic strip had spelling / grammatical errors
- The comic strip story did not make sense
- The comic strip story was inappropriate
On a scale of 1 (lowest / does not describe) to 7 (highest / completely describes), please rate the comic strip on the following measures
- The comic strip had a clear story to it.
- The comic strip was / could be effective at teaching news facts.
- Compared to reading the news article, the comic had the same main details.

The comic strip was easier to read than the news article.
I would prefer to read a comic strips like this as opposed to the news article they were created from. If you answered yes, why?

Above: Example of a creative user-generated comic based on an article on Obama and Romney.

	Control Condition - Without Narrative Storyboard Stage	Experimental Condition - With Narrative Storyboard Stage
Comic Strip Quality	4.2	4.3
Creativity	3.8	3.3
Informativeness	3.6	3.9
Representative of Article	4.2	4.2
Uniqueness	3.8*	2.7

*Significant difference; p=.003

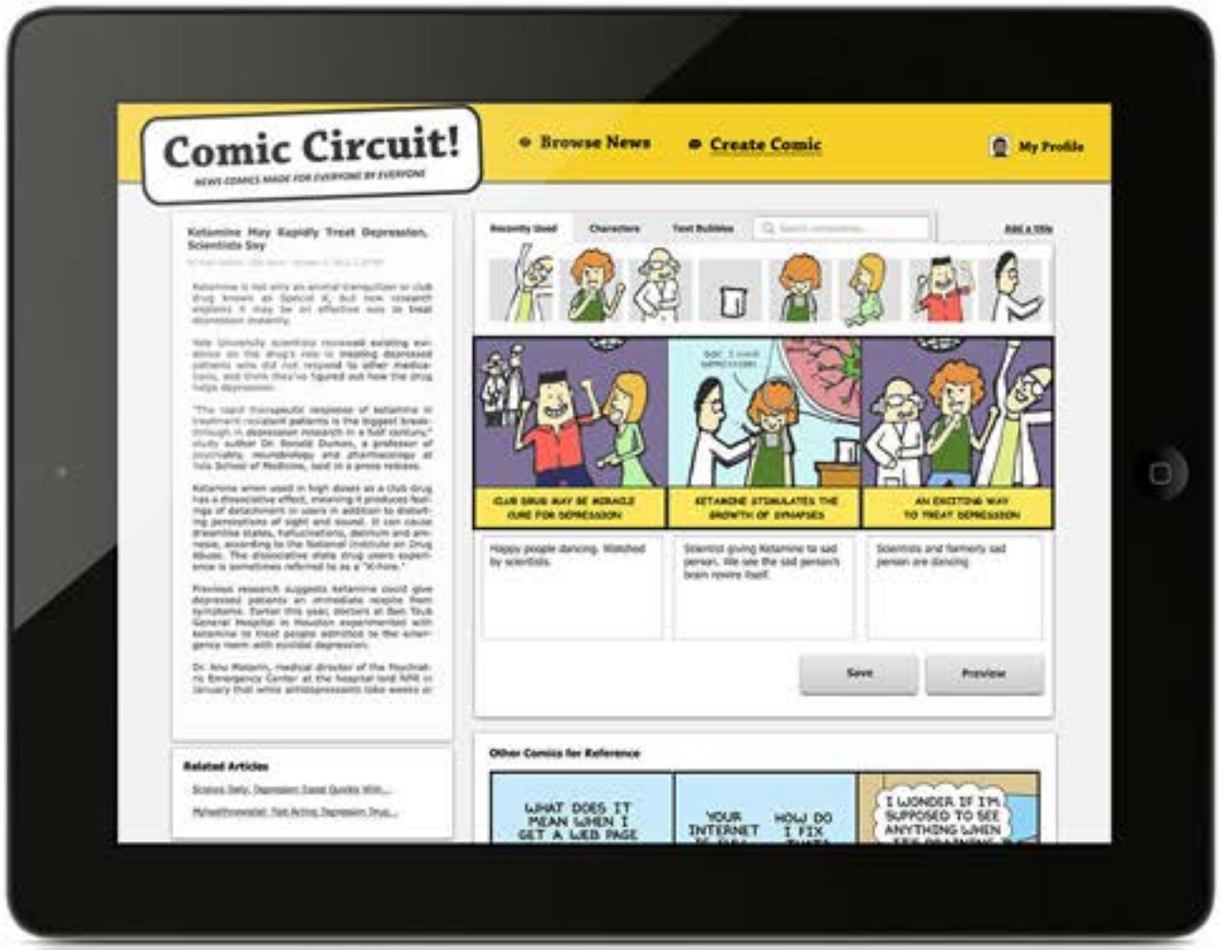
Above: Collected summary of 95 evaluations using Likert scale ratings.

Findings

Based on our quantitative evaluation of the comic creation steps, we were able to conclude that:

- Comics made without the narrative storyboard stage were more creative and unique.
- Comics made with the narrative storyboard stage were more informative.

Due to the benefits of both, we chose to encourage the use of the narrative storyboard stage in the comic creation process in order to ensure informativeness of the comic. Creative contributors have the option to skip the step in order to create more unique perspectives on the article.



Comic Circuit

High-Fidelity Prototype

Hi-Fi Prototype

Conducting user testing and crowd experiments helped us validate the idea of encouraging the crowd to create comics together by building on each other's work.

We designed a high-fidelity prototype for the tablet and web based on insights and decisions from various stages of our design process.

Features

The prototype (attached separately) consists of 2 main users flows: browse and create.

Browse

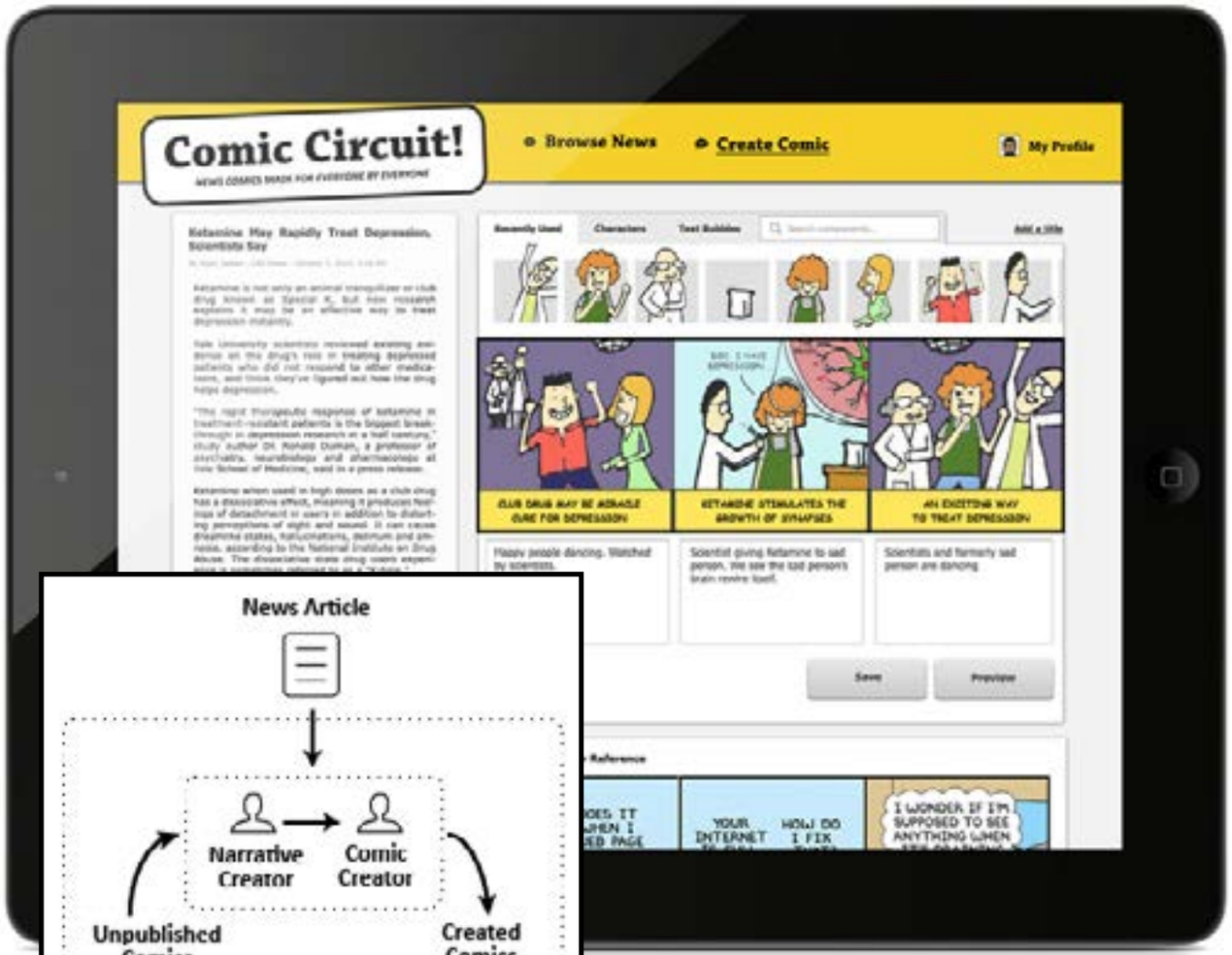
In browse mode, the user can read the headlines on the home page as well as filter or search for specific articles and topics. When events are filtered by certain keywords (e.g. "Obama"), the user can view the resulting events as a related horizontal narrative that connects multiple events in comic strip format.

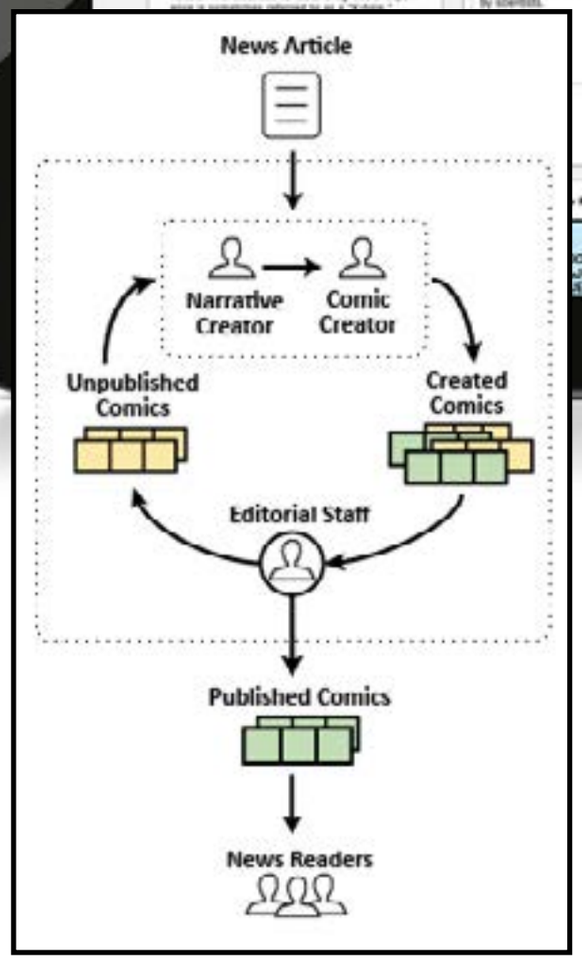
Within each article, the user can scroll vertically to access all the comics that have been created for that particular news article, in order to get multiple people's perspectives on the same event.

Create

In create mode, the user is directly linked to the dashboard page, where the user can select from multiple options of making a comic: start from scratch by viewing an article, finish a previously saved draft comic, or continue on someone else's unfinished comic by accessing the shared work-in-progress.

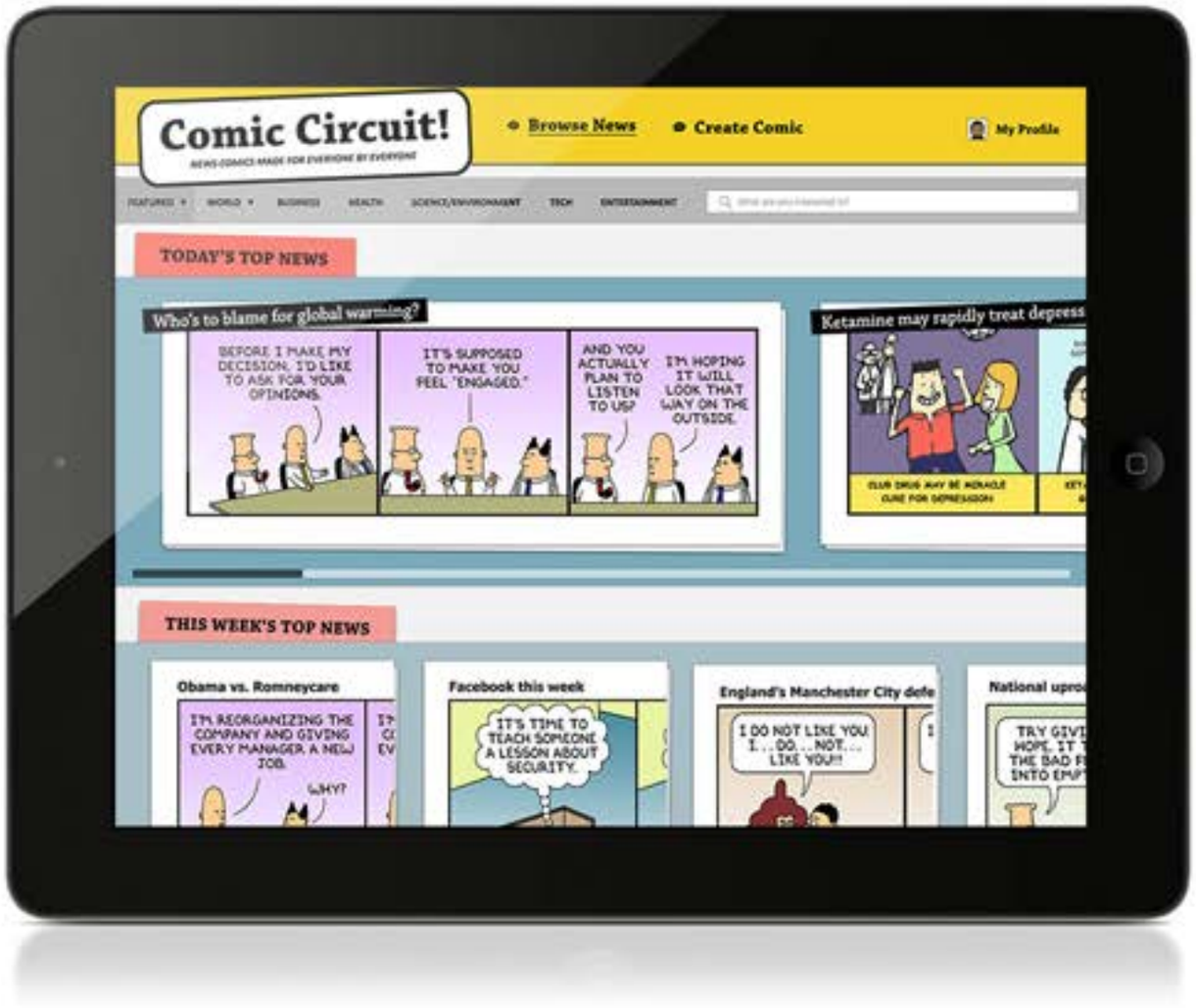
Within the comic creation workflow, the user first sees the article on the left and text input region on the right in order to describe the panels with words, saving the visual creation process for later. This step is based on the narrative storyboard stage tested in our prior research. When this step is done, the user can either save their progress or move on to the next step and access the visual components library needed to piece the panels together. When the user submits the comic, an editorial staff of expert users will choose to approve the comic for publication or provide constructive feedback, similar to the process of professional cartoonists who work closely with editors on projects.





Above: The hi-fi screen for using narrative storyboard and visual components library to build a comic.

Left: The editorial process diagram for the Comic Circuit system that shows how a news article becomes published comics for readers.

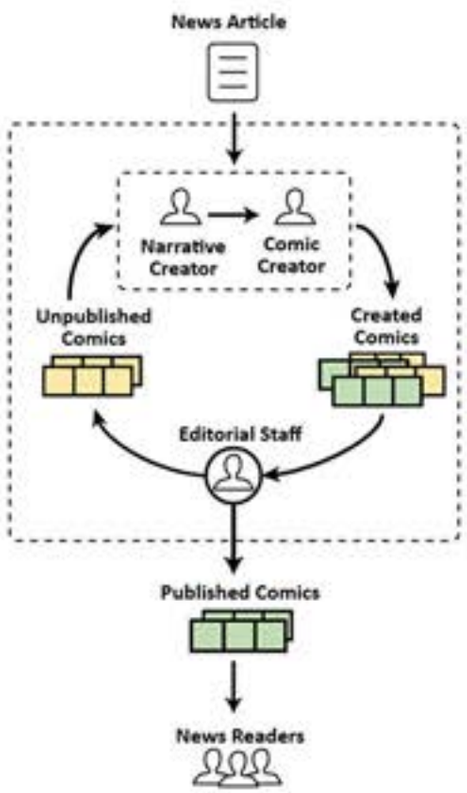


Colors

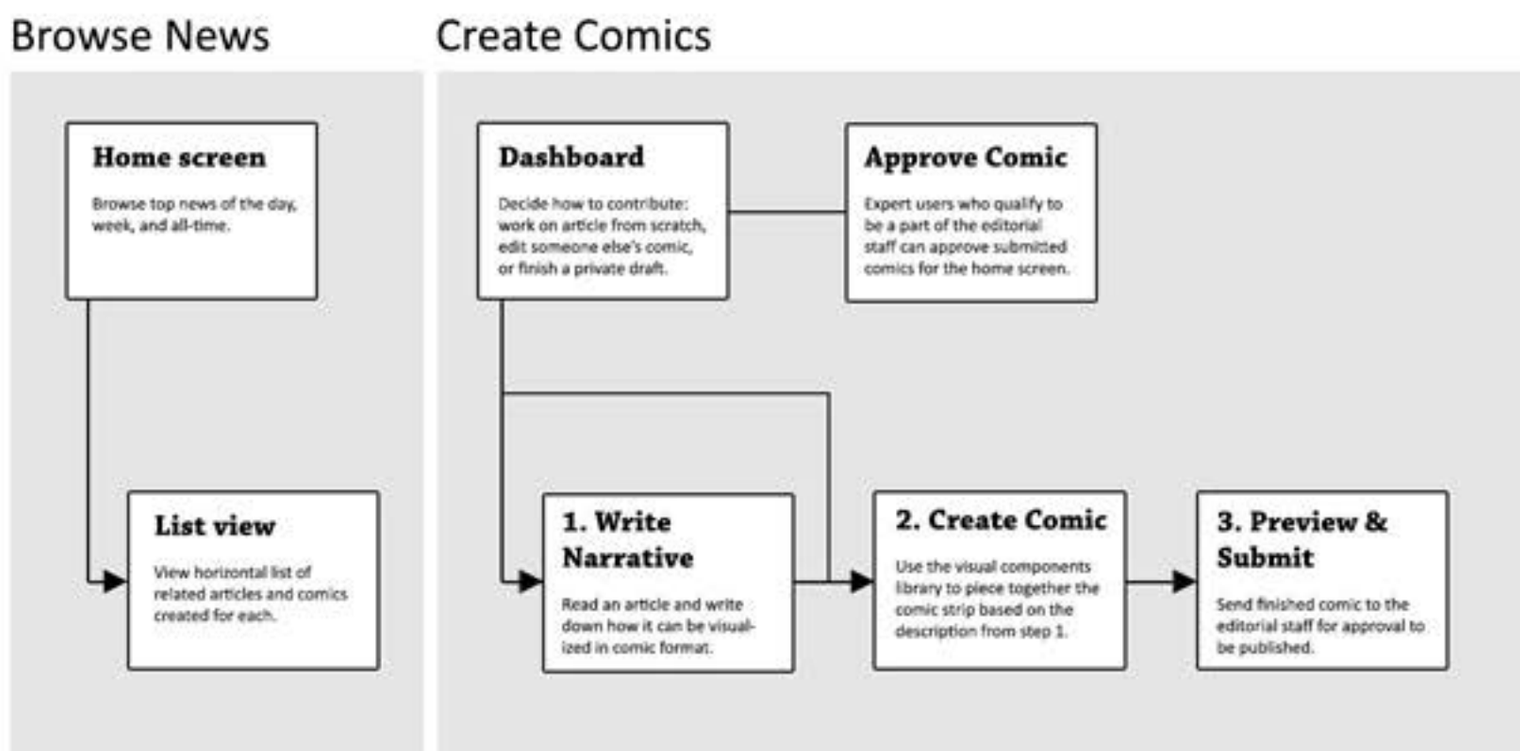
Typography

Headings: Chaparral Pro
Normal: Calibri

Editorial Process



System Navigation



Browse News: Home Screen

This is the main screen that a news reader visits in order to quickly skim published comics for top current events.

This screen contains three vertically-stacked, horizontally-scrollable regions:

- Today's Top News
- This Week's Top News
- All-Time Top News

The user can filter or search for specific articles using the gray navigation bar below the logo.

An editorial staff determines which articles are featured on the site.

Browse News: Home Screen

By scrolling down, the user can access major news events from the more distant past.

These sections are designed to display more current events by incorporating smaller previews of the comic.

Browse News: List View

When the user searches for or filters through comics, a list view is shown for the user to browse through related articles in chronological order.

The list is designed to smoothly transition between comics, indicating that distinct world events are often related to one another.

Browse News: List View

Scrolling up allows the user to view other comics that have been created for this particular news article. The articles are ordered by popularity as decided by viewers.

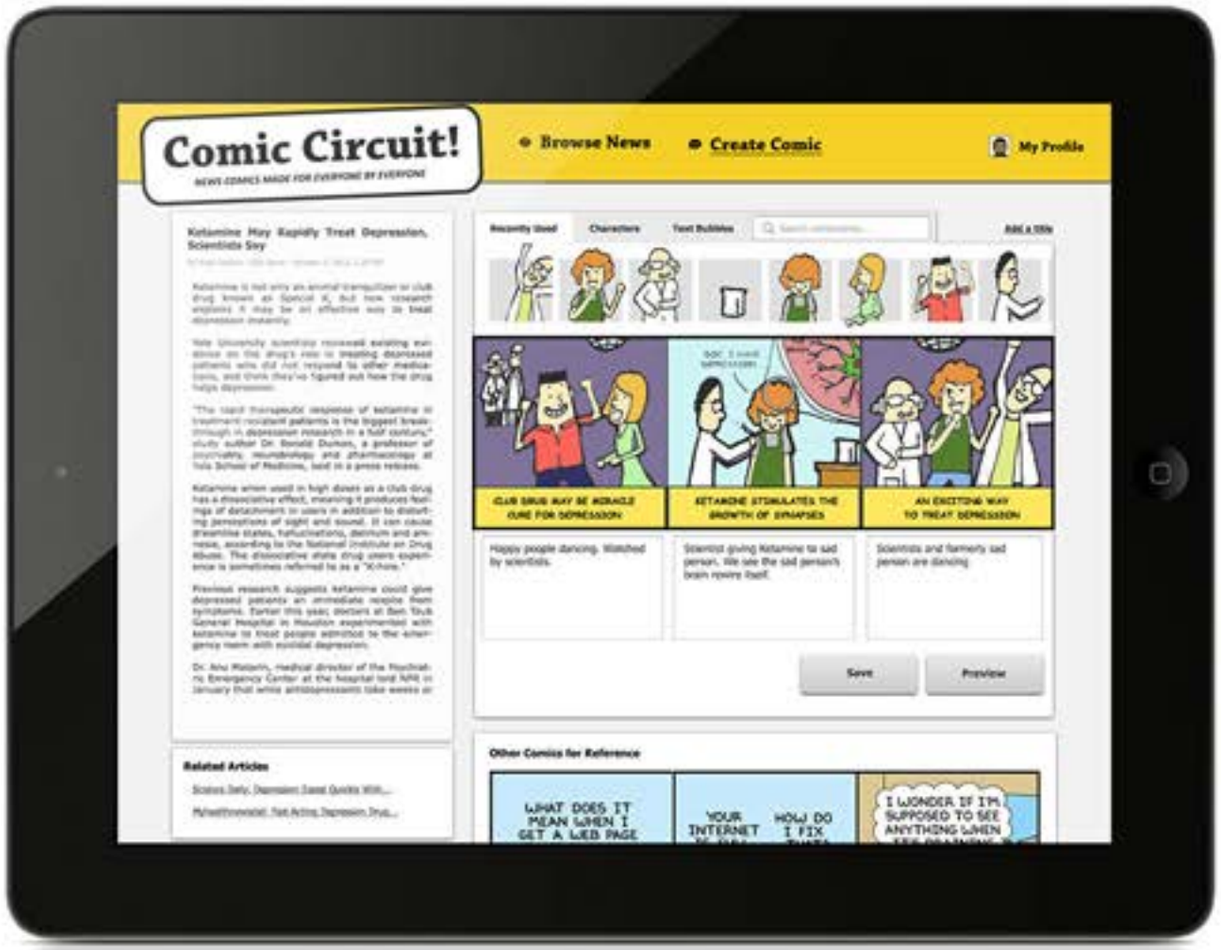
Browse News: List View

The user has the option to easily access the original news article on Comic Circuit. The article is shown as an overlay above the published comics.

Create Comic: Dashboard

This is the first screen that the user sees when the "Create Comic" button is pressed. The dashboard view contains various options a user can choose from.

Specifically, the user can start making the comic in two ways. S/he can make the comic from scratch while referencing the original article, or choose to work on an existing comic that someone else created and saved as a public draft.



Create Comic: Visual Components

This is the second and final step in creating the news comic. In this step, the user searches in the components library for the right pieces to place inside the panels. The user is guided by the text-based scene description that was created previously.

When completed, the user has the option to save this as a private or public draft, or to preview and submit the comic strip for the editorial staff to approve for publication.

The user can reference related articles and comic strips, which are located below the left and right columns as resources for research and inspiration.

The Team

Bingxin (Nancy) Chen

Masters in Human-Computer Interaction at Carnegie Mellon University
BS in Computer Science and Minor in Visual Arts

Before pursuing her masters degree in HCI at CMU, Nancy graduated from Duke University and then worked as an interaction designer for NetApp. Her love for comics developed when she started an online news blog drawing her interpretations of current events for three years, before realizing that she could not draw all of the news herself. Her role for Comic Circuit included initial research, interviewing, and UI design.

Ben Margines

Masters in Human-Computer Interaction at Carnegie Mellon University
BA in Cognitive Science

Ben has a BA in Cognitive Science from Yale University, where he conducted research on causal relationships between subtle psychological cues and socially positive behavior. Afterward, he worked in large-scale market research analysis for The Nielsen Company, and in community management for BoostCTR. Ben oversaw the quantitative research behind the design of Comic Circuit.

Shailie Thakkar

Masters in Human-Computer Interaction at Carnegie Mellon University
BA in Plan II Honors and Philosophy

Shailie explored knowledge, thought, and meaning as an undergraduate at the University of Texas and those issues have framed her studies as a Master's student in HCI at Carnegie Mellon. In particular, she is interested in how ideas are conveyed and transferred and how to make information more accessible. She contributed to research, interviewing, and analysis for Comic Circuit.

Rebecca Jablonsky

Masters in Human-Computer Interaction at Carnegie Mellon University
BA in Psychology, MA in Psychology

Rebecca has a background in social science, and has previously conducted and published research on the intersection of culture and artistic communities. She sees comics as an exciting way to convey the human experience. Rebecca contributed to Comic Circuit by conducting interviews, interpreting research findings, and translating data into design ideas.

Raunaq Gupta

Masters in Human-Computer Interaction at Carnegie Mellon University
Bachelors in Computer Science and Engineering

Raunaq studied computer science and worked on interactive voice response systems as a software engineer before pursuing his Masters in HCI. His interest in comics has spanned the superhero universes to the 'funnies' section of newspapers, and he admires the power that comics bring to the art of storytelling. He contributed to the UI design and user testing for Comic Circuit.