

*Master in Computer Science and Engineering
Sapienza Università di Roma*

Human-Computer Interaction

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Mobile Design Patterns

Matteo Filosa m.filosa@diag.uniroma1.it

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Good vs Bad Mobile Design

- An interesting and quick way to better understand how people are using apps is to **read reviews in mobile marketplaces**.
- In general, most 4- and 5-star reviews are not very specific.
- But the **1- and 2-star reviews are much more telling**; they tend to offer a truer picture of problems users are having with applications.
- Most common complaints are:

- Crashing
- Lack of key features (e.g., syncing, filtering, account linking)
- Confusing interface design
- Poor navigation (e.g., can't go back, can't find things)

To be fixed, they require user and device testing.

They can be fixed by following traditional mobile design patterns.

Reviews do not substitute usability evaluation but are useful in design phase to identify specific issues of a system.



Design Patterns

One way to approach the design of user interfaces is to **learn from examples** that have proven to be **successful** in the past.

Design Patterns are **solutions** to a **recurrent problem** within a **specific application domain**.

They allow to **capture** and **reuse** the **knowledge** of what made a system – or paradigm – successful and apply it again in new situations.

Mobile Design Patterns:

Navigation

Forms

Search

Tools

Helps and Tutorials

Feedback & Affordance

Roadmap

- **Navigation**
- Forms
- Search
- Tools
- Invitations
- Feedback & Affordance

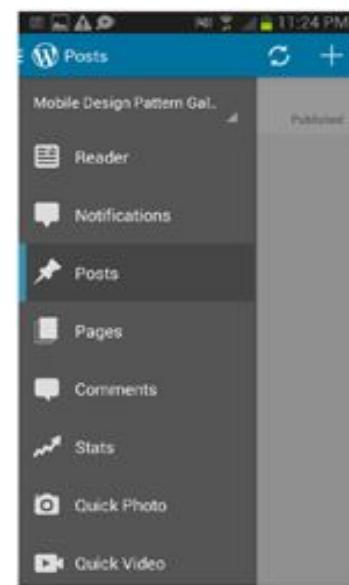
Navigation

- **Navigation** is about **how users move through the views**.
- Good navigation, like good design, is **invisible**.
 - Applications with good navigation just feel simple and make it easy to accomplish any task, from browsing through the web to post a comment on Facebook.
- **Primary Navigation patterns**: navigation from one primary category to another (as with the top-level menus of a desktop application).
- **Secondary Navigation patterns**: moving and navigating within a selected module.

Navigation Patterns

- Two distinct types of primary navigation: **persistent** and **transient**.
- **Persistent navigation** concerns interactive navigation components (for example, list menus) that are permanently visible.
- **Transient navigation** must be explicitly revealed with a tap or gesture.
 - These patterns arise from the constraints of smartphone screen sizes, which have pushed mobile designers to think “outside of the box”.

Instagram app
Tab Bar for persistent
primary navigation.



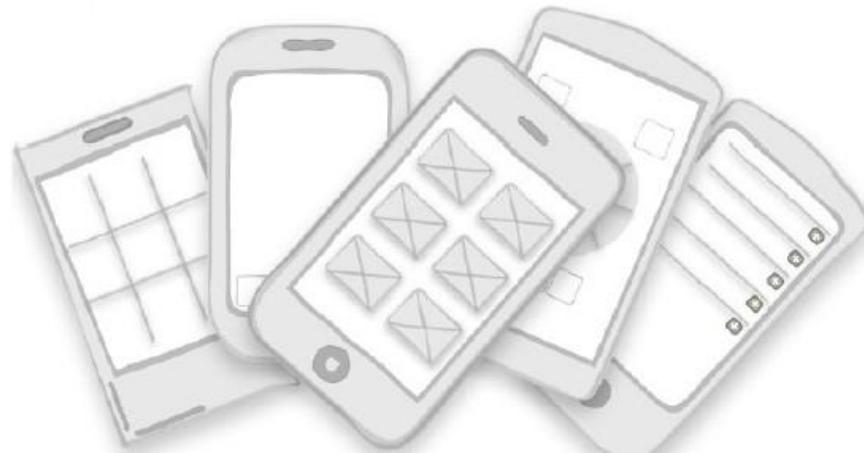
WordPress app (Android & iOS)
Transient navigation
through Side Drawer.



Primary Navigation

□ Persistent Patterns:

- Springboard
- List Menu
- Expanding Lists
- Cards
- Gallery (Grid)
- Tabs
- Metaphor
- Infinite Area



Springboard

Springboard is a landing screen with **options** that act as **launch points** into the application.

Often used as navigation patterns at OS level (Windows Phone, iOS and Android).

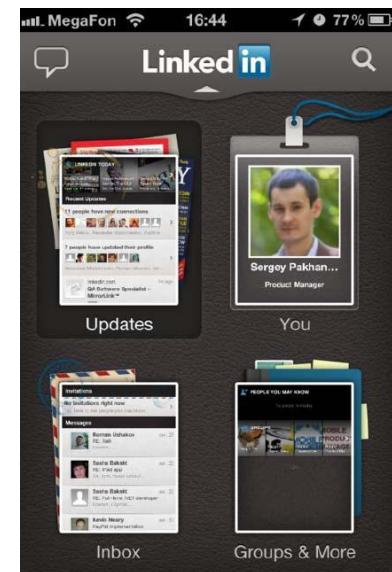
Use a **grid layout** for items of **equal importance**, or an **irregular layout** to **emphasize some items** more than others.



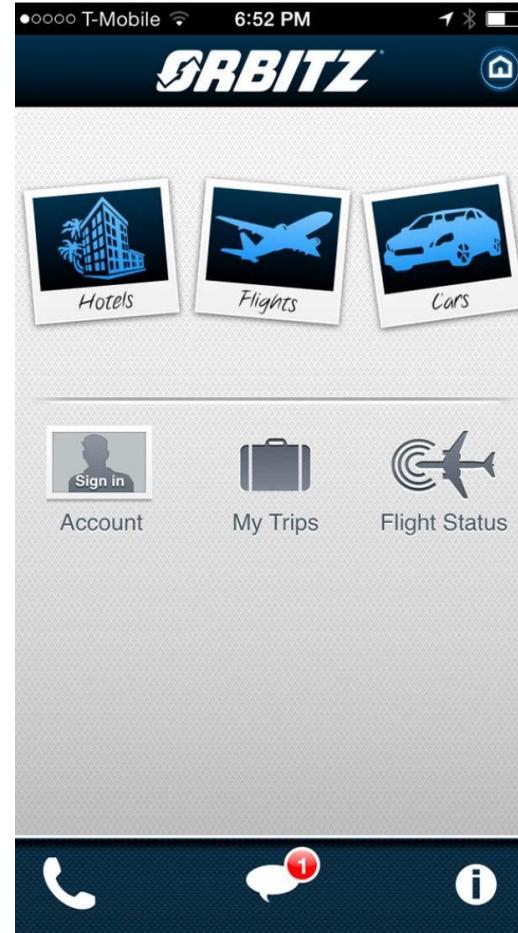
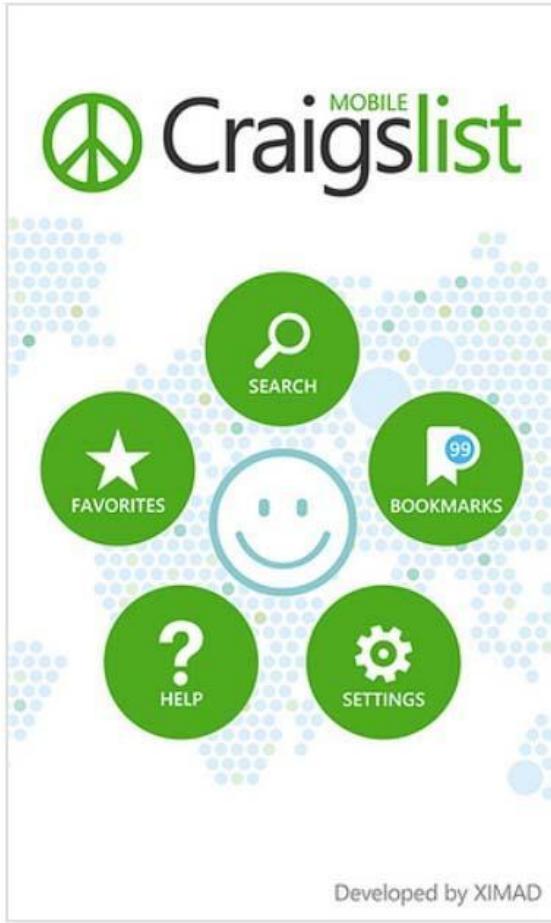
Home page of iOS phones.
Example of traditional
springboard



Springboard with **irregular layout** to emphasize **importance**
(Windows phone) or **hierarchy**
(LinkedIn for iOS).



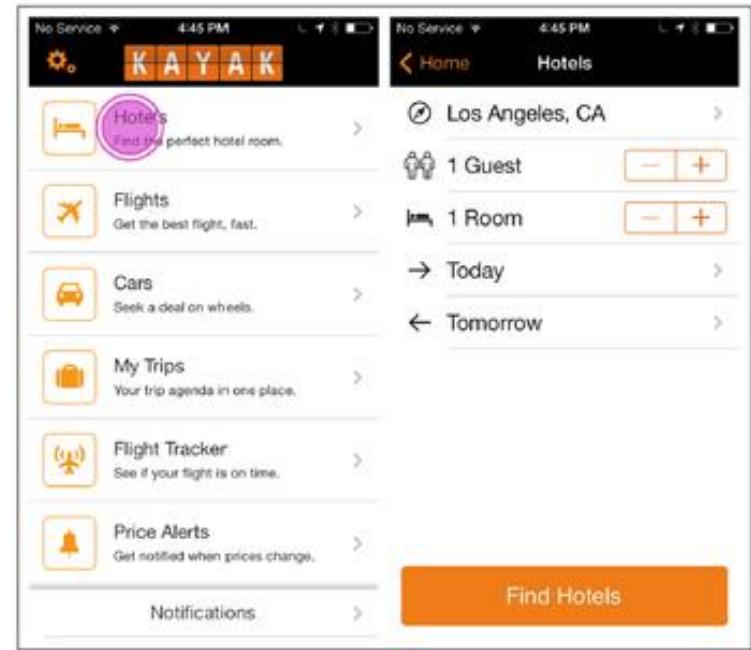
Customized Springboard with irregular components



List Menu

Each **list item** is a **launch point** into the application, and switching modules requires navigating back to the list.

- Users navigate by making **one choice per screen** until they reach their destination.
- To navigate to another destination, users must **retrace** some of their steps (or **start over** from the beginning) and make different choices.
- All internal screens should have a **way for returning back**. This is a kind of **hierarchical navigation**.



Works well for long (potentially infinite) lists with subtext [Kayak for iOS].

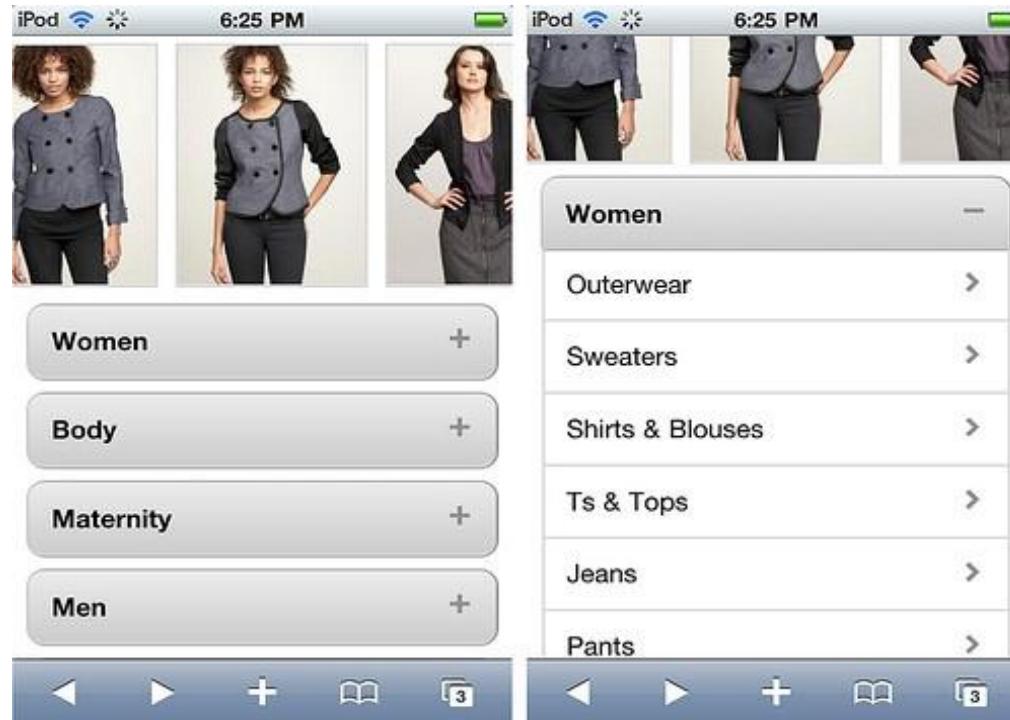
Customized List Menu with headings and icons



Expanding Lists

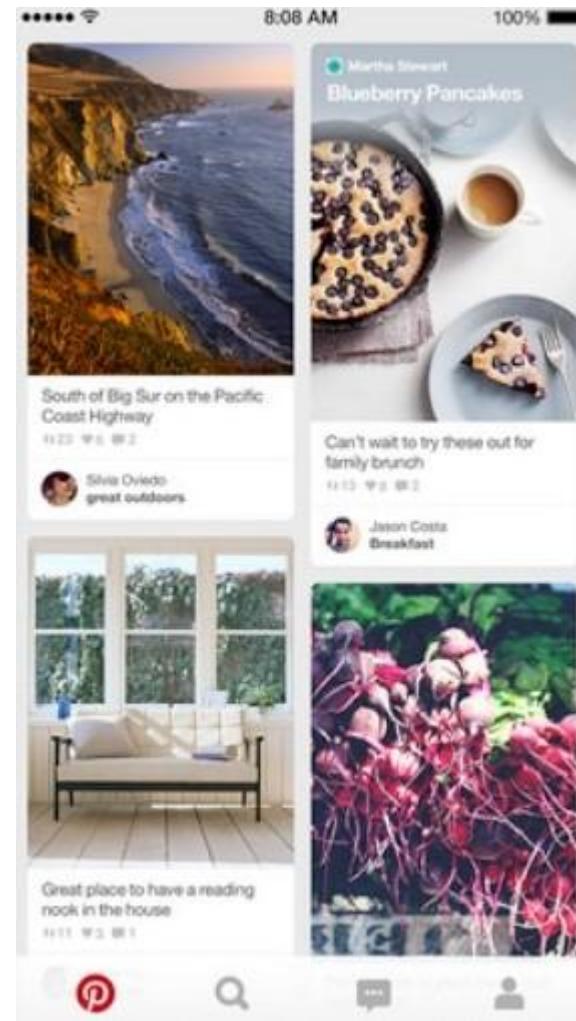
Works best for progressively disclosing more details for an object.

Often used when a mobile app has been ported from an existing desktop's one.

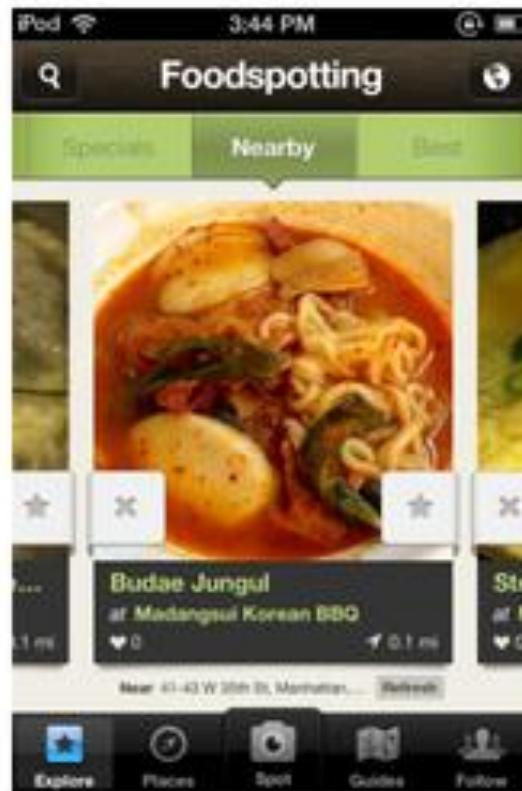
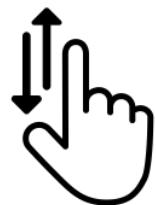
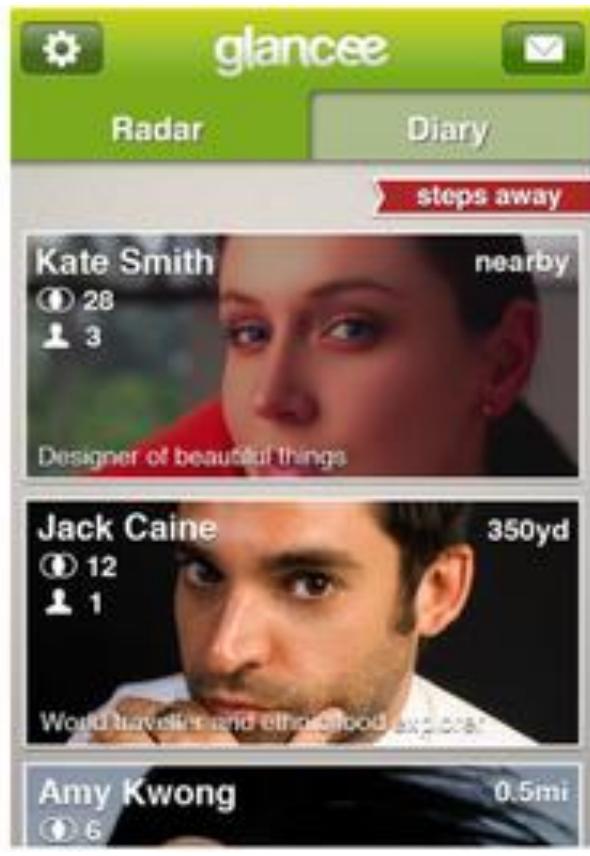


Cards

- **Cards** are small containers that logically encapsulate relevant information.
- Card navigation is based on a **card deck metaphor**, often including common card deck manipulations such as *stacking*, *shuffling*, *discarding*, and *flipping*.
- Good for presenting similar objects whose size or supported actions can vary considerably.



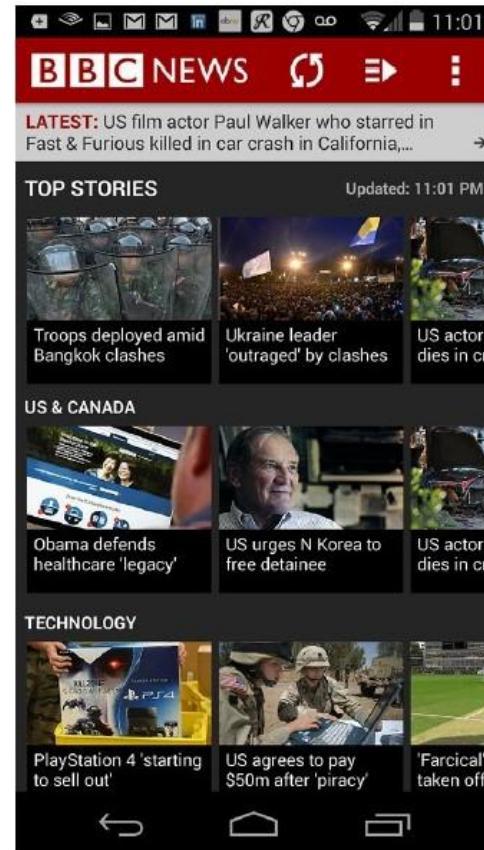
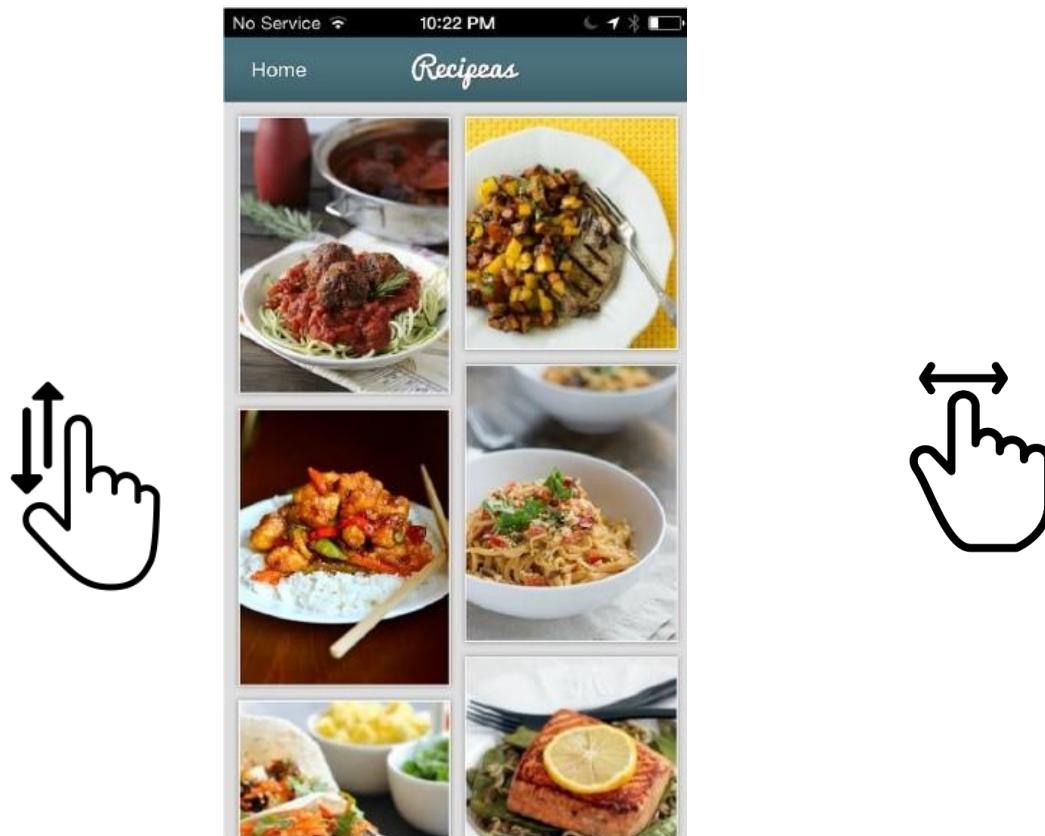
Example of Cards



Gallery

It works best for showing frequently updated, highly visual content where **no hierarchy** is implied.

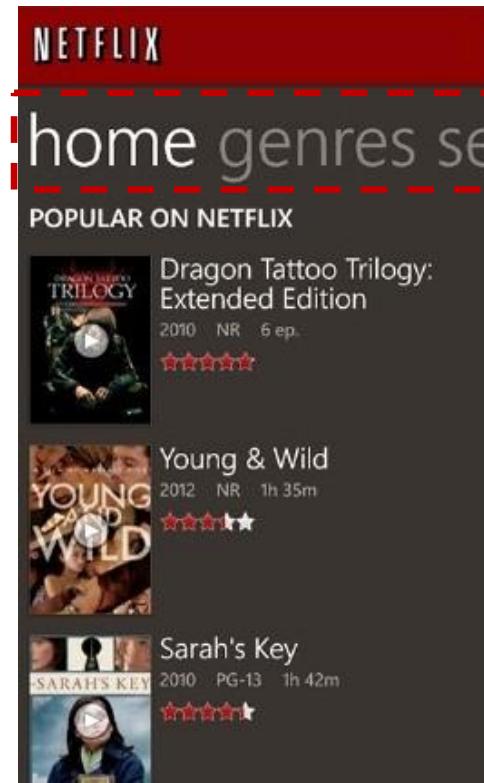
- The Gallery pattern displays live content (news, recipes, movies or photos) arranged in a **grid** (as with *Recipeas* app) or a **carousel** (as with BBC News)



Tabs

Clearly differentiate the selected tab from the others!

- **Tab bars** are suggested to navigate **flat information structures**.
 - Users can navigate directly from one primary category to another because **all primary categories are accessible from the main screen**.



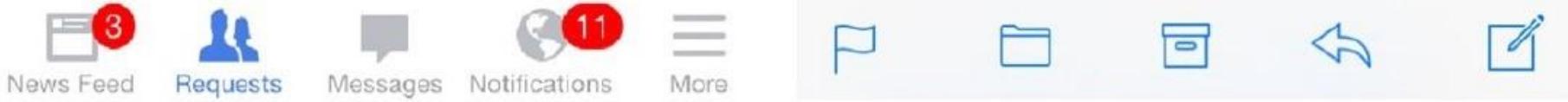
Tabs: further examples



Antipattern! Yammer has tabs, but no labels, making navigation more of a challenge.

Do not confuse tab bar with toolbar!

The Tab Bar is for navigating the main categories of the app; the toolbar presents the tools and actions, for a specific screen.



Hipstamatic for iOS.
Emulation of a real camera.

Metaphor

This pattern is characterized by an interface designed to match its real-world counterpart.

Use the Metaphor pattern judiciously!



Infinite Area

The entire data set can be considered to be a large, navigable two dimensional graphic.

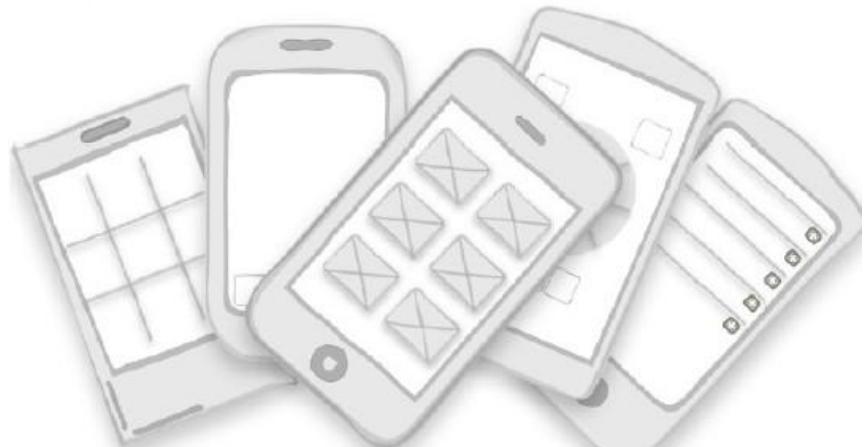
The viewport shows only a small subset of the whole data set.



Primary Navigation

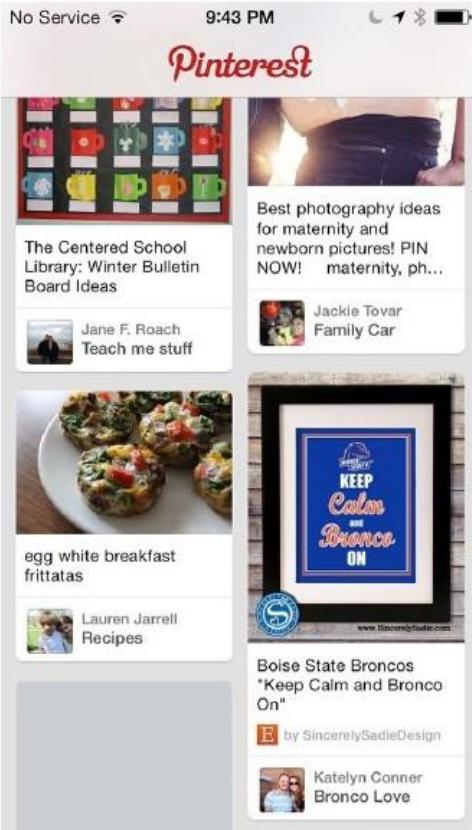
transient patterns

- The term **transient** means “staying a short time”, which is exactly how such navigation components work.
- They are **hidden** until we reveal them; then we make a selection and they **disappear again**.
- Transient Patterns:
 - Retracting Tab
 - Side Drawer
 - Toggle Menus



Retracting Tab

- Tab bar collapses or appears when the user is scrolling or swiping down through content.

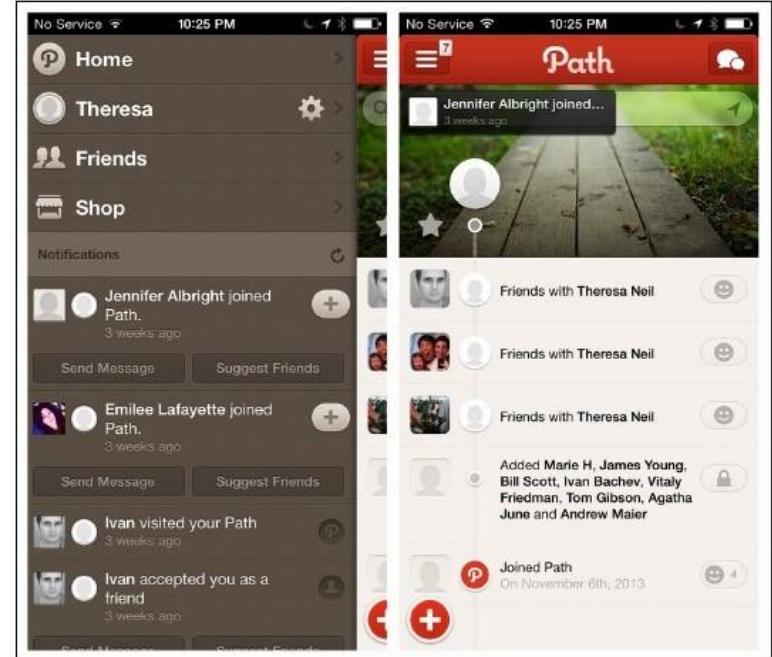
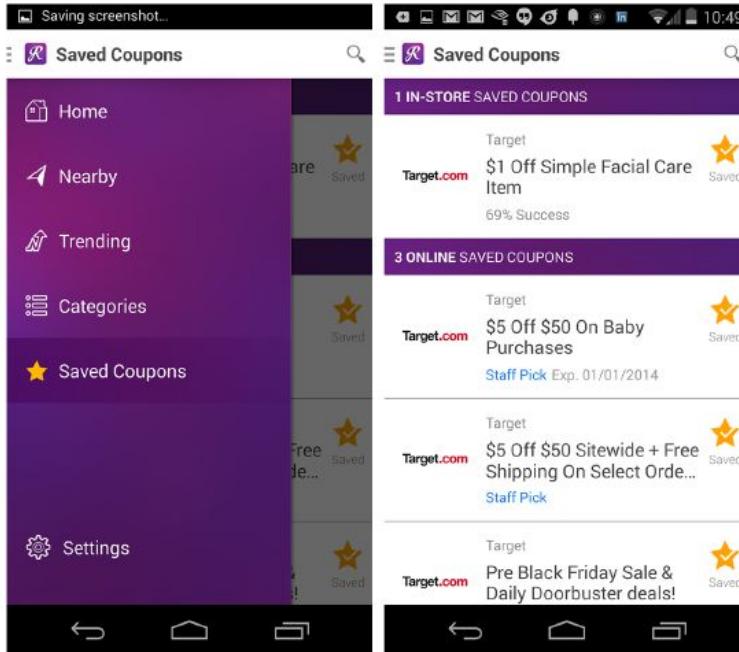


Pinterest for iOS:
scrolling down hides
the toolbar; scrolling
up reveals it!



Side Drawer

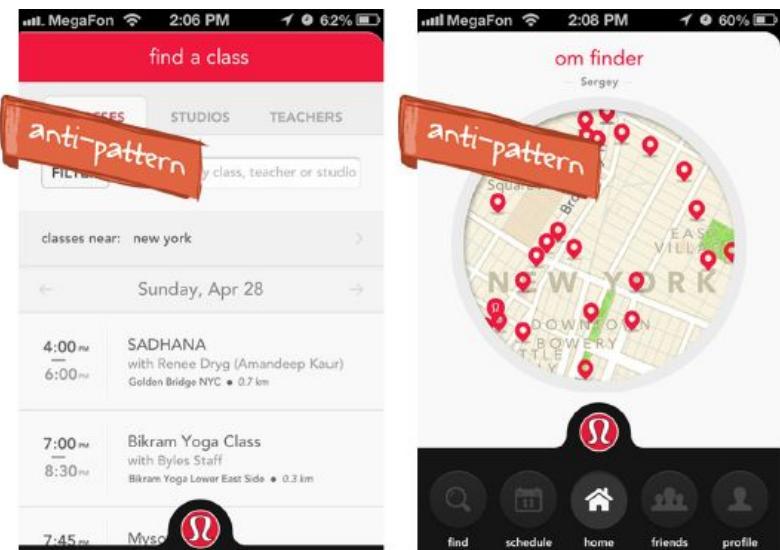
- There are two styles of Side Drawers.
 - The first is an **overlay**, meaning a **swipe gesture** will reveal a drawer that partially covers or overlaps the original screen content (as in RetailMeNot for Android).
 - The second style is an **inlay**, in which a **swipe** gesture will open a drawer that pushes the original screen content partially off-canvas (as in Path for iOS).



Tips for realizing side drawers

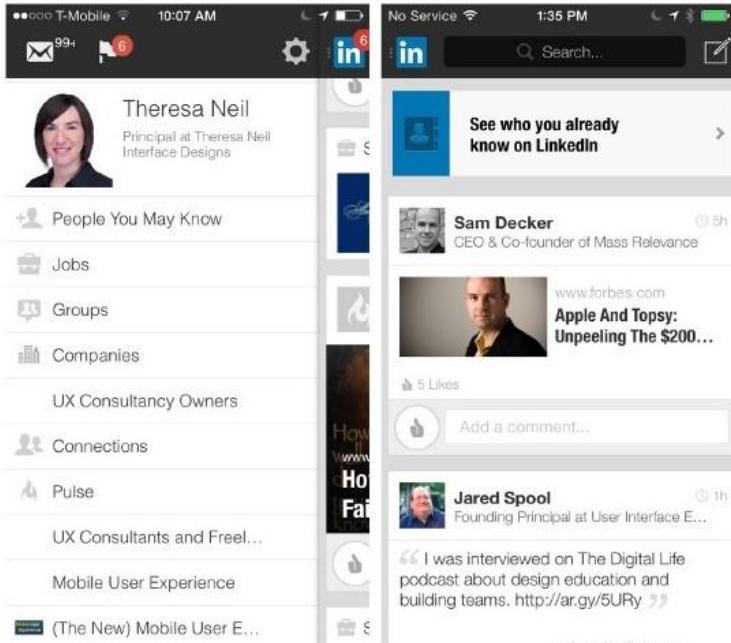
1. The Android design guidelines recommend having the **drawer automatically open on first use** so the user can see the menu and its structure, and learn how to close the drawer.
 - ? In the subsequent interactions, just launch the app with the side drawer closed.
2. The most popular orientation for the side drawer is **on the left**, but there are examples in which it is placed on the right (IfThisThenThat for iOS) or on both sides (Facebook for Windows Phone).
3. **Avoid to position** the side drawer on the bottom or on the top!
 - This positioning conflicts with the swipe up/down gesture that reveals the Control Center and Configuration features in iOS/Android devices.

Om finder for iOS. Almost every time we try to open the side drawer, the iOS Control Center opens instead.

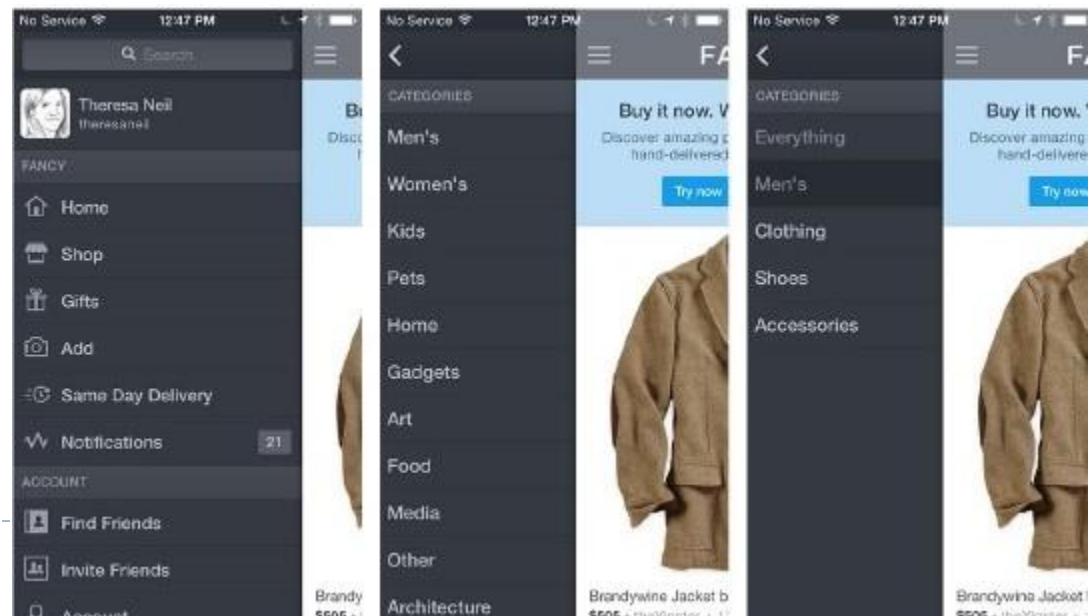


Tips for realizing side drawers

4. Side Drawer content **need not be limited** to only navigation options.
 - ? They may include profile information (Linkedin for iOS)
5. Side Drawer can be more than one level deep. You can tap-tap-tap down the path until you reach the lowest level category.



Do not overload side drawer with too many features. And **always include** a back button to the top-level navigation options.

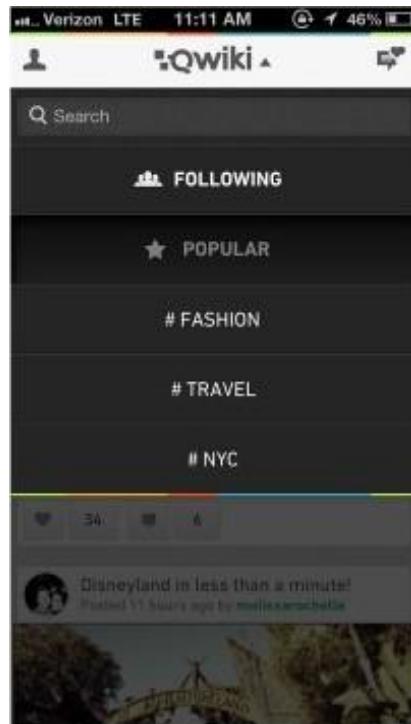


Toggle Menu

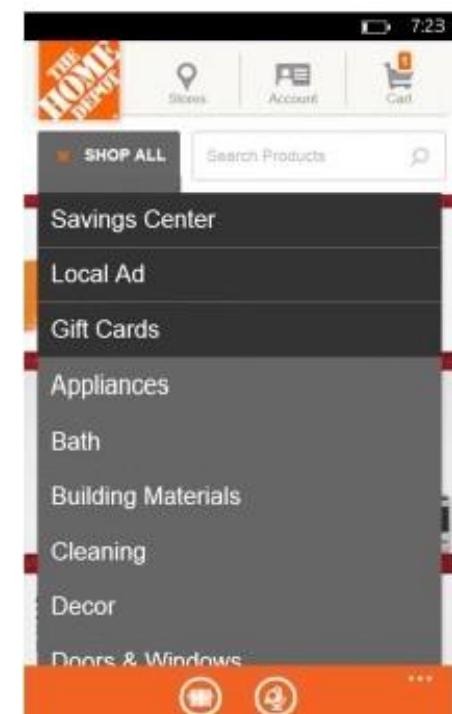
The Toggle Menu can be an **inlay** that pushes the content down below the menu, or an **overlay** that appears as a layer above the content.

The overlay design is the **more common option** in native mobile apps.

It should not cover the whole screen, but instead let the background peek through. Tapping anywhere in the background should also hide the menu.



Qwiki for iOS.
Inlay toggle menu.



Home Depot for Windows
phone
Overlay toggle menu.

Persistent vs Transient Navigation

- When deciding between persistent and transient navigation, ask yourself a few questions:
 - Is your application “flat”?
 - Are the menu categories equivalent in hierarchy, and are there just a few primary categories (i.e., three to five) in the app?
 - Do your users need the menu to be always visible for quick access?
 - Do the menu categories have status indicators, like the number of unread emails, for instance?
- If you answered **yes** to one or more of these questions, it’s probably best to stick with **persistent navigation**.

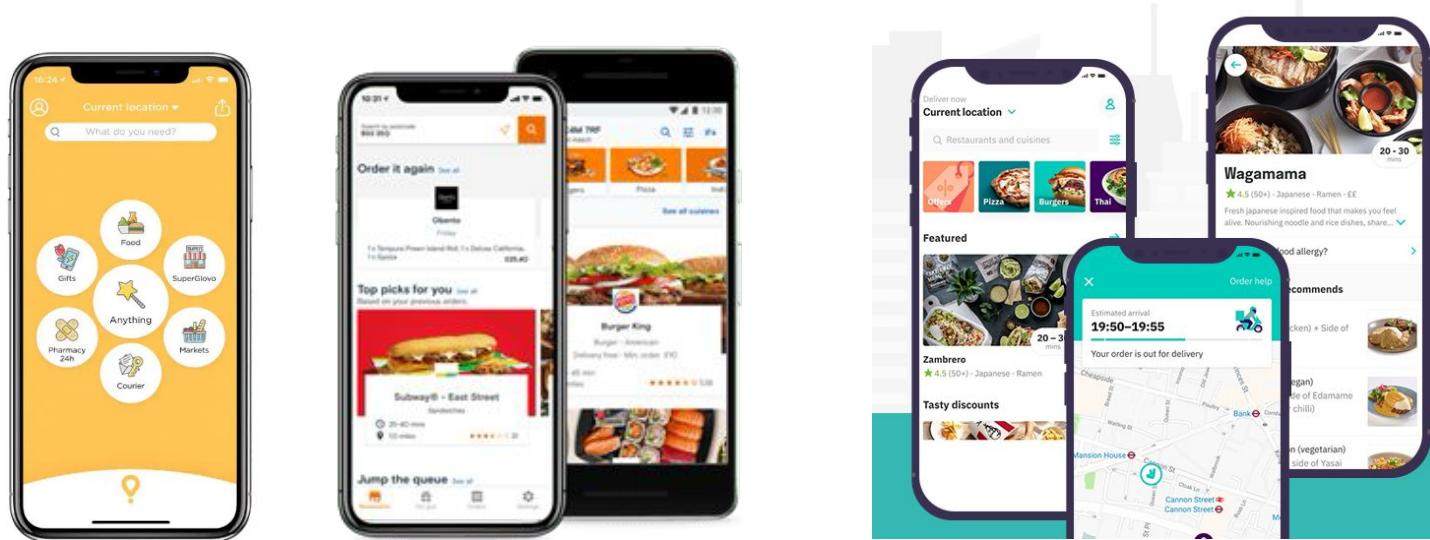
Exercise

We want to create a series of mockups for a mobile food delivery application, by looking at existing patterns, where users can:

Search for a particular restaurant using a search bar.

Look at a list of restaurants, divided in category, that can be sorted in different ways (e.g., number or likes, price, distance....).

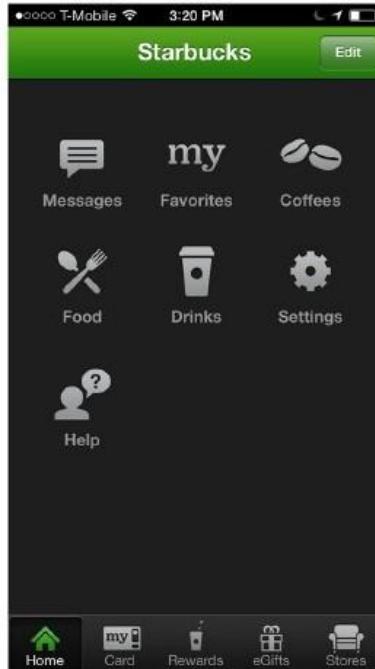
Search for restaurant using a map.



Secondary Navigation

National Geographic for iOS:
Side Drawer for primary navigation,
Gallery for secondary.

- It is about the navigation **within** a selected module.



Starbucks for iOS:
Tabs for primary navigation,
Springboard for secondary.



Page Swiping

- This pattern for secondary navigation can be used to navigate quickly through content using the swipe gesture.
- The most common way to communicate this navigation pattern is via page indicators (the iOS term for the horizontal line of little dots) or with cards.



Audible for iOS.
Tabs for primary navigation,
Page Swiping for
secondary.
Note page indicators.

Exercise

Side Drawer + List Menu

- Can you compare these navigation designs?

Tab bar + List Menu



Springboard + page swiping



HCI 24/25



Mobile Design Patterns

Roadmap

- Navigation
- **Forms**
- Search
- Tools
- Helps and Tutorials
- Feedback & Affordance

Forms

- Used for data entry and configuration features:
 - Sign In
 - Registration
 - Check-in
 - Comments
 - Users Profile
 - Share
 - Empty Datasets
 - Multi-step
 - Settings

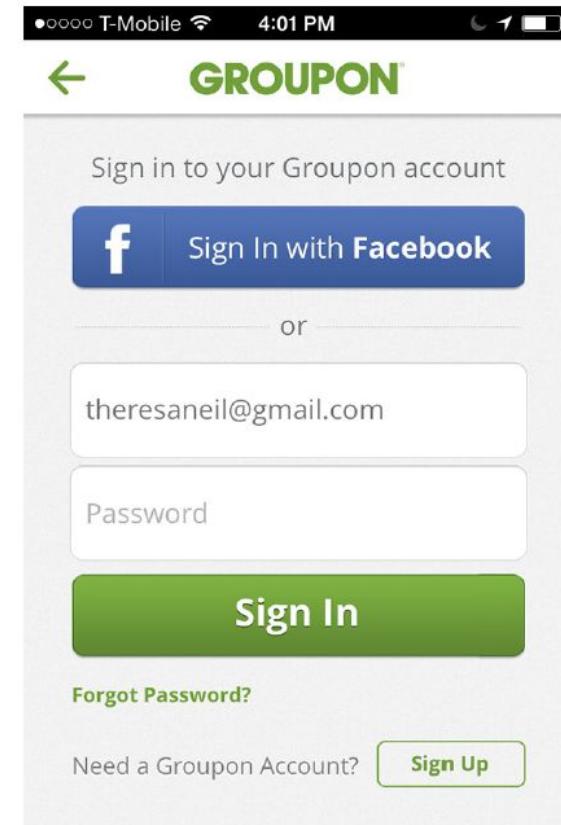


Sign In

- Sign In forms require a minimal number of inputs:

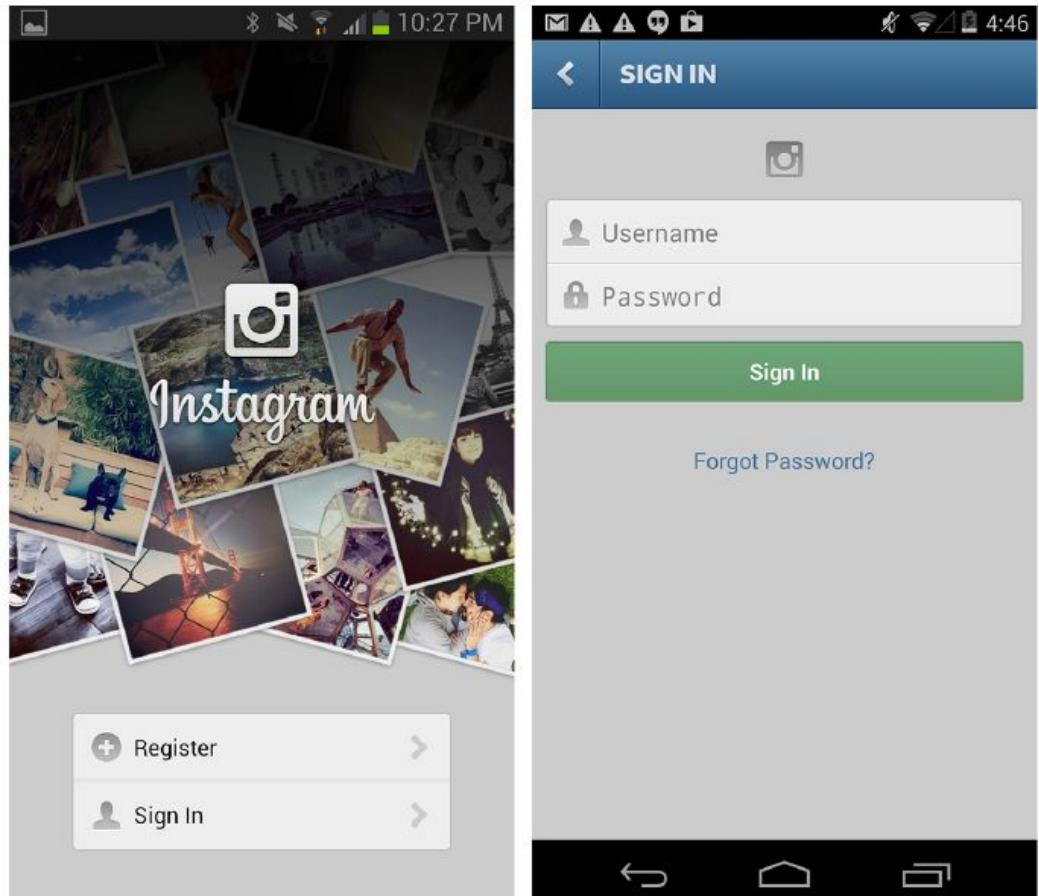
- username
- password
- command button
- password help
- option to register
- social sign in [optional]

Some apps do this
in a **single screen**
(Groupon for iOS)



Sign In

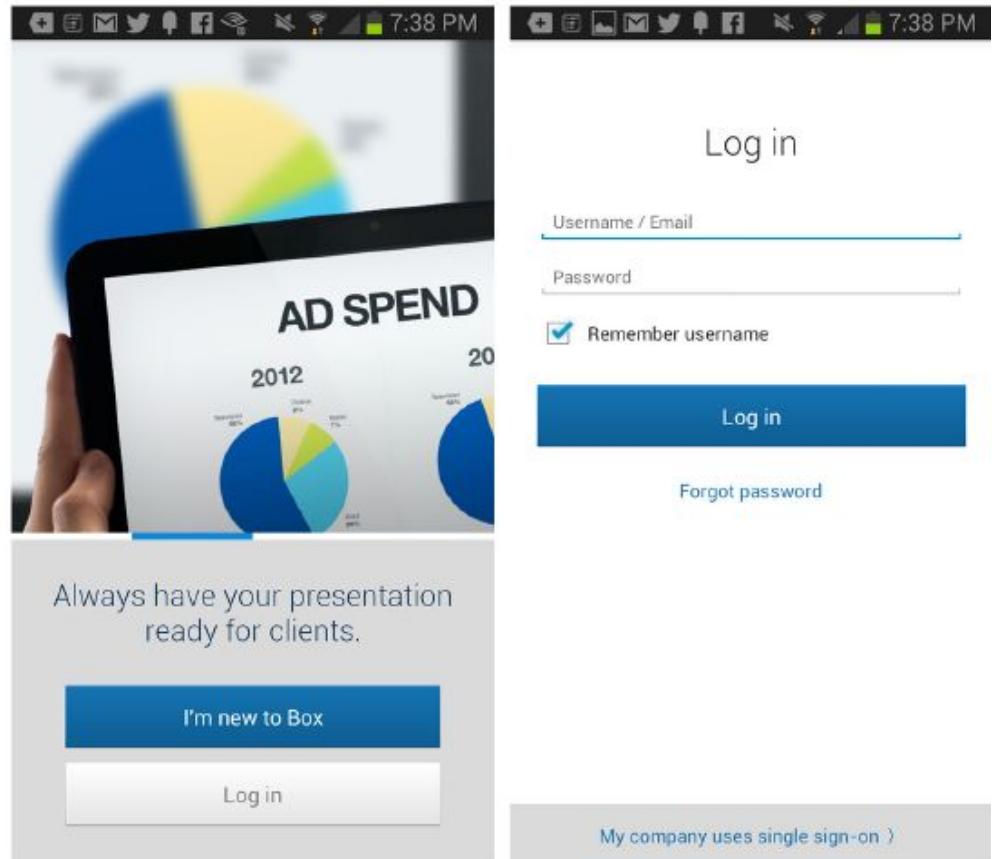
Other apps (Instagram for Android) present the Sign In and Register options **up front**, then take the user to the appropriate form.



Sign In

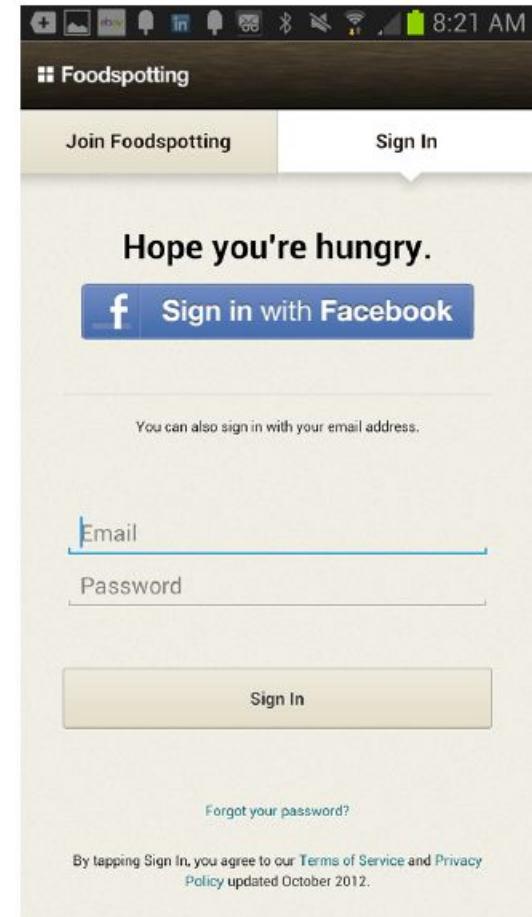
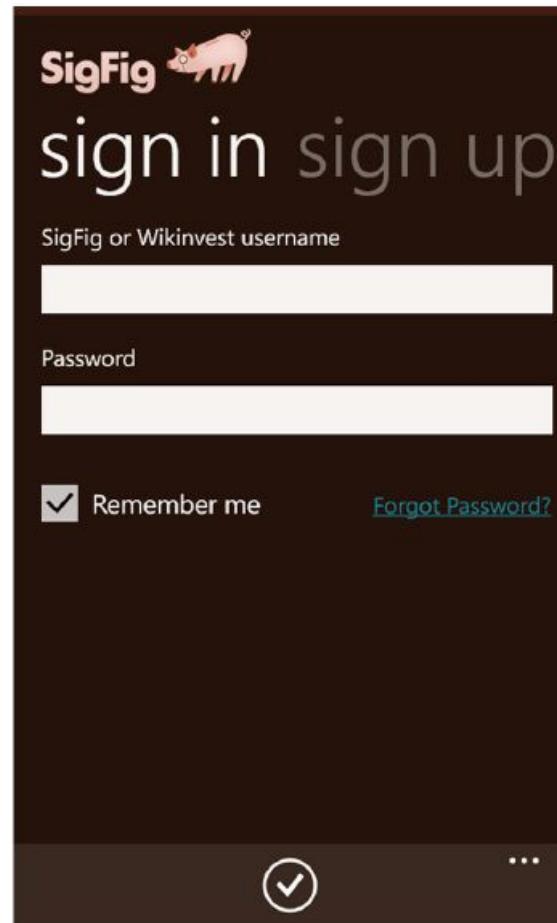
Other apps (Box for Android), place the Sign Up and Log In options in context **within the promotional tour**.

Prospective users may take action once they have been persuaded to use the app, and equally easy to simply log in.



Sign In

Sign In and Sign Up on **tabs**.
(Foodspotting for Android and
SigFig for Windows Phone)



Do not force users to register if it is not strictly required!

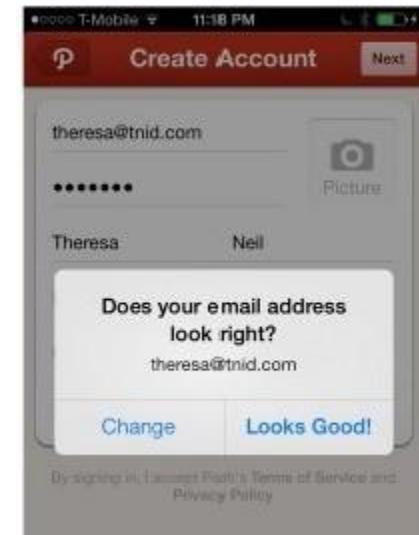
Registration . . .

- Keep it short, preferably one screen. Register button well visible.
- Eliminate the redundant Confirm Email and (if possible) Confirm Password fields.

Nook for Android.
Redundant Email and
Password fields.



Tips: prompt users to double-check the email. Use Hide/Show options for checking the password.



Exercise

We want to create a series of mockups for a mobile banking application for iOS devices.

Starting from the previous exercises, design a complete prototype of the banking application through Balsamiq Wireframes or Figma. Include a login/logout feature.

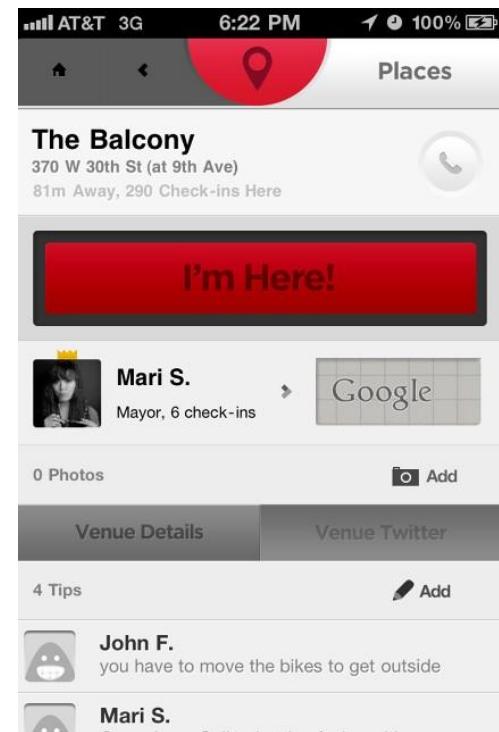
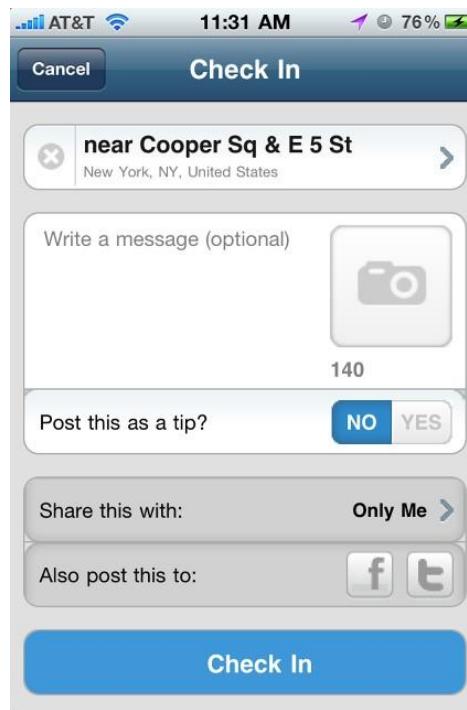
Exercise

- ? We want to create a series of mockups for a mobile banking application for iOS devices.
 - ? Starting from the previous exercices, design a complete prototype of the banking application through Balsamiq. Include a login/logout feature.
 - ? Tutorial & Screencast:
<https://support.balsamiq.com/tutorials/mobileapplication/>



Check-in

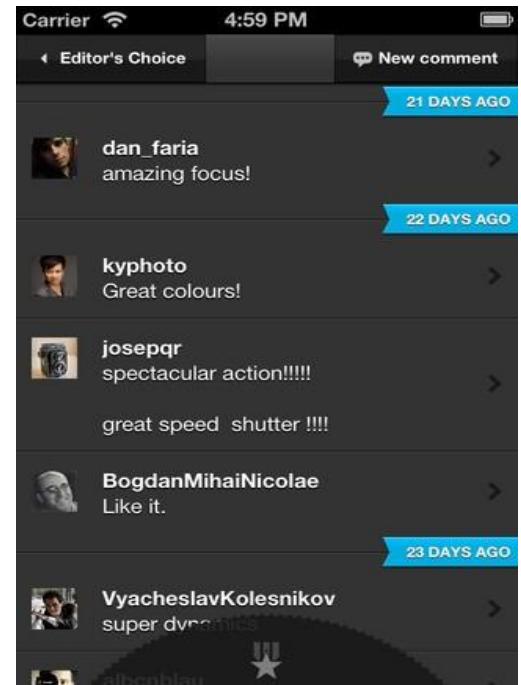
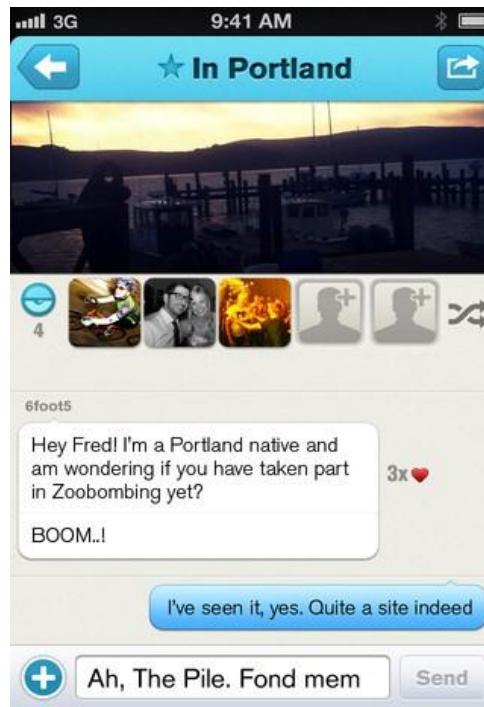
- It allows people to use the GPS on their mobile devices to let friends know exactly where they are.
- Keep it **ultra-short**. Design for speed, and efficiency.
- **Eliminate unnecessary fields.**



Credits: Ivano Malavolta
Design Patterns for Mobile Apps

Comments

- Feature used for inviting and allowing users to leave comment.
- **Always clarify** what is being commented!
- Show other people's **comments over time**.



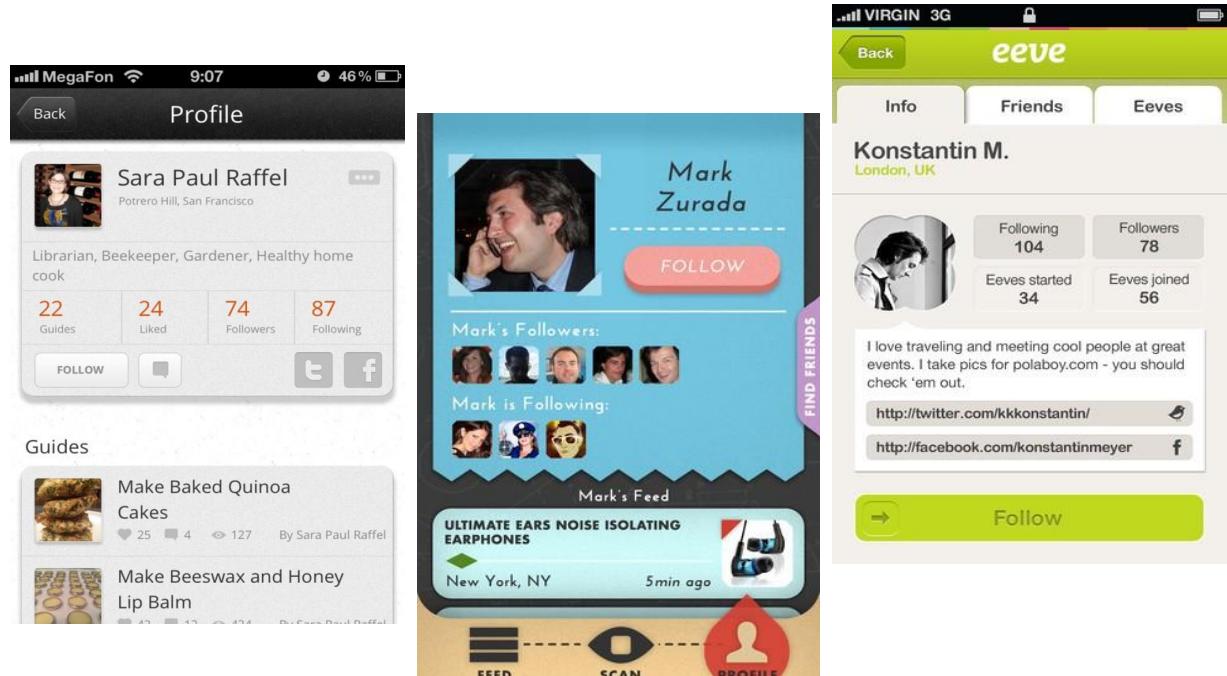
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Design Patterns for Mobile Apps

How to show timeline?

- Within the current hour, show as *minutes ago*.
- Within the current day, show the time as number of *hours ago*.
- Within the last two days, show the *day of the week*, and the *time range*, morning, afternoon, evening, night.
- Within the past week, show the *day of the week*.
- Within 12 months, show as *mm/DD*.
- Older than 12 months, show *only the year*.

User's Profile

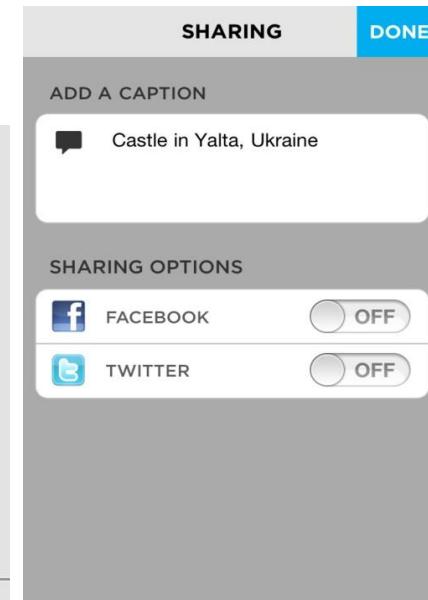
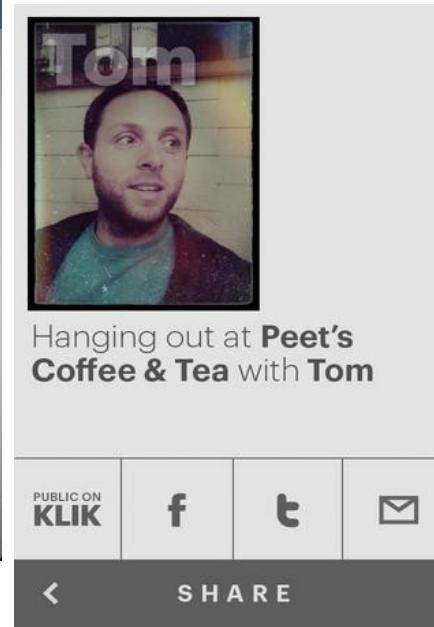
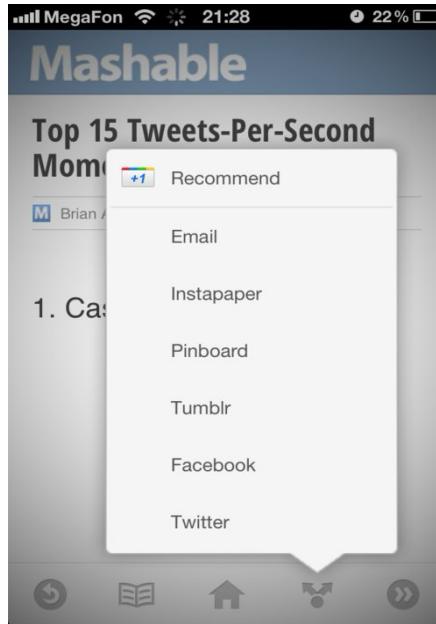
- Put the **name** and the **picture** in evidence.
- Show their **contribution** to the app or to the social network.
- Provide **action controls**.



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Design Patterns for Mobile Apps

Share

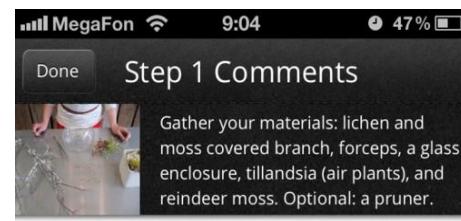
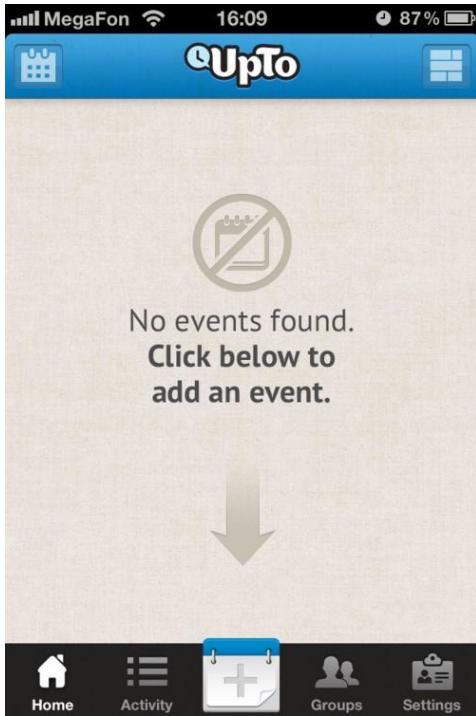
- Always provide an “**off social**” way to share (e.g., by email).
- **Remark what is being shared** and keep track of past logins.



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Design Patterns for Mobile Apps

Empty Datasets

- **Avoid white-screens**, explain why the dataset is empty
- Call for action, only one!
- **Avoid error messages.**



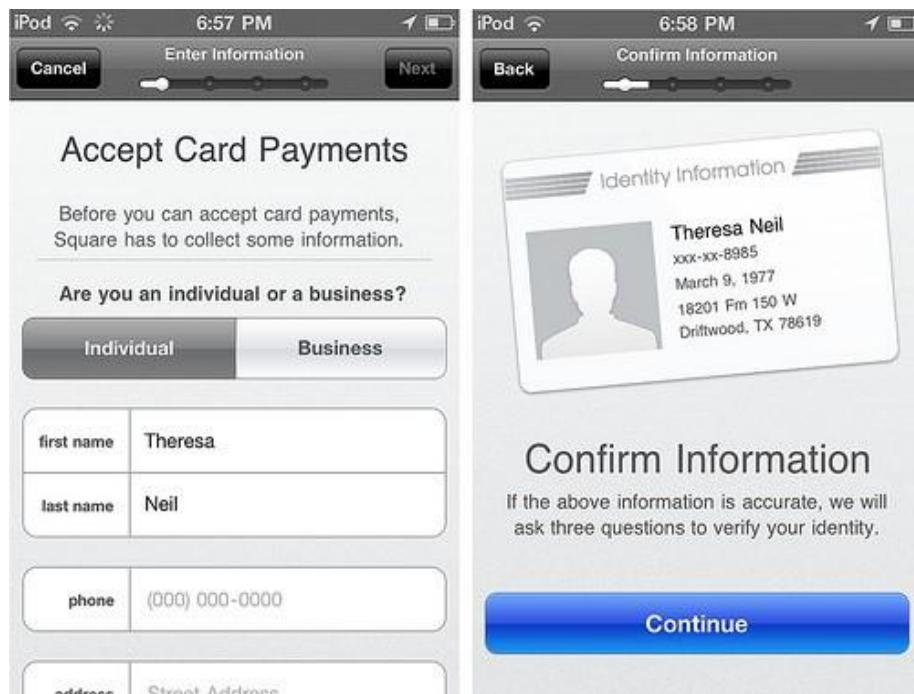
Be the first
to comment on
this step



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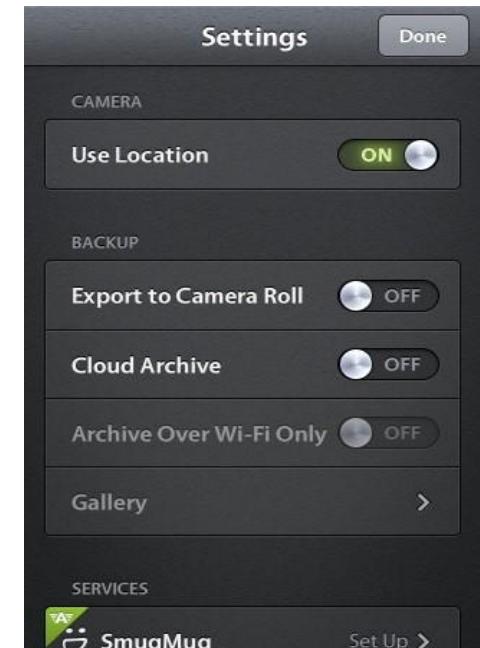
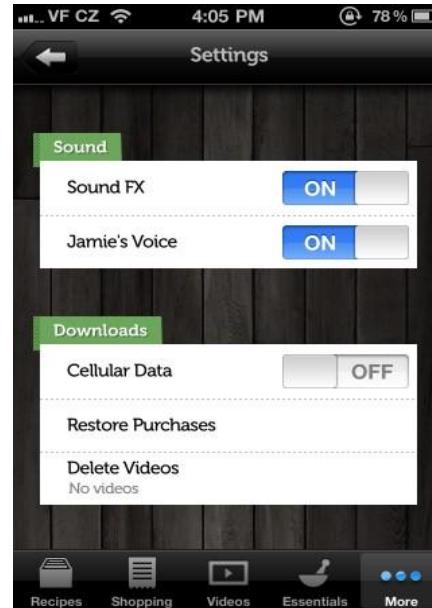
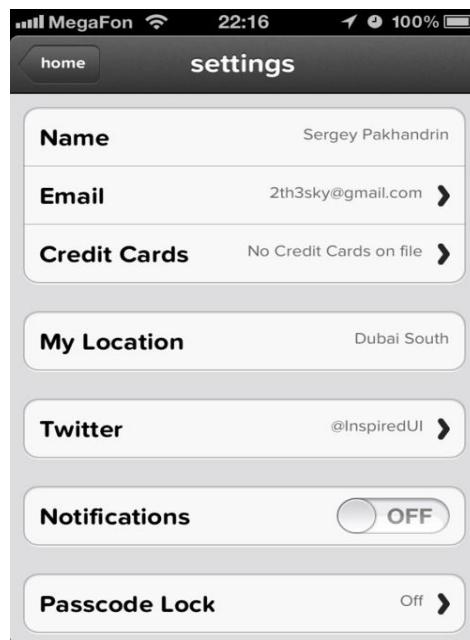
Multi Steps

- Show the user **where they are** and **where they can go**.
- Often organized as **sequential workflows**.
- Minimize the number of pages and steps.



Settings

- Put them inside the app.
- **Clear and grouped!** Easy to be understood!



Credits: Ivano Malavolta
Design Patterns for Mobile Apps

Roadmap

- Navigation
- Forms
- **Search**
- Tools
- Helps and Tutorials
- Feedback & Affordance

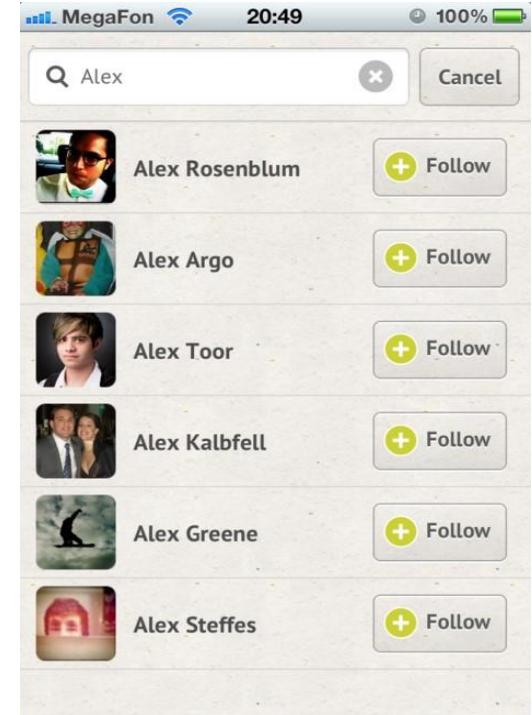
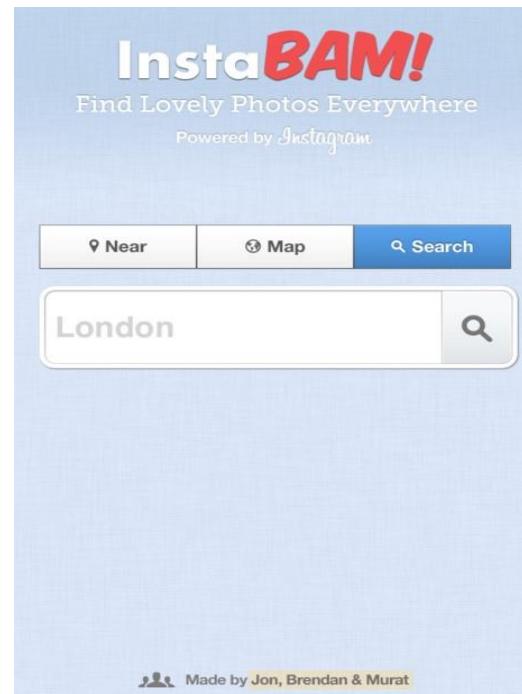
Search

- Explicit Search
- Dynamic Search
- Search form
- Search Results



Explicit Search

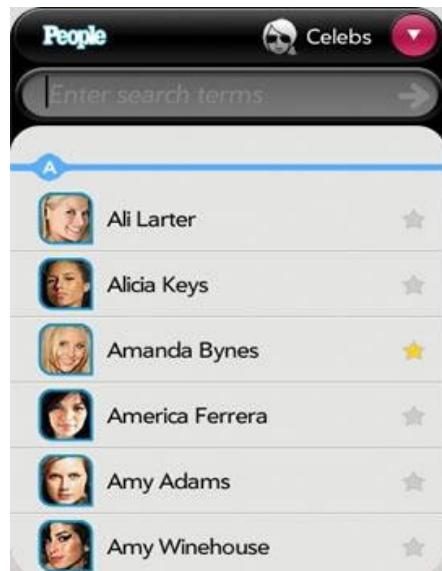
- Offer a **clear button** in the field.
- Provide an **option to cancel** the search.
- **Use feedback** to show the search is being performed.



Credits: Ivano Malavolta
Design Patterns for Mobile Apps

Dynamic Search

- **Automatically filters** a given list of items dynamically, during typing.
- Works well for constrained data sets, like an address book or personal media library.



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Search form

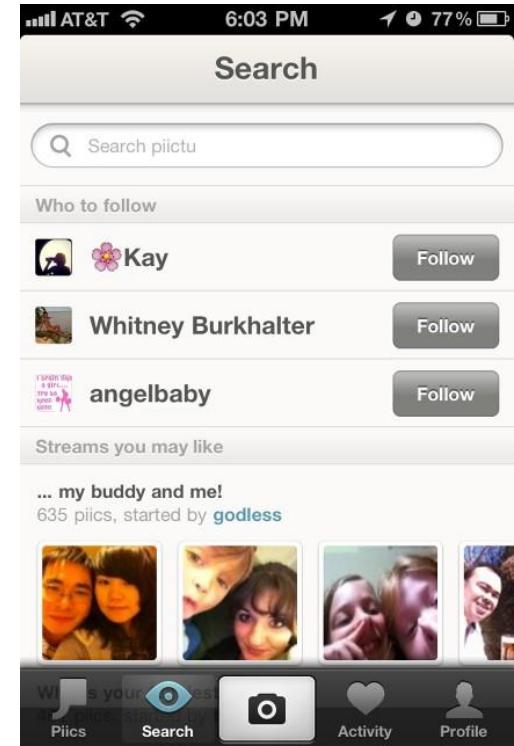
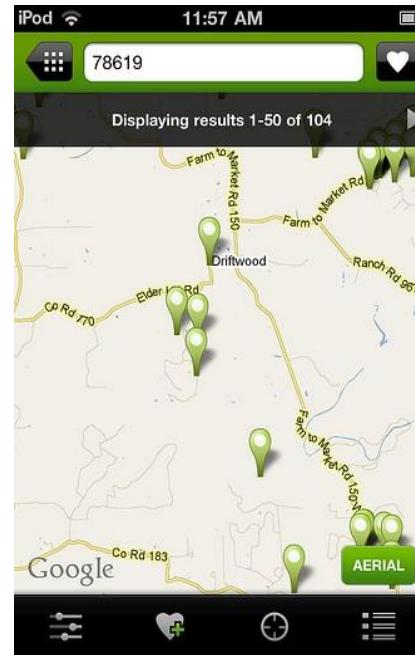
- **Minimize** the number of input fields.
- Follow form design best practices (alignment, labels, size)
- Use only when strictly needed!



Credits: Ivano Malavolta
Design Patterns for Mobile Apps

Search Results

- Scroll down to analyze the results.
- Apply a **reasonable default sort order**.
- Call for action.



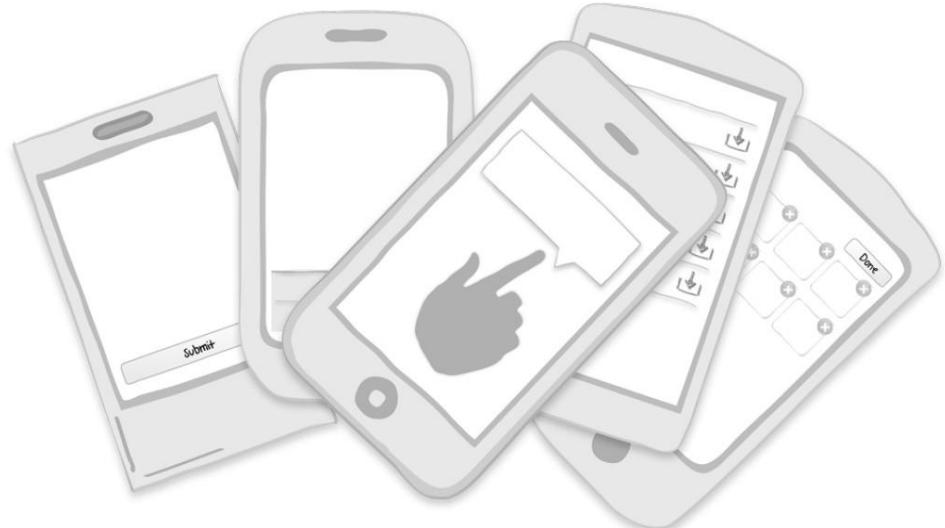
Credits: Ivano Malavolta
Design Patterns for Mobile Apps

Roadmap

- Navigation
- Forms
- Search
- **Tools**
- Helps and Tutorials
- Feedback & Affordance

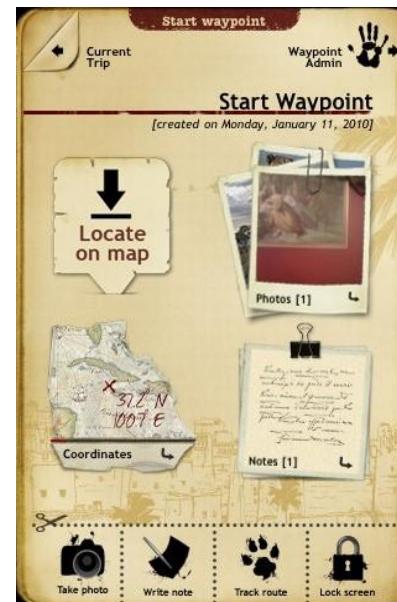
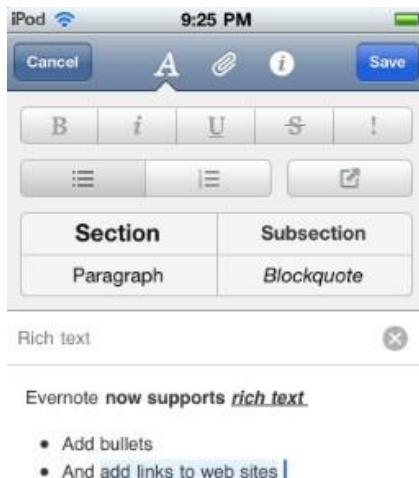
Tools

- Buttons & Controls
 - Toolbar
 - Contextual Buttons
 - Inline Actions
 - Call to Action Buttons
 - Multi-state Button
 - Actions on Maps



Toolbar

- Contain **screen level actions**, they are generally displayed at the bottom of the screen. **Different** from the tab bar!
- Choose icons that are easy to recognize, or use labels plus icons!

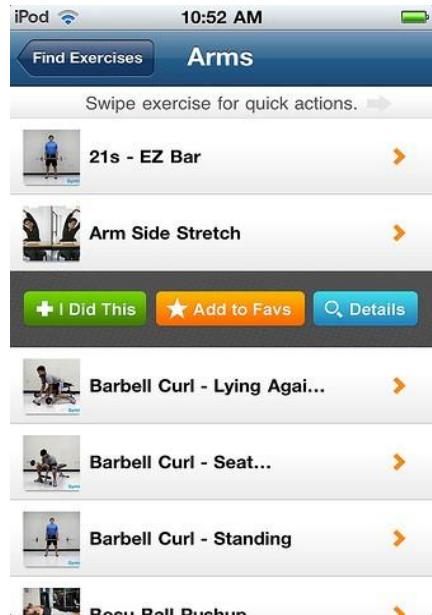


Credits: Ivano Malavolta
Design Patterns for Mobile Apps



Contextual Buttons

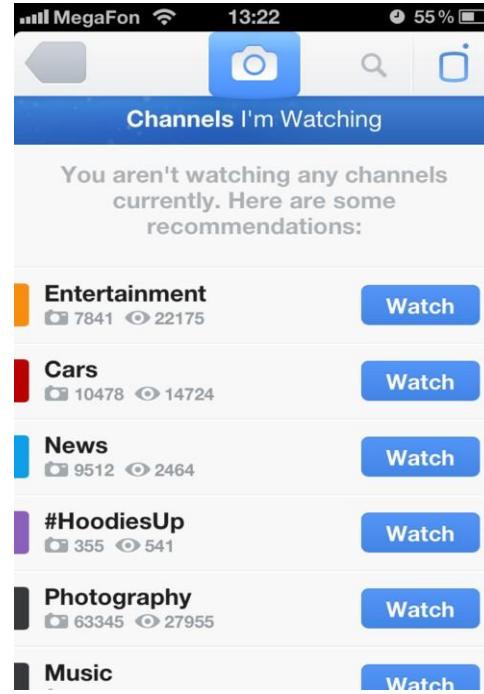
- If buttons are necessary, they should be displayed in **proximity to the actionable object**.
- Choose a familiar icon or use a text label.



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Inline Actions

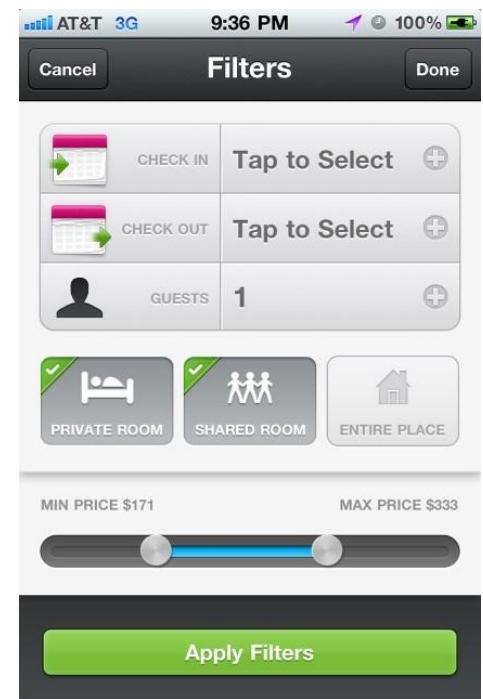
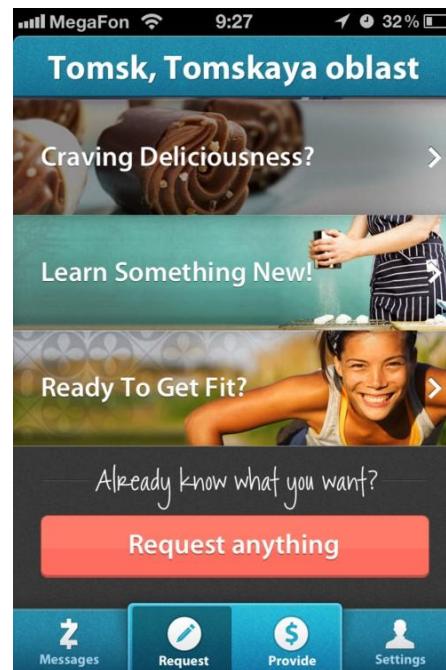
- They should be in **proximity to the actionable object**.
- Choose a familiar icon or use a text label.
- Max 1 to 2 Inline Actions per object!



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Call to Action Buttons

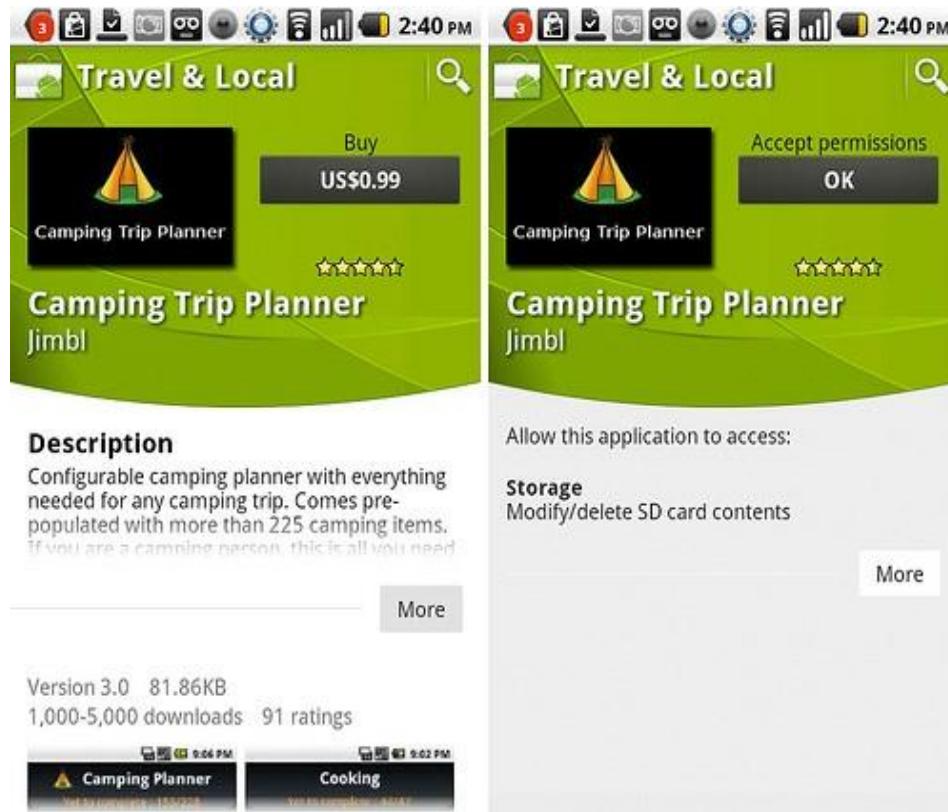
- **Don't hide the main call to action** in a menu or disguise it as an unrecognizable icon in a toolbar.
- **Good contrast and clear label!**



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Design Patterns for Mobile Apps

Multi-state Buttons

- Multi-State Buttons work well for a series of tightly correlated actions that will be performed in succession.



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Actions on Maps

- Provide visible markers (avoiding “terrain-mode”).
- Use as **much screen** as possible
- Can be small if the location is not the main item.



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Design Patterns for Mobile Apps

Roadmap

- Navigation
- Forms
- Search
- Tools
- **Helps and Tutorials**
- Feedback & Affordance

Helps and Tutorials

- Helpful tips displayed the first time a user launches an app.
 - Dialog
 - Tips
 - Tour
 - Video
 - Transparency



Dialog

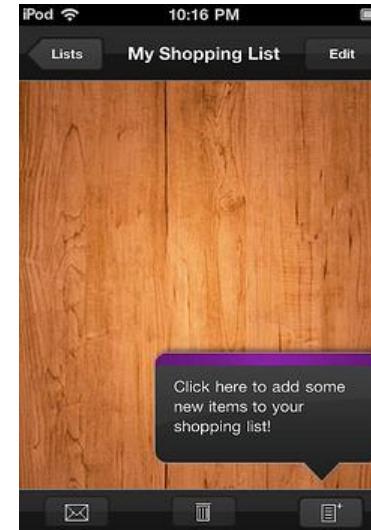
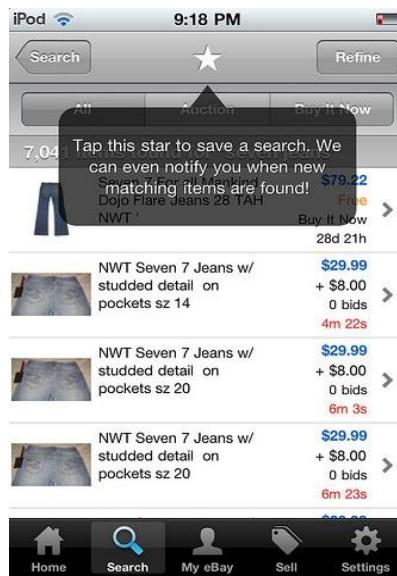
- Keep dialog content short.
- Make sure there is an alternate way to access instructions from within the application.



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Tips

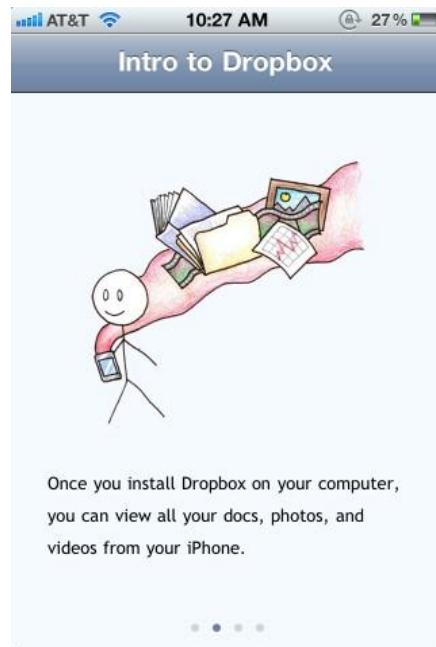
- Place tips in **proximity to the feature** they refer to.
- Keep the content short.
- **Remove the tip once interaction begins.**



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Tour

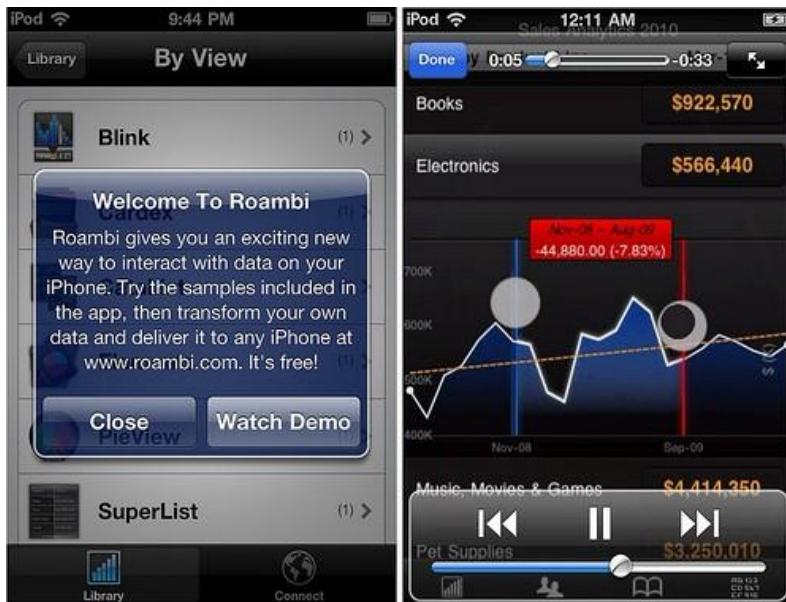
- A tour should **highlight key features** of the application, preferably from a (user) goal perspective.
- Keep it short and visually engaging.



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Design Patterns for Mobile Apps

Video

- Demos and screencasts should showcase **key features** or show **how to use the application**.
 - Common video features (pause, volume controls, etc.) should be provided.



Transparency

- Transparencies are not meant to compensate for poor screen designs!
- Remove the Transparency once interaction begins.



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Design Patterns for Mobile Apps

Roadmap

- Navigation
- Forms
- Search
- Tools
- Helps and Tutorials
- **Feedback & Affordance**

Feedback & Affordance

□ Feedback

- Errors
- Confirmation
- System Status

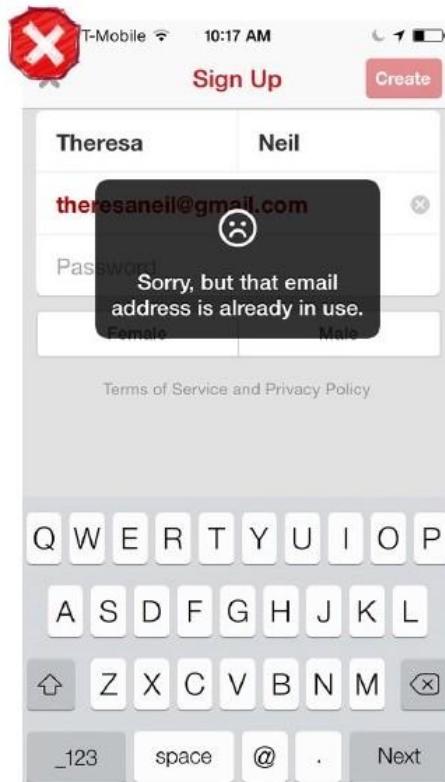
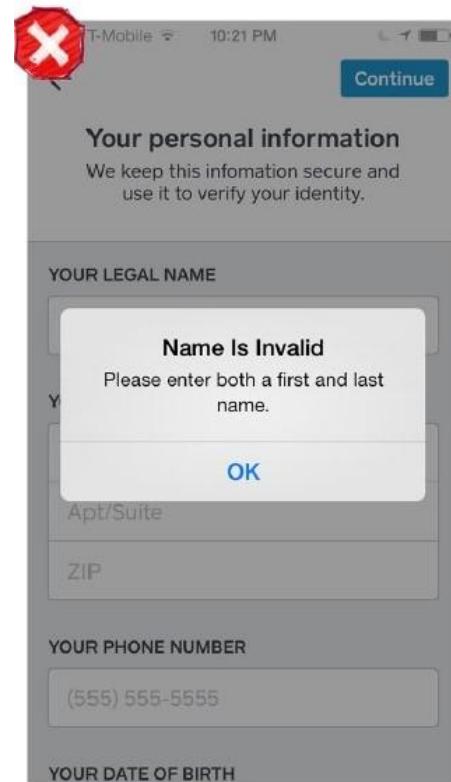
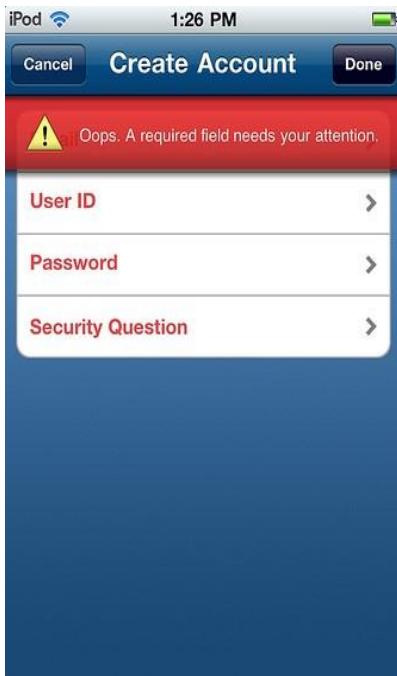
□ Affordance

- Tap
- Flick
- Drag



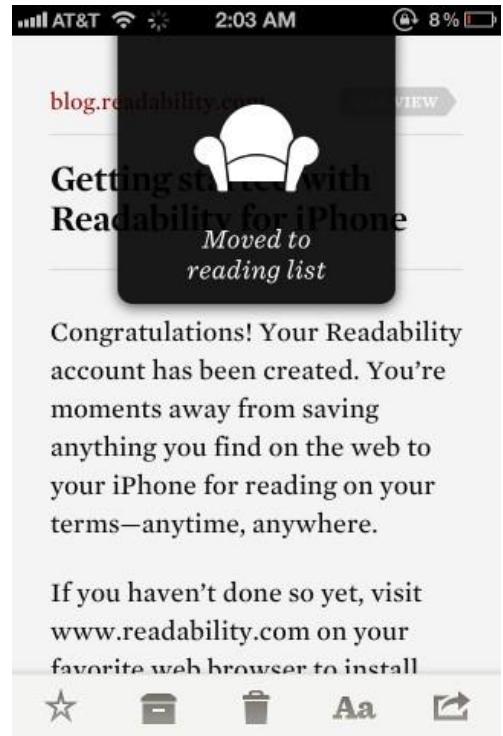
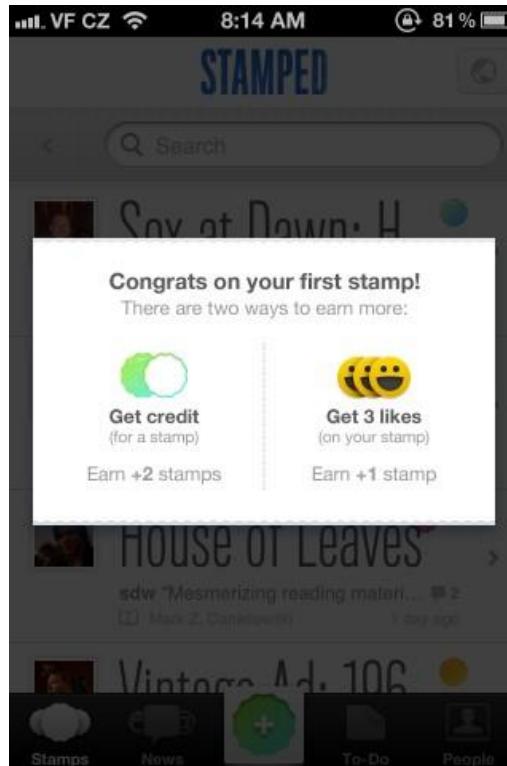
Feedback: Errors

- Use plain language that offers a solution for resolving the issue.
 - make the error **visible**.
 - use **in-screen messaging** instead of modal dialogs.



Feedback: Confirmation

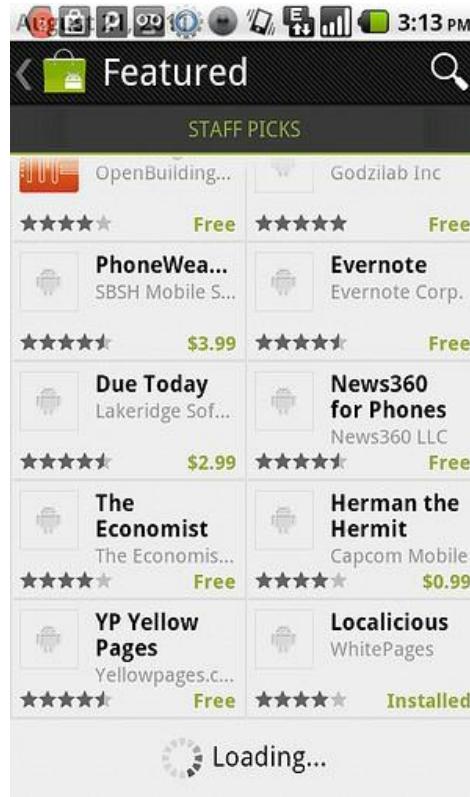
- Provide confirmation when an action is taken.
 - don't break the user's flow!



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Design Patterns for Mobile Apps

Feedback: System Status

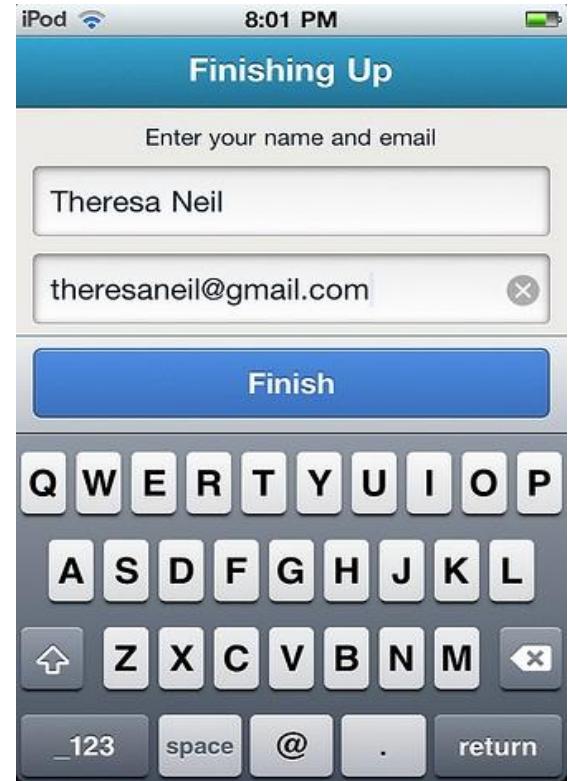
- Provide feedback about the system's status.
 - Offer a cancel option for potentially lengthy operations.



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Design Patterns for Mobile Apps

Affordance: Tap

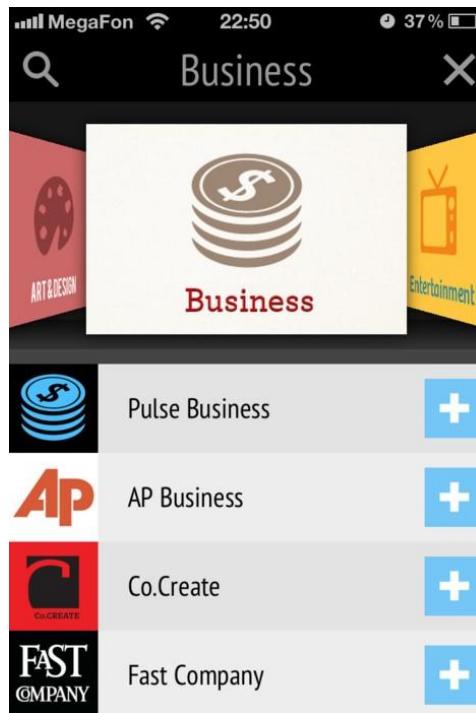
- Use common visual design techniques to indicate tappable controls.
- Apply 3D effects (for example, shadows) judiciously.



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Affordance: Flick

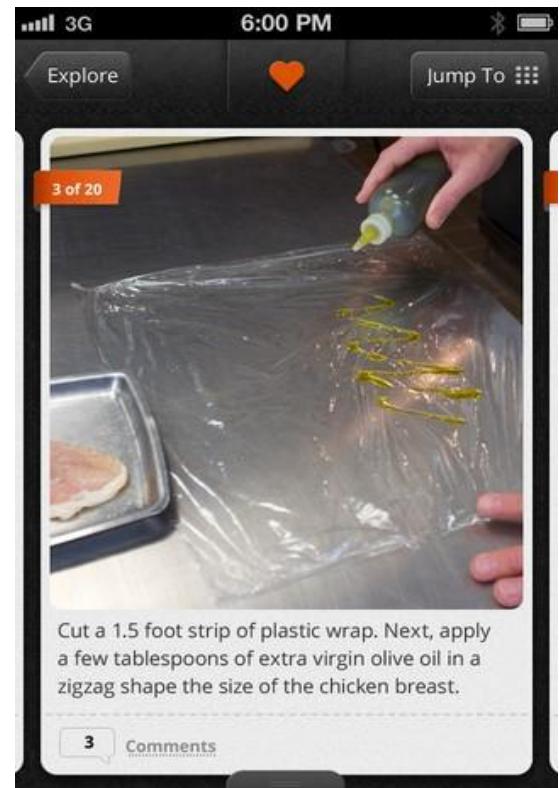
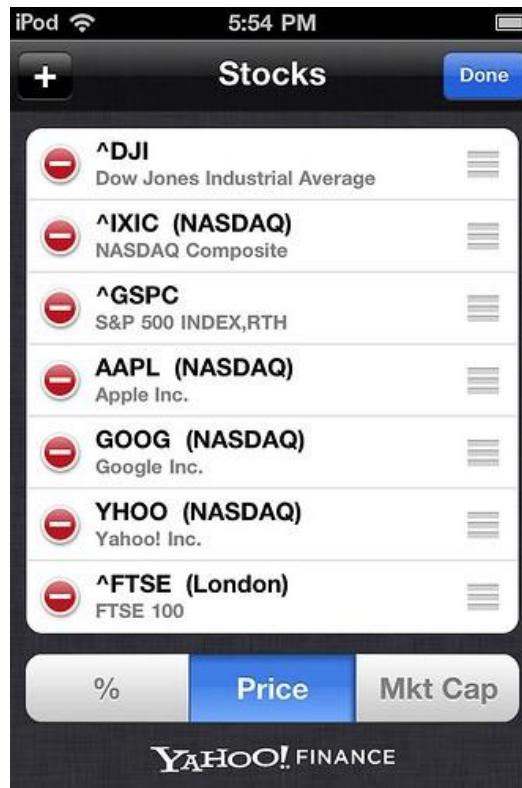
- Use a page indicator.
- Show the edge of the next item.
- Avoid heavy weight scroll bars.



Credits: Ivano Malavolta
Design Patterns for Mobile Apps

Affordance: Drag

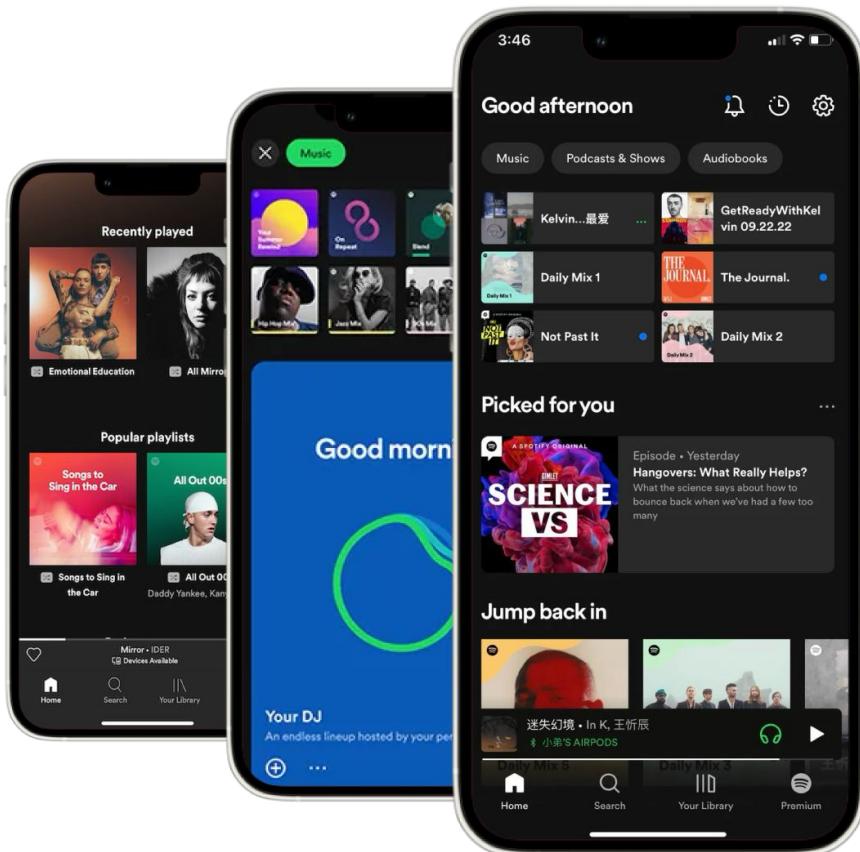
- Use a **recognizable icon** for the handle.
- Consider to help the users to let they know this feature is available.



Credits: Ivano Malavolta
Design Patterns for Mobile Apps

Excellent Designs Examples

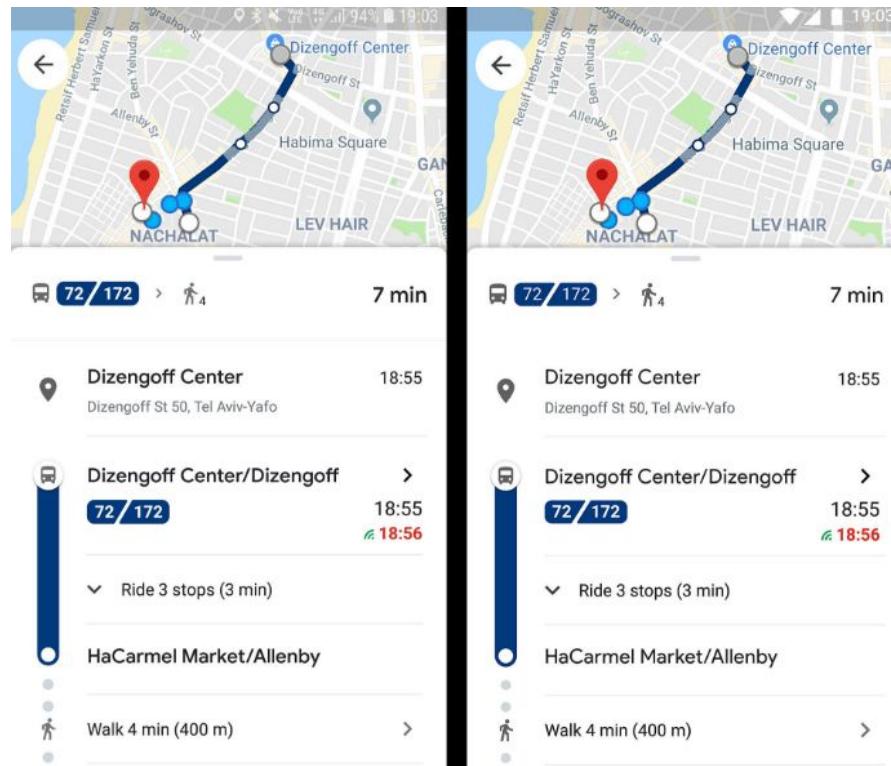
- Spotify is a clear example of a GOOD application design



- **Scalable UI:** simple for new users, powerful for experts.
- **Clear navigation** (bottom bar).
- **Smart personalization** (recommendation algorithms).
- **Immediate feedback** (downloads, buffering, playback).
- **Clean interface**, reducing cognitive load.

Excellent Designs Examples

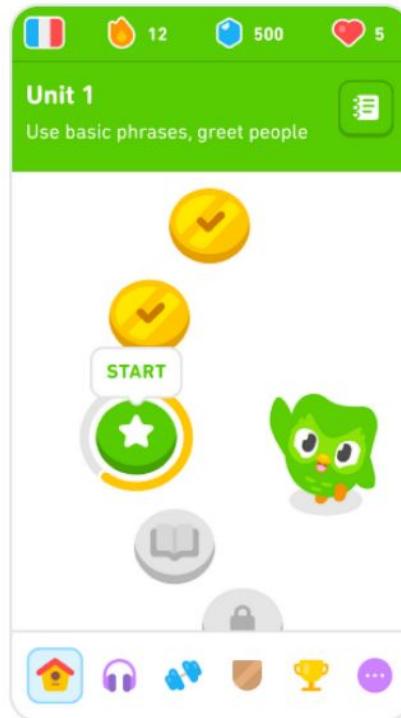
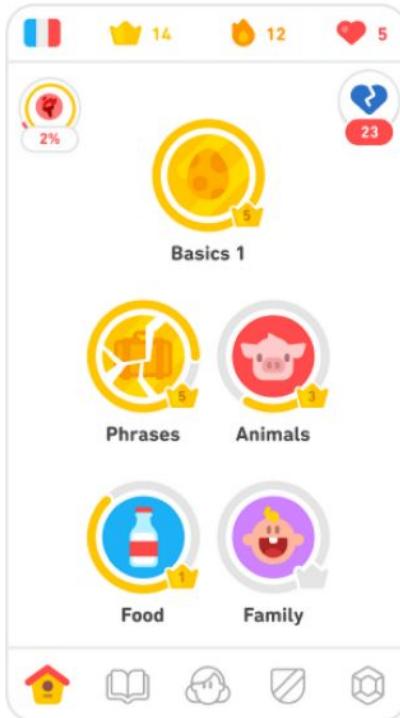
□ Google Maps is also a GOOD application design



- **Multimodal interaction** (touch, voice, haptic feedback, Android Auto too).
- **Real-time feedback** (live search, navigation updates).
- **Strong affordance** (clear interactive elements).
- **Context-aware UI** (adapts based on time, location, past use).

Excellent Designs Examples

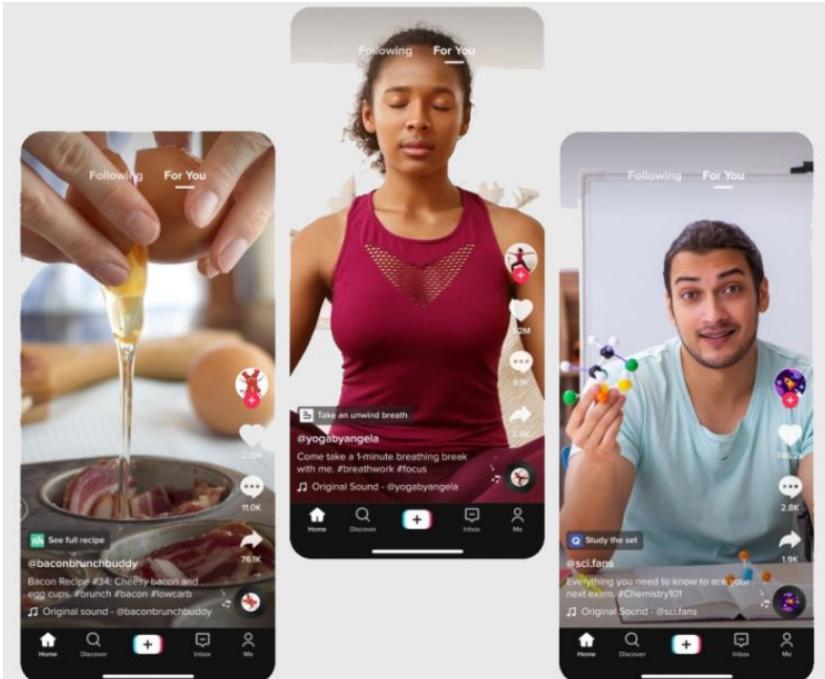
Duolingo



- **Gamification** (progress, rewards, motivation).
- **Simplicity** (quick actions, minimal friction).
- **Microinteractions** (animations, sounds, instant feedback).
- **Adaptive learning** (difficulty adjusts to user performance).

When a design is ...too good!

□ TikTok



- **Massive User Base:** 1.562 billion active users globally, making it the **fifth most active social network worldwide**.
- **Endless Scrolling:** The infinite scroll design is “easy” for the user, and encourages **continuous engagement**, making it easy for users to **consume content without interruption**.
- **Advanced Personalization:** TikTok's sophisticated algorithm curates a **personalized feed** based on **user interactions**.
- **Compelling Notifications:** Strategically timed push notifications draw users back into the app, **prolonging usage sessions**.
- **Fast Microinteractions:** Features like quick likes, comments, and follows are seamlessly integrated, fostering **immediate user engagement**.

Bibliography

1. T. Neil: *Mobile Design Pattern Gallery* , 2nd Edition (2015)
2. I. Malavolta: Design Patterns for Mobile Apps