

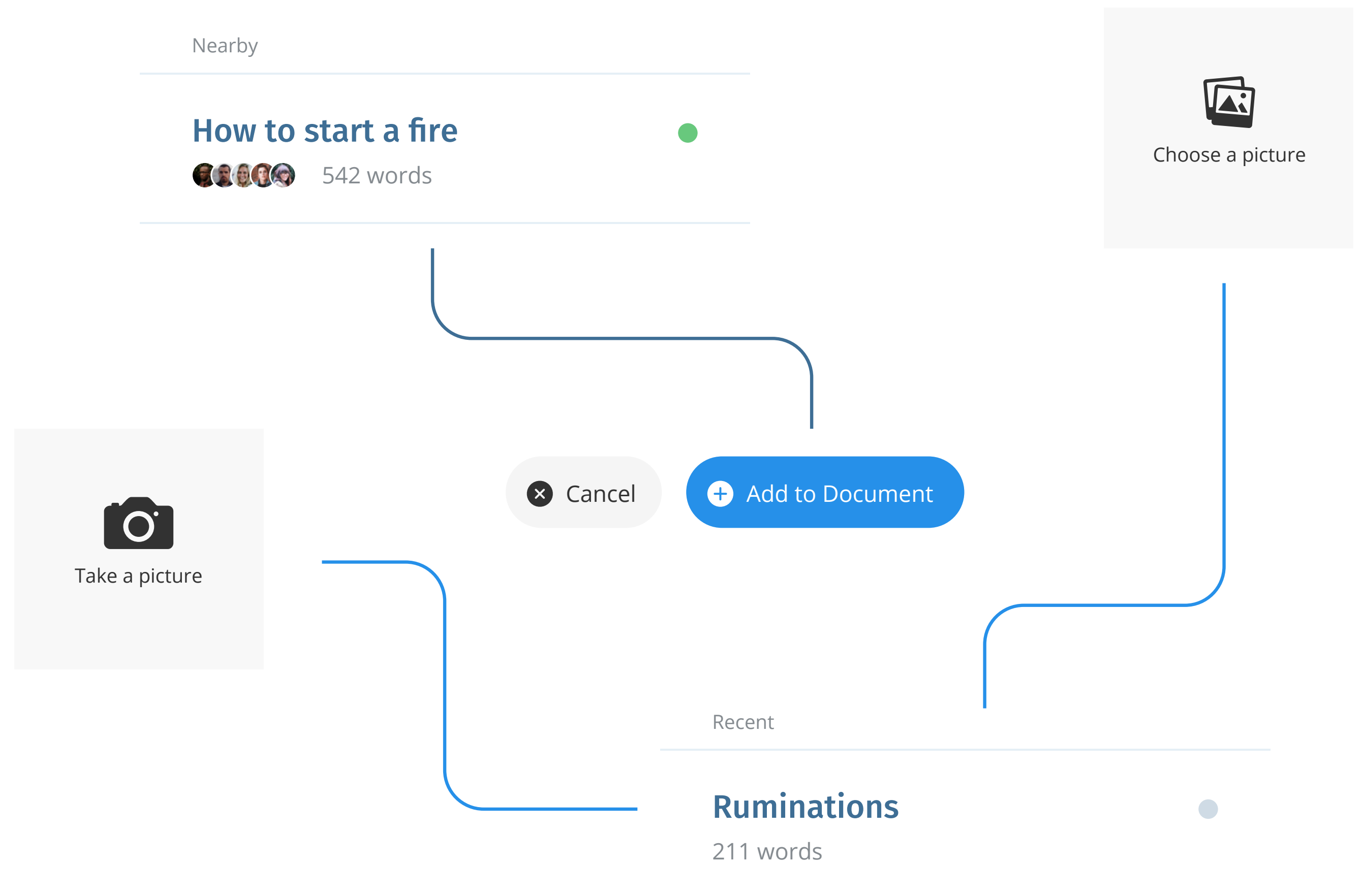


Vertical

A smarter way to write together

Naveen Shaji
16U130021

Guide: Prof. Simon Robinson,
Swansea University



The Better Together Toolkit

The Better Together Toolkit is a suite of resources designed to help separate complex applications and services between multiple devices to empower [emergent users](#).

The project is based in the FIT Lab at [Swansea University](#), UK with partners at [IIT Bombay](#), Mumbai, India.

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DEP 405 : B.Des Design Project - I

March 2017

Developed Better Together Toolkit
Collaborative Shopping Concept
Better Together Video Player

Sept 2017

Published Better Together at
MobileHCI 2017
IIT Bombay x Swansea University

2 Years

Sept 2019

B.Des Redesign Project
Design Research Seminar
Exchange Semester

Nov 2019

This Presentation



Naveen Shaji
<https://naveen.io>



SONY

DISNEY



TEACHFORINDIA

Designing digital products that enable human collaboration

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Previous Research

Quite a bit of research has been done in the areas of **co-located interactions** and **multi-device collaboration**.

Quilt: A collaborative tool for cooperative writing - <https://dl.acm.org/citation.cfm?id=45414>

Collaborative Content Creation: Impact of Media Type on Author Behavior - <https://dl.acm.org/citation.cfm?id=3274092>

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Supporting out of office software development using personal devices - <https://dl.acm.org/citation.cfm?id=3229454>

Designing Mobile Experiences for Collocated Interaction - <https://dl.acm.org/citation.cfm?id=2675133.2675171>

Mobiphos: a collocated-synchronous mobile photo sharing application - <https://dl.acm.org/citation.cfm?id=1409261>

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Co-curator: designing for mobile ideation in groups - <https://dl.acm.org/citation.cfm?id=2994350>

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To encourage this development, modern education incorporates elements of collaborative learning with use of social technologies that promote peer-learning and community building along with improvement of learning outcomes [5]. However, this also leads to blurring boundaries between acceptable (and/or encouraged) collaboration and academic misconduct [6].

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Especially in larger groups, the main challenges are related to group work and social interactions within the group: making decisions and agreeing on a common strategy, coordinating and synchronizing actions, and keeping track of the others and the overall task status.

An important consideration is also keeping everybody engaged in the process, as people easily get bored or distracted when they cannot do anything but wait for others to complete the group formation.

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Multiple participants of the survey mentioned issues of inter-net connectivity or speed when working away from the office. It is thus important that the IDE can be used even without internet access. We therefore opted for a solution that is local on the developer machine rather than cloud-based. Mobile devices can be connected through a local WiFi network broadcast by one of the devices.

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Switching attention between the devices should still be minimised. In particular, our participants preferred most interaction to happen on the laptop with the phone and tablet mostly used as helper devices where information could be offloaded. This is consistent with previous work [29].

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ENGAGEMENT [*continuous*] [*intermittent*] [*sporadic*]. This refers to users’ broad temporal patterns of action within the experience, such as how intensely and how often they will engage with it and each other. This is highly dependent on the length of a session. Designers of a long-term pervasive game will for example more or less inherently assume and design for an *intermittent* or *sporadic* engagement [15]. For example, iBrainstorm allows intermitting ENGAGEMENT, however one can assume *continuous* ENGAGEMENT during a focused collocated brainstorming session. Atomic Orchid, on the other hand, requires *continuous* ENGAGEMENT during its relatively short sessions (~30mins).

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None of our participants expressed concern about the loss of control over what specific photographs were shared. A participant from group 1, BM, reflected that the sharing of photographs made sense because the experience was shared: “we’re in the same space and doing the same thing.”

This introduced redundancy into the set of photographs collected by the group and was an frequently-discussed point of interest in the focus groups (e.g., HM from group 2 mentioned that “even though we both took the same picture, I chose hers [in the selection task] because it was better than mine”).

Collaborative interactions among group members were even more frequent. When reconvening after dispersing to take photographs of a historic church, GM from group 2 commented to himself that “this is like distributed work.” He had let other group members take pictures of the stained glass windows while he focused his attention elsewhere. When asked about this comment later in the focus group, he explained: “We had just read [in the tour brochure] about the historic stained glass windows. I was certain that the other members of the group would take pictures of the windows so I let them focus on that while I decided to take a picture of something else.”

Other examples of collaborative behavior included instances in which groups negotiated the distribution of photographic work. For example, when the members of group 1 approached a two-sided sign, BM raised his camera to take a photo. WF asked, “Are you getting both of them [sides of the sign]?” and BM responded, “You get one; I’ll get the other.”

There were tensions between participants wanting, on one hand, to maintain a shared group identity and to contribute photographs that were similar to the photographs others took, and participants wanting, on the other hand, to have a unique identity within the group and to contribute photographs that no one else would think to or be able to contribute.

Collaborative use of mobile phones for brainstorming - <https://dl.acm.org/citation.cfm?id=1851659>

The paper is structured as follows. First, we provide background information and discuss related work. Second, we introduce the design principles and interaction techniques of the *MindMap* prototype. Third, we present the evaluation of the prototype and its results. Finally, we present conclusions and future work.

In the first part of the study (30 min.), we briefly explained the *MindMap* prototype and its interaction techniques. We then allowed them to freely explore the available functionality and get acquainted with the application. In the second part of the study (30 min.), all 3 participants collaboratively created a mind map containing at least 10 notes on any topic that they would agree on. In the final part of the study (30 min.), we had semi-structured interviews in which we asked participants to walk us through some of their experiences while creating the mind map.

We observed that in the first session each participant had a specific role (i.e. P1: create and type notes, P2: provide content and define layout, and P3: follow the discussion and make high-level decisions on content), while in the second and third sessions participants shifted these roles more freely throughout the session

All participants (9/9) said the application supported collaboration between them. The interaction between people and with the devices really created a common working space for participants. They could see what others were doing with the notes and it also established discussion between the participants:

However, the current implementation of the application only allows one note to be edited at the same time. Especially in the second session where all participants contributed actively to entering new notes, it could not be done fast enough because they had to wait for a user to finish note editing before a new note could be entered. For this reason, they had to take turns in editing notes, which made the interaction sequential and slightly reduced the collaborative feeling of the application.

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The notion of using mobile devices as shared screens can be seen as a potential reason for 8/15 participants identifying that they would have liked to perform the task on a larger screen or tablet as opposed to a mobile phone, with P4 stating that “maybe co-curation could happen on a single tablet?” Two groups also raised ideas for larger screens to share material with each other, and allowing for a “shared view” (P1) of the timelines, either instead of, or in addition to, the separate mobile devices

Research Insights

Insights from the cited [previous research](#) and studies pertaining to co-located interactions in a group.

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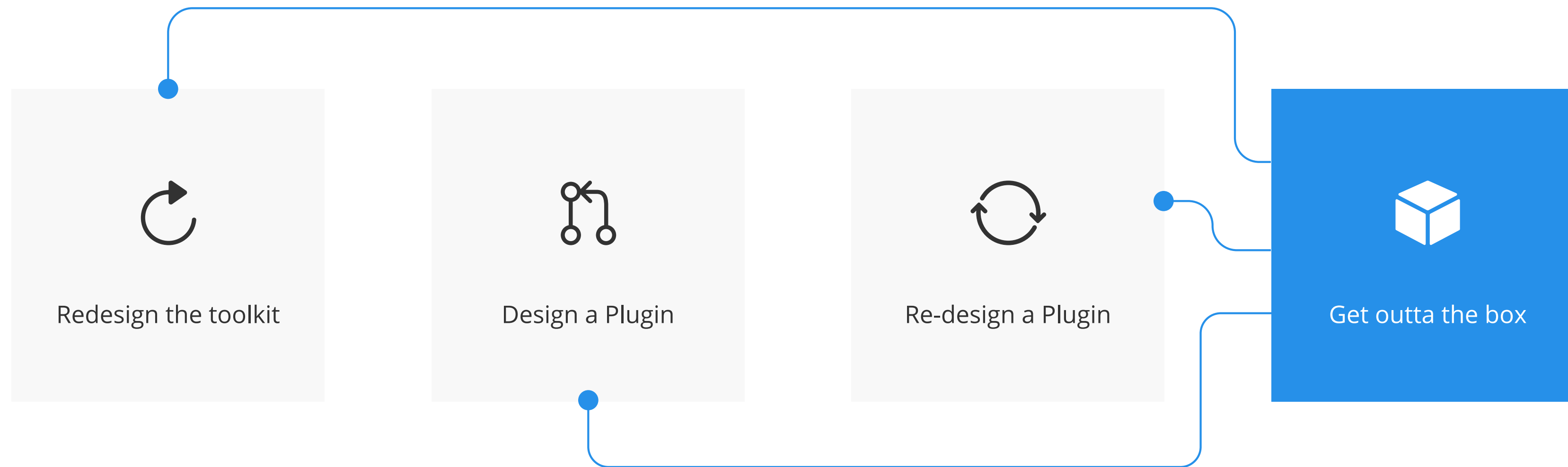
Switching between windows as an impediment to efficiency when working on a laptop screen. [\[Hussmann, 2018\]](#)

Multiple participants of the survey mentioned issues of internet connectivity or speed when working together [\[Hussmann, 2018\]](#)

Information symmetry is crucial - all users should see the contents on the shared tablet and on their own phone [\[Lundgren, 2015\]](#)

What kind of impact did I want to make?

There were three obvious choices. I wanted more. I wanted to create something that offers a **complete experience**



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Empowering Creation

I wanted to empower people to write together using their mobile devices in a **co-located** setting, thereby encouraging **human-human interaction**.

“A connecting experience”

[Porcheron et al., 2015]



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Primary Research

Conducted 8 semi-structured user interviews to model multiple personas to aid in the design process.

- 4 University Students
- 2 Consistent Bloggers
- 2 Content Writers

What do you write on phone	Problems faced	Amount of text usually written on a phone	Writing collaboratively
Writes stuff on phone - notes mainly. Lecture notes - things to remember - Uses notes like a journal sometimes - very private	Inability to see entirety of text entered on screen, Inability to research stuff and then write about it	less than 300 unless I have to write an academic essay and I don't have my laptop nearby.	The only time I've written collaboratively was when an academic assignment had us all working together on google docs to write the final essay that had to be submitted
Writes poetry and prose, usually on phone only. Uses laptop very rarely for writing and usually because the laptop is a dedicated animation rig which is heavy, big and not very portable	Writing on mobile keyboard is not an issue - is actually faster on mobile keyboard. Having to multitask is painful because sometimes the phone kills the browser while he is writing and it is out of memory. Most writing is creative and does not need references	Have written more than 1500 words on a phone - no joke. It often feels more natural and comfortable than typing on a laptop screen especially for poetry.	Have written collaboratively - but one person did most of the actual writing with others collaborating with ideas and storylines rather than literal words.
I usually just save stuff with a short description of what it is. Happens usually when I'm browsing social media and I find something interesting, I save the link and write a few lines about it. I also write down my expenses and passwords	writing on mobile is way less comfortable than writing on a keyboard. Sometimes I have to send a mail on phone and that is usually very hard due to the small keyboard and the fact that I have to wear glasses to see it properly since the text is so small	No more than 200 words - which is still very rare. Most writing is done by hand or on a computer at the office.	Usually directs others to write for me. I tell them what to type and they type it out for me.
Write posts for social media on phones. Sometimes posts on reddit and blogs. If it's a big piece I usually whip out my laptop because it just feels more comfortable	I don't write anything related to work or academics on my phone because that feels like serious work. I'm also more likely to slack off and turn to social media when I'm on my phone	Around 500 words I guess. It varies on what exactly I'm writing about	Did not write collaboratively at all.
I mostly write quick notes. Sometimes when I'm at events, I take notes on my phone.		200-300 approximately.	Usually at events when me and a few work friends attend, We take notes on our phones and then share if it's important content. Collaborated on google docs on mobiles

Research Insights

Insights from the user study conducted to establish user goals and personas.

People use their phones to click pictures to add to their document even if they're working on a Laptop.

Switching between apps on a mobile is cumbersome as some phones close background apps regularly.

Work deemed 'serious' is preferably done on a laptop.

Smartphones are more distractive surfaces due to the easy access to social media and entertainment.

A certain group of users prefer writing on mobile phones which suggest that once you get past the steep curve, it becomes easier.

A lot of content is often taken from websites. Depending on the kind of work, more than half the textual content can be from other websites.

Pictures are almost never used when writing on mobile due to the hassle of downloading and then inserting pictures.

Meet Luke, Ann, and Sarah

Luke, Ann, and Sarah are the three primary personas modelled from **research findings** with their own **unique** user goals and needs.



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Let's make notes!

Luke, Ann, and Sarah go to design school

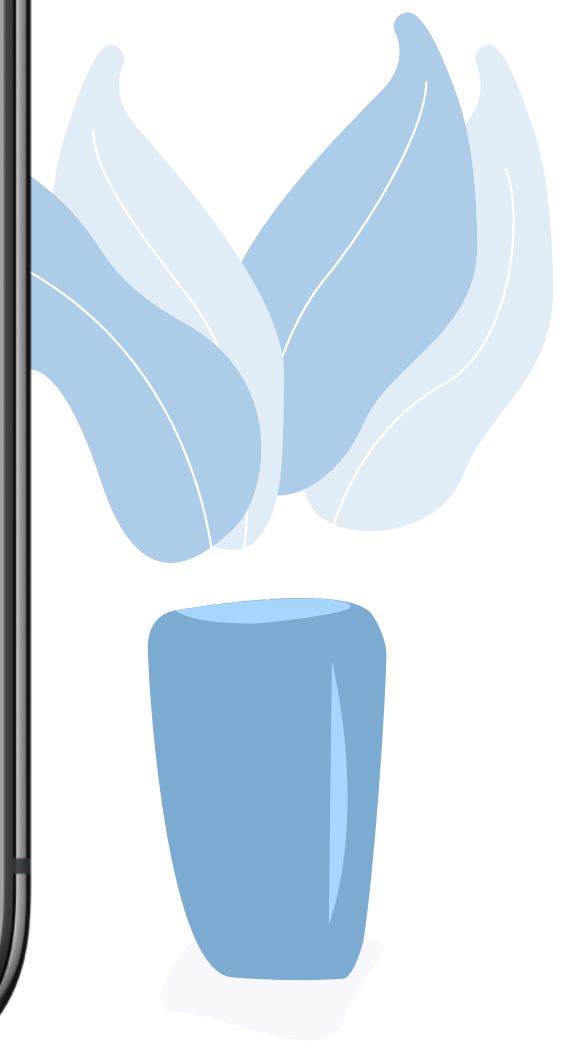
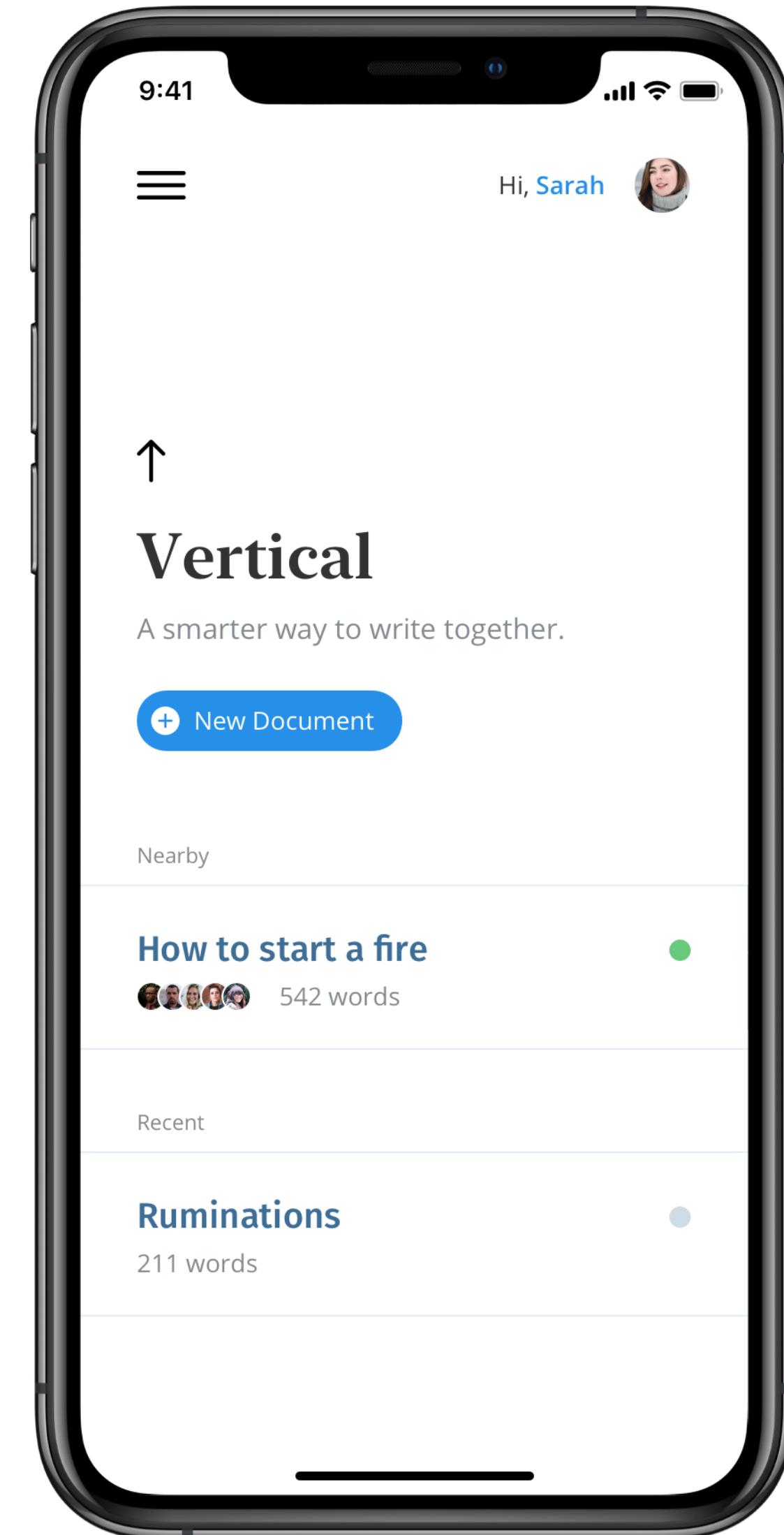
As they hear about the Gestalt Principles, Sarah asks her friends Luke and Ann if they know about them.



Vertical

“We should write down what we find”

- Luke

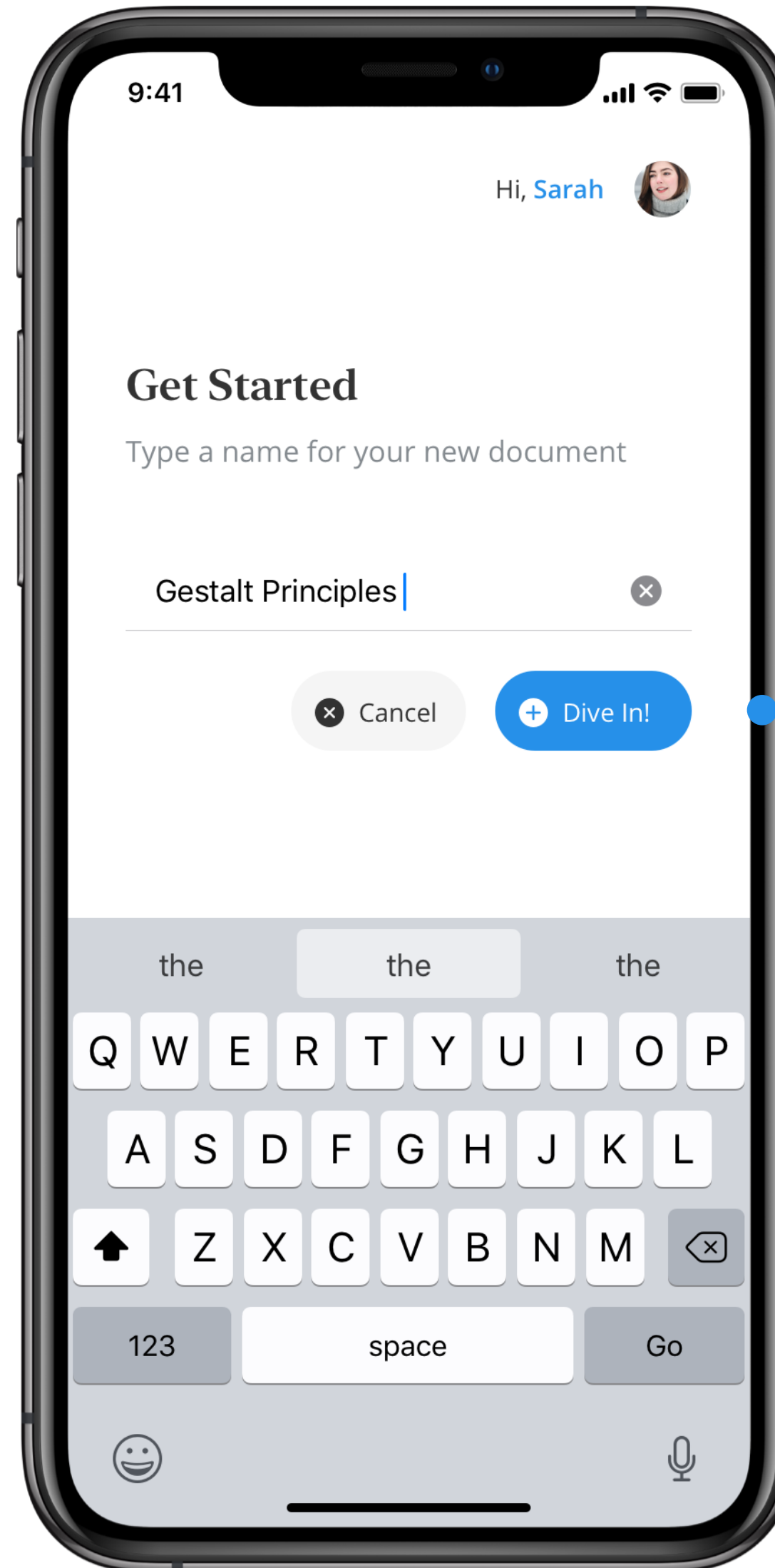


Vertical

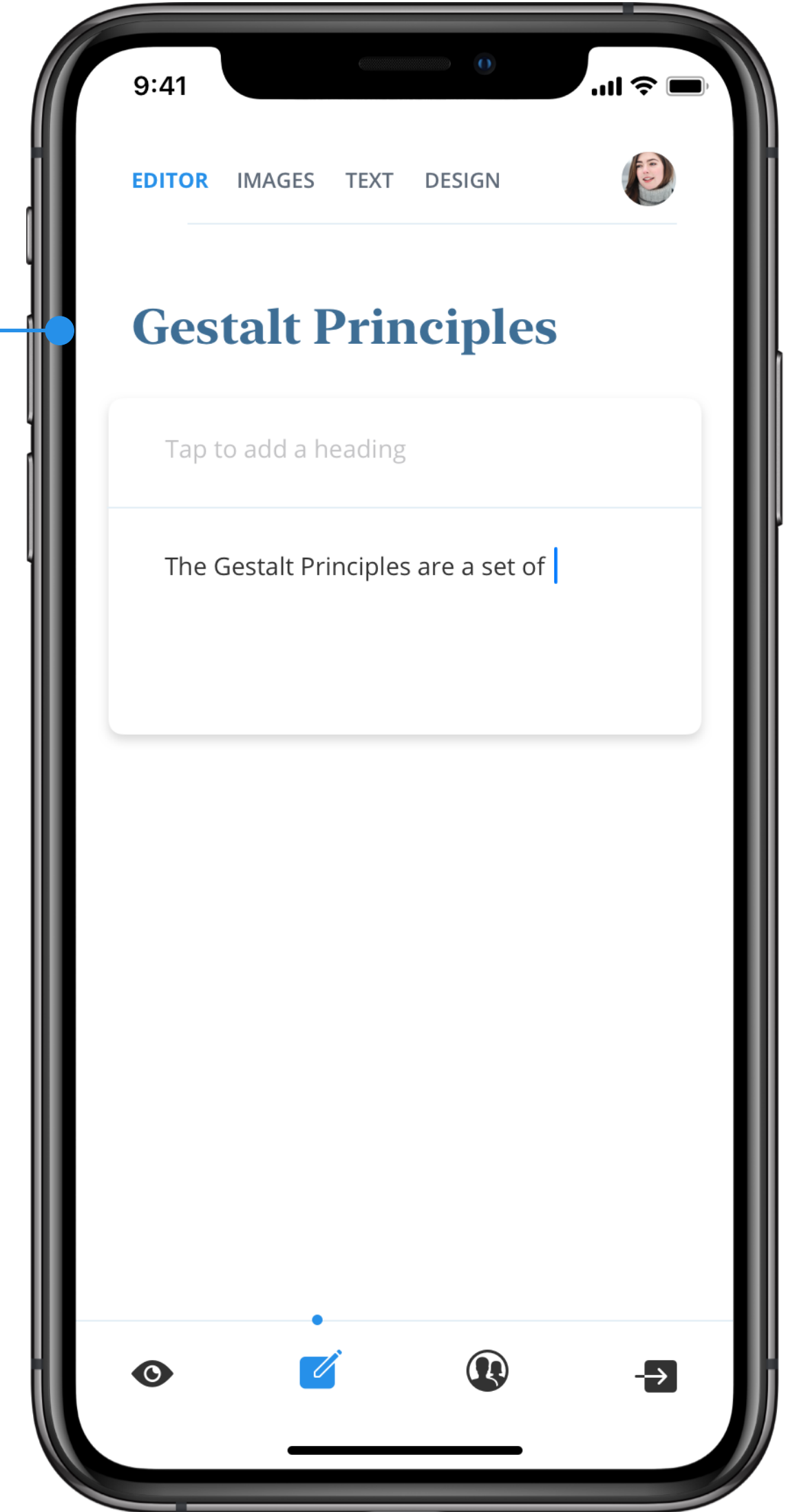
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Sarah wastes no time

As soon as she jumps in, she starts typing what she knows about the Gestalt Principles



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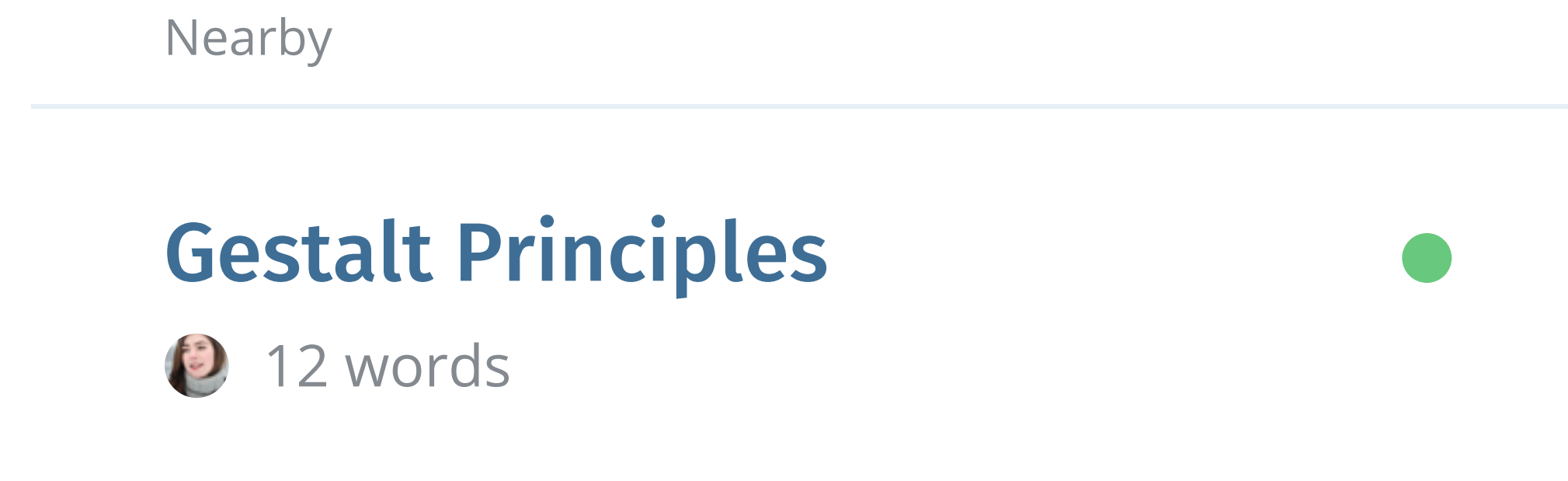


Vertical

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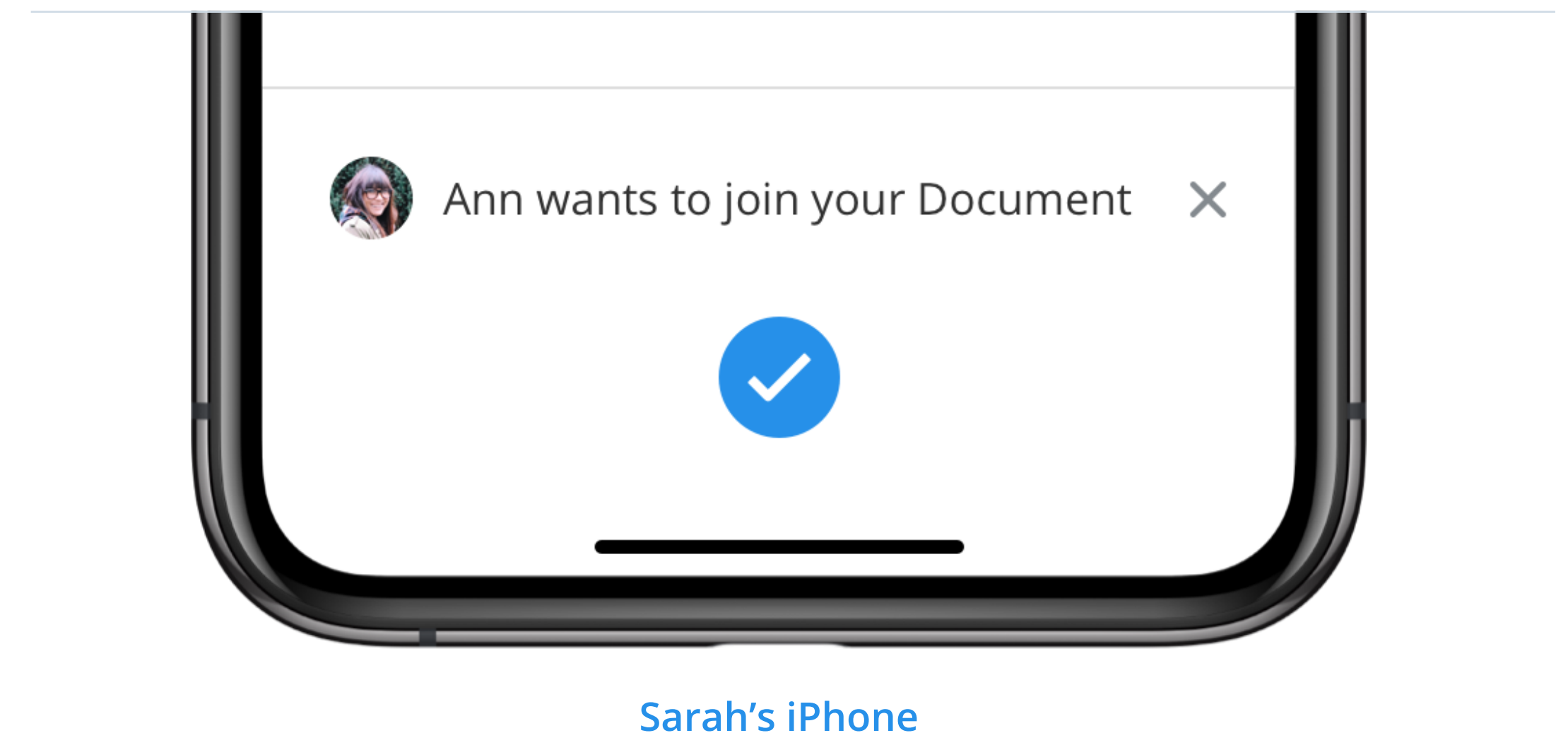
Nearby

When they open the app on their phones, they immediately notice **Sarah's** document



Privacy

When **Ann** tries joining the document, **Sarah** gets a request on her phone, that she then accepts.



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Ann's iPhone

Real-time view

When [Ann](#) and [Luke](#) are in, they see [Sarah](#) typing away in real-time on their phones.

“Hey Luke, can you find me some images that explain some of the Gestalt Principles?”

- Sarah

Vertical

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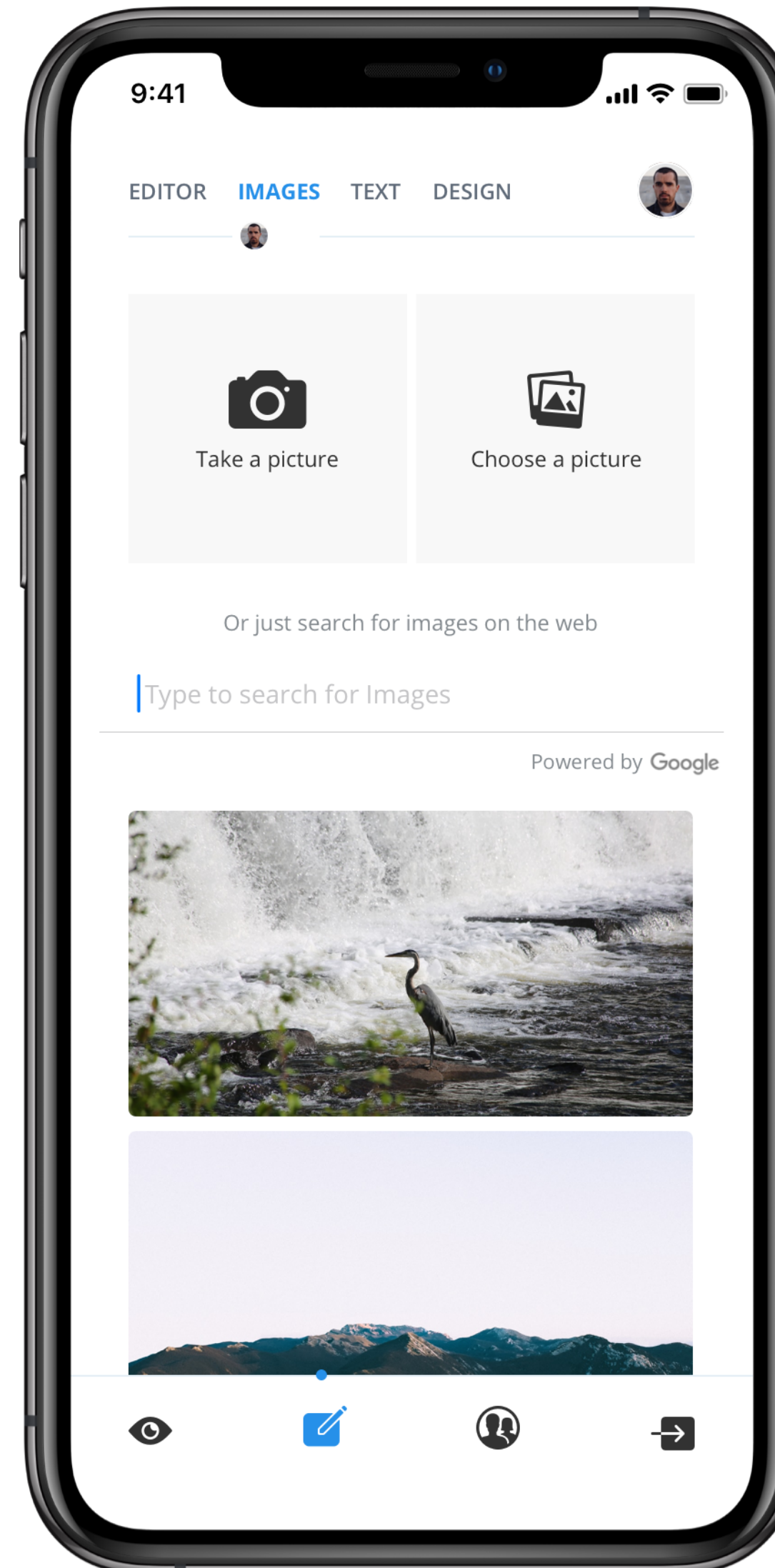
Image Search

Luke swipes over to the **Images** tab

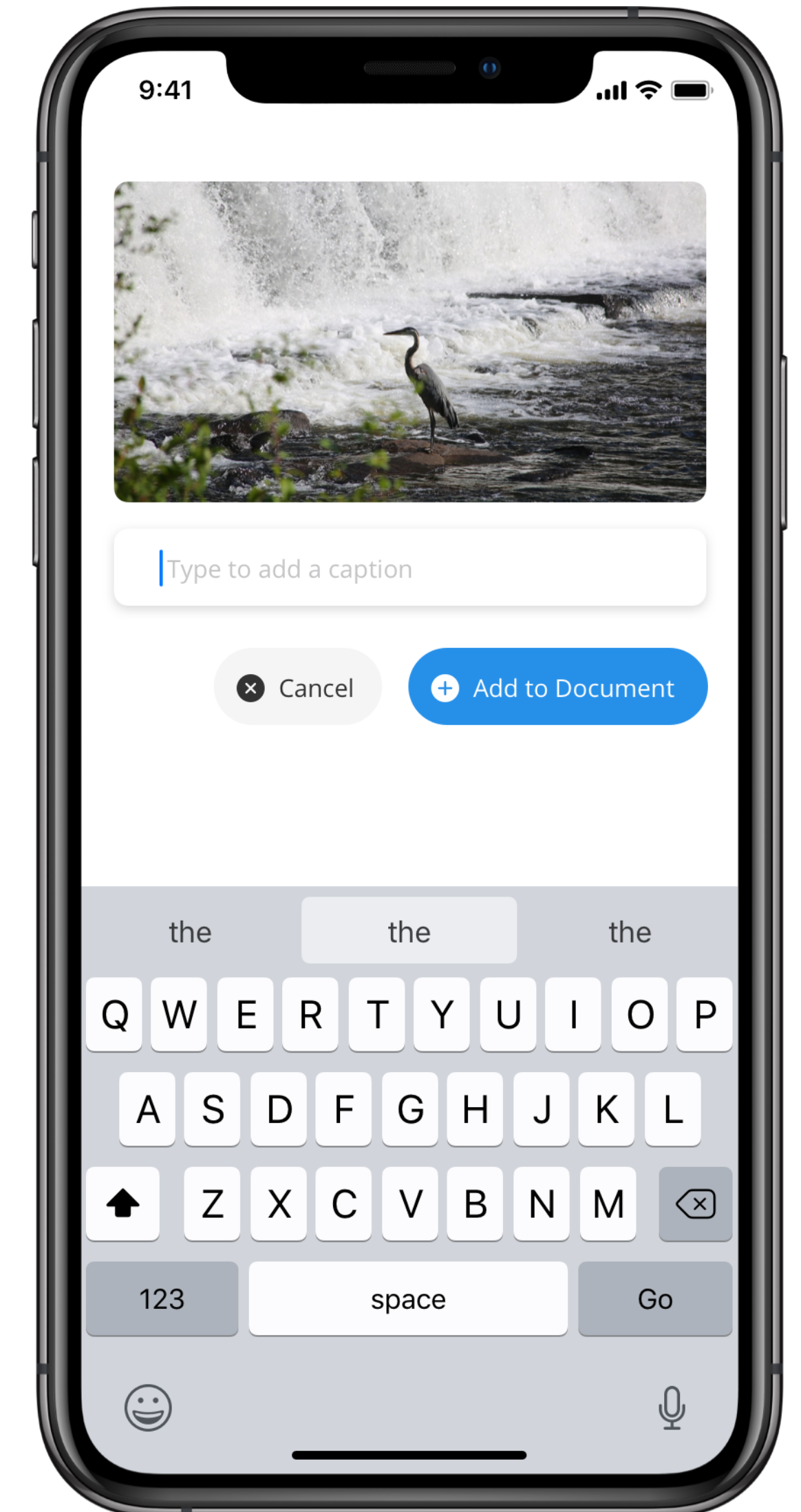
Non-copyrighted images can be searched and added to the document. **Citations** are automatic.

You can choose to add a caption before adding the image to the document.

Luke's iPhone



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Vertical

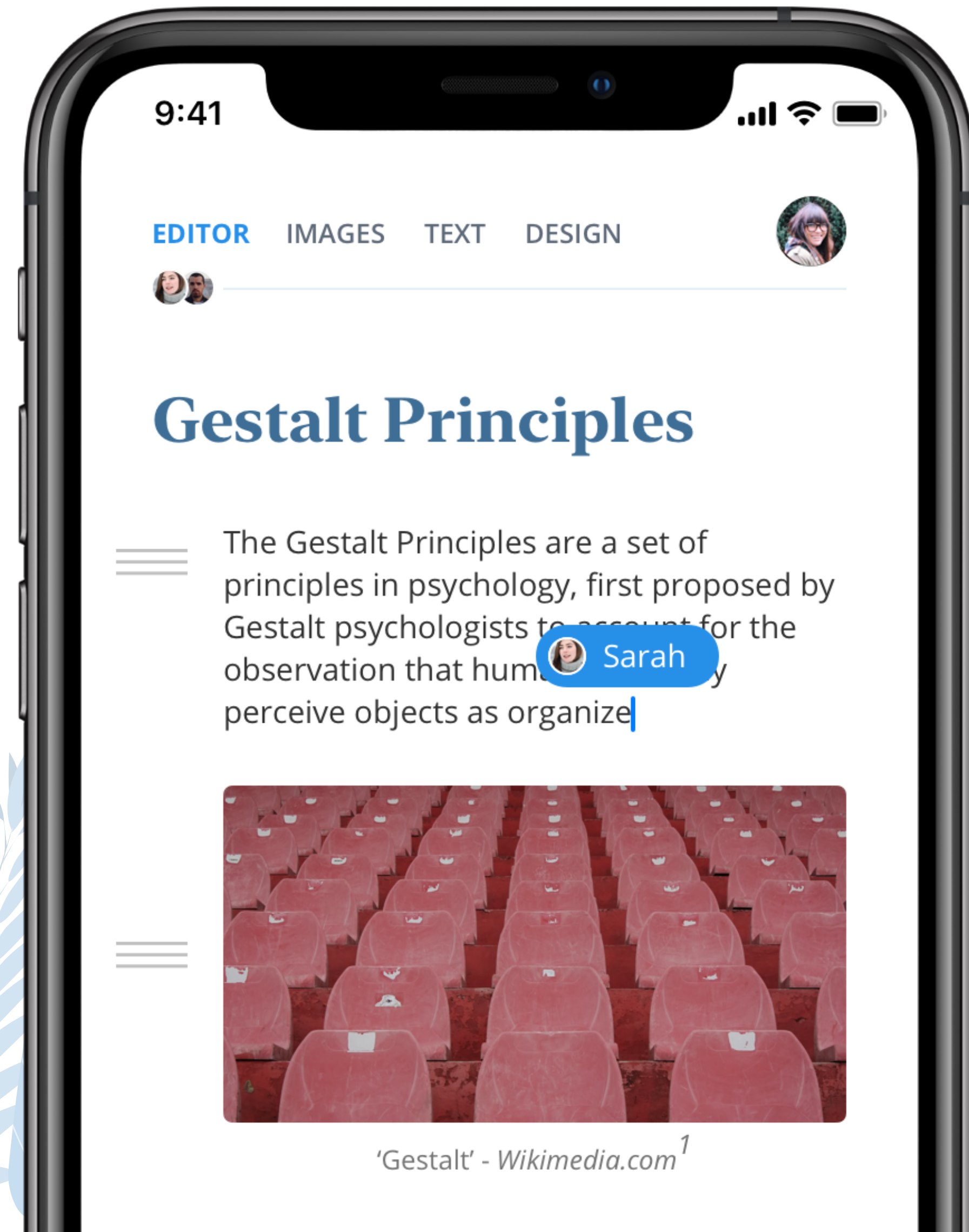
A smarter way to write together

Ann's iPhone

The image that Luke added appears on Ann's and Sarah's editor screen.

“Looks neat! Thanks Luke. Let me see if I can find something about this on Wikipedia”

- Ann



Vertical

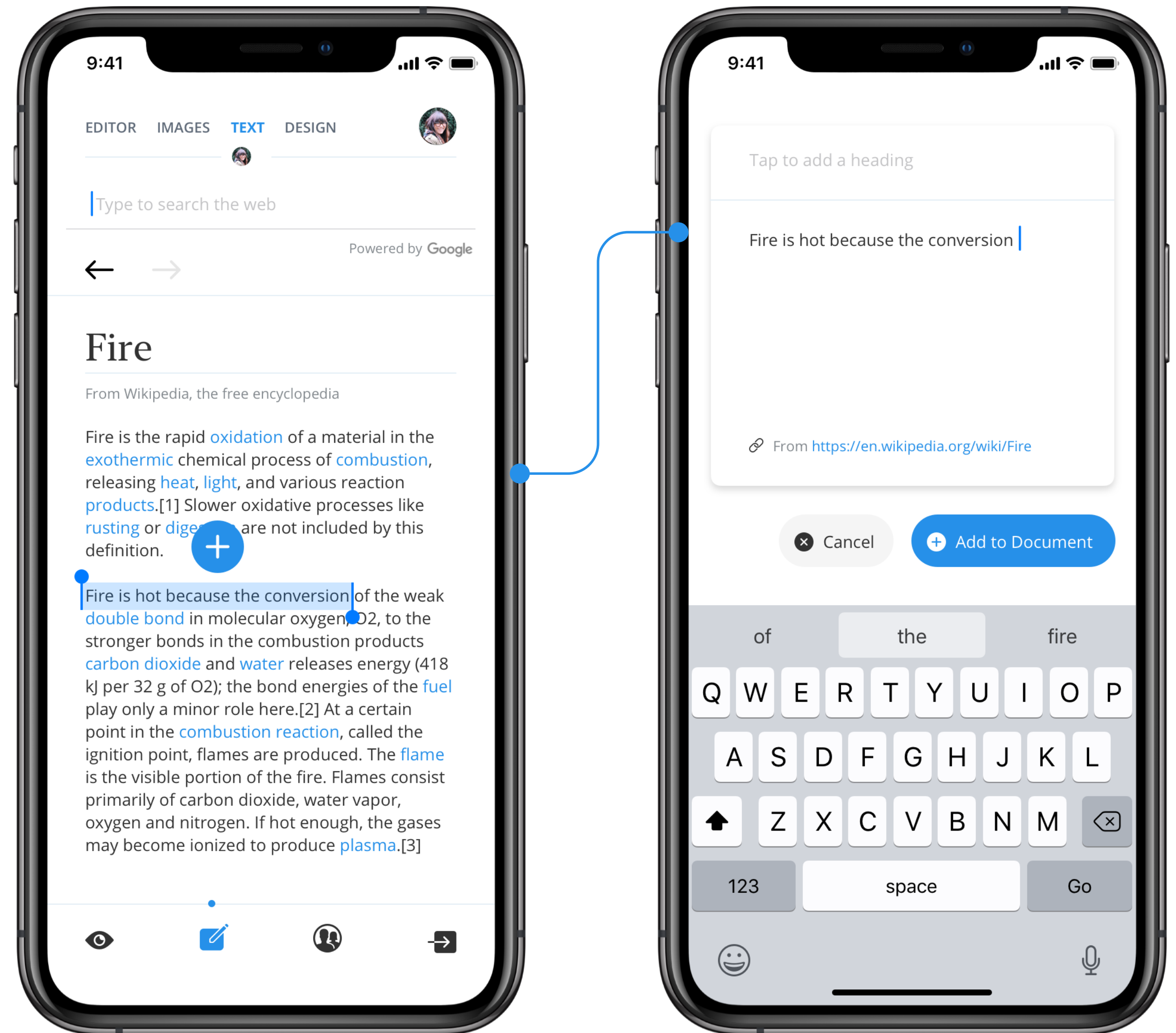
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Cite text from websites

Enables collection of text from various websites without ever leaving the Vertical App.

The selected text can be added to the document with automatic citations back to the source website.

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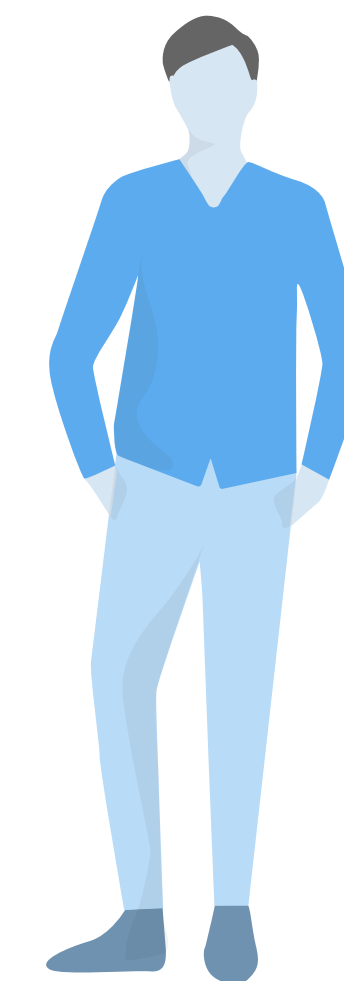
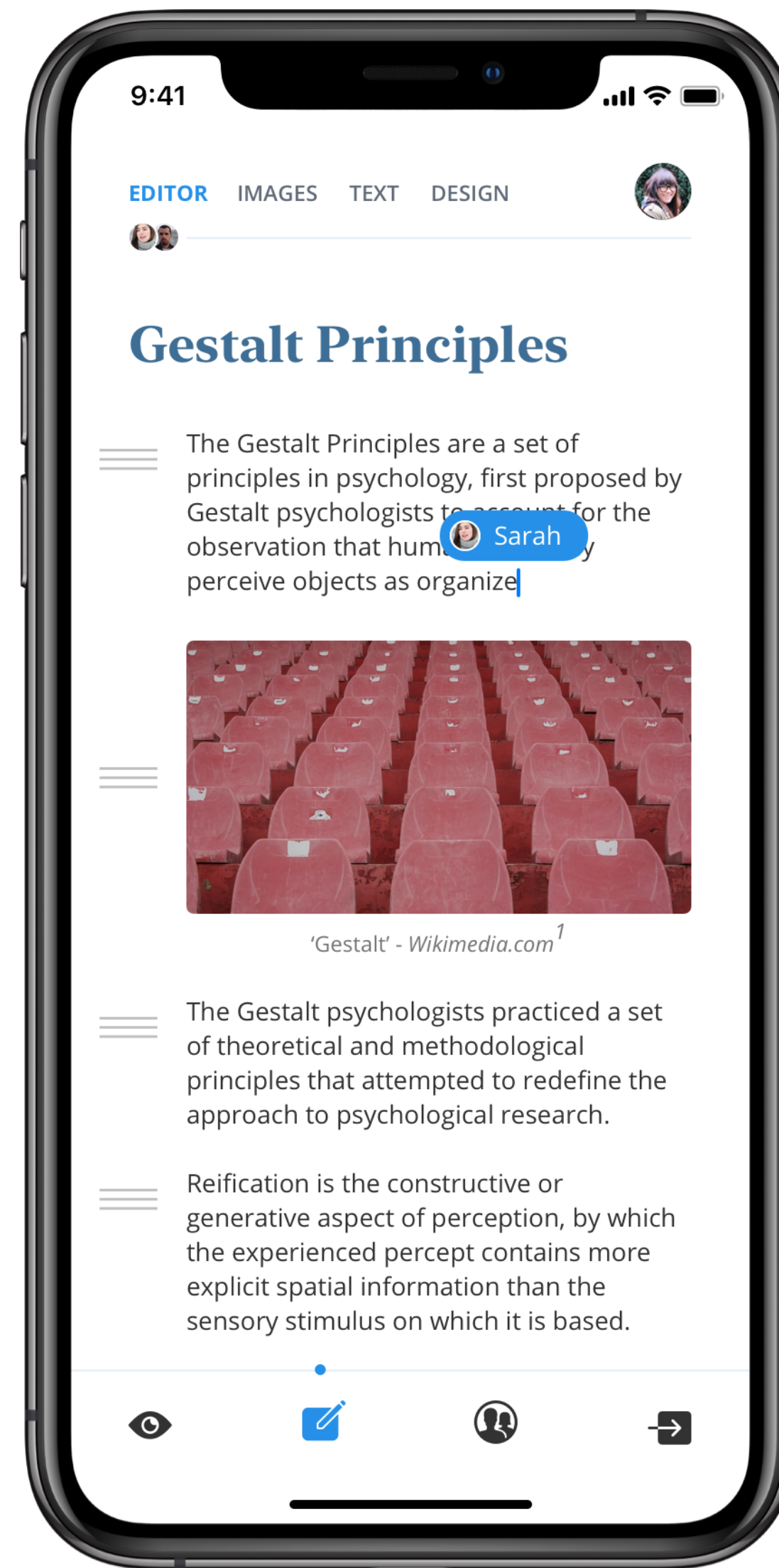
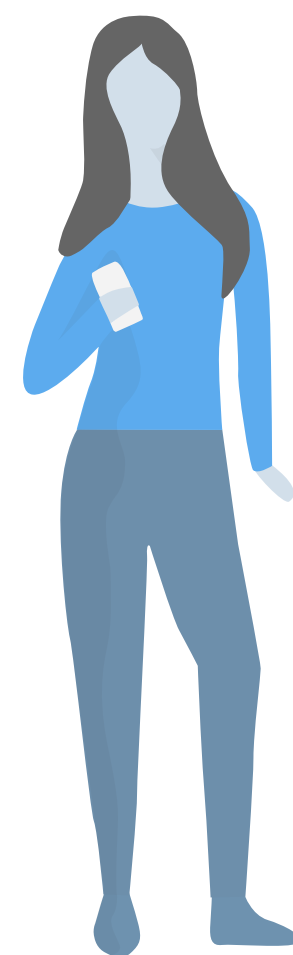


Vertical

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Reflow

Text and images can be rearranged as required using the drag handles on the editor page.

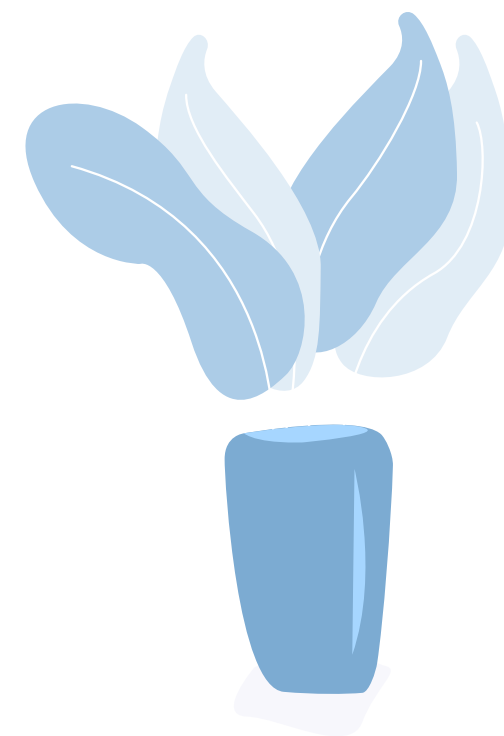


“Looks great! Thanks for contributing, everyone!”

- Sarah

The road ahead

I'm currently building a web-prototype of this using JavaScript and Python. This will be used for user-testing, the results of which will be submitted as part of [DEP 403 : Design Research Seminar](#) next semester



Vertical

A smarter way to write together

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Appendix

Supporting out of office software development using personal devices - <https://dl.acm.org/citation.cfm?id=3229454>

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None of our participants expressed concern about the loss of control over what specific photographs were shared. A participant from group 1, BM, reflected that the sharing of photographs made sense because the experience was shared: “we’re in the same space and doing the same thing.”

This introduced redundancy into the set of photographs collected by the group and was an frequently- discussed point of interest in the focus groups (e.g., HM from group 2 mentioned that “even though we both took the same picture, I chose hers [in the selection task] because it was better than mine”).

Collaborative interactions among group members were even more frequent. When reconvening after dispersing to take photographs of a historic church, GM from group 2 commented to himself that “this is like distributed work.” He had let other group members take pictures of the stained glass windows while he focused his attention elsewhere. When asked about this comment later in the focus group, he explained: “We had just read [in the tour brochure] about the historic stained glass windows. I was certain that the other members of the group would take pictures of the windows so I let them focus on that while I decided to take a picture of something else.”

Other examples of collaborative behavior included instances in which groups negotiated the distribution of photographic work. For example, when the members of group 1 approached a two-sided sign, BM raised his camera to take a photo. WF asked, “Are you getting both of them [sides of the sign]?” and BM responded, “You get one; I’ll get the other.”

there were tensions between participants wanting, on one hand, to maintain a shared group identity and to contribute photographs that were similar to the photographs others took, and participants wanting, on the other hand, to have a unique identity within the group and to contribute photographs that no one else would think to or be able to contribute.