

# toddle

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## OVERVIEW

Toddle is an iOS app that allows parents to quickly and easily share recommendations or warnings about children's products with their friends. Parents can take a photo of a kids product, let others know if its a product they love or hate, share comments on why, and post this information for their friends to see. Users can see what products their friends are posting, how they feel about them and for what ages they are appropriate. Parents can use Toddle to help their friends purchase the best products possible for their children, while avoiding products that aren't worth purchasing, are unsafe, or of poor quality. As kids get older, Toddle makes it easy for parents, grandparents and their friends to see which products will meet kids changing needs. Toddle lets users ask each other for product advice, share their expertise, and give away or sell products that their kids no longer need.

Our group felt that there was room in the marketplace for an information service that helped facilitate the sharing of product recommendations amongst friends. From previous projects and research, we knew that a personal recommendation from a friend is generally much more valuable to users than a recommendation, or several recommendations, from strangers. Additionally, being able to look up anonymous product reviews while in a store on a mobile device was something that we all thought helpful, but we didn't know of an existing way to easily access or solicit product advice from friends while on the go.

Right now, information services such as Yelp and Angie's List provide reviews of services and local businesses for free or for a fee, but don't provide reviews for products. Sites like Amazon and many other shopping sites often provide product reviews, but many of these sites aren't integrated with social networking sites or email to allow you to see only reviews made by trusted people in your network. While these sites do provide reviews, they attempt to cover a broad range of business verticals, so the information they aggregate is likewise very broad; they generally don't allow for very specific product categorization or filtering and rarely allow users to differentiate reviews based on whether or not a person owns a product, how long they've owned it, etc. Lastly, the product overview or recommendation areas of shopping websites are very rarely optimized for mobile devices.

As a result, we agreed to design a mobile app that allows for an improved product recommendation experience amongst friends.

## MARKET

Rather than design a service for all products and customer segments, we decided to narrow our focus to one specific niche market. Since newer parents are often very passionate about researching purchases and providing product recommendations and reviews, we thought this demographic might be a good fit for our project. From personal experience we hypothesized that mothers spend a lot of time and effort searching for and evaluating products for their

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children. We did not, however, want to limit ourselves to children's products without first conducting user research to see if we could identify a more suitable market.

In an initial round of user research, we interviewed ten people, six of which were parents. We were interested in finding product categories where users heavily researched or discussed products before making a purchasing decision, as our overall hypothesis was that our app would be used the most by people needing specific product advice or by people currently being asked for product advice.

In our interviews, we found that the product categories most heavily researched and discussed by consumers were:

- Autos
- Electronics
- Books and movies
- Children's products
- Women's clothing

Moms were much more interested in soliciting and providing recommendations for kids' products than they were for themselves and spent more time researching children's products before purchasing and much more time discussing those products after purchase than they did on other product categories. As a result, we concluded that narrowing the scope of our service to baby and children's products would allow us to tap into a very engaged and passionate customer base. Additionally, by focusing on one product group, we could provide users with a more customized design, look and feel, and a much more detailed product categorization scheme than sites like Amazon currently provide.

## COMPETITIVE ANALYSIS

Similar products in our market can be broadly categorized into the following:

### Retailers

Retailers like Amazon, Target, Babies R Us and Toys R Us have a huge customer base and a very wide variety of products. Most of them also have a well-established e-commerce presence, where users can find and buy products, write reviews and also determine product availability in brick and mortar stores.

Users cannot directly compare products or brands on these retailer's websites and instead have to read user-submitted reviews or product ratings and then draw their own comparisons. These reviews and ratings are submitted by users but are limited to products sold by the retailers. Consumers cannot find out what their friends or other users like them are buying as these e-commerce websites do not leverage social networks or provide transparent and robust user profiles.

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## **Social networks**

Social networks are an efficient way for users to share information and media with acquaintances, and particularly with large groups of friends simultaneously.. Facebook allows friends to share data and stay connected and is slowly also venturing into e-commerce through Facebook gifts and offers. Pinterest is much more focused on the sharing of photos and is commonly used for sharing ideas, recipes and crafts with others. Unlike Facebook, Pinterest users can choose to see postings made by their “followers” (eg: friends who are in their Pinterest network) or by the general public., but these website do not have a product focus. If users do post product photos or reviews, they are not easily searchable and allow for no distinction between products that users own or have used and products that users simply feel like sharing with friends, often because of the product’s aesthetics rather than function or safety.

## **Online Forums/Groups**

Forums and groups work particularly well for users belonging to specific neighborhoods or age groups. Groups like Berkeley Parents Network and San Francisco Mothers Club are quite popular among women and moms. Users like to share advice and experiences and these forums have become a default destination for getting a wide range of recommendations and tips.

Again, these forums have no specific focus on products or e-commerce. The user experience is generally limited to lists of archived emails or comments, search is limited to basic keyword searches and the data (recommendation and information) is often outdated and not current.

## **USER RESEARCH**

Our team conducted an early round of user research followed by a round of user research and usability testing after the first version of our app was completed. In the first round we performed very generalized user interviews of ten people, some with children, some without, and focused on the topics of product purchasing behavior, use of product reviews and ratings, use of mobile and web apps in product purchasing and discovery of new products.

In our second round of user research and usability testing, we interviewed six women who either have young children, frequently shop for children’s products or are pregnant to discuss their product purchasing behavior and observe them using our app and our prototype. Three of these women had their children with them at the time of testing.

## **Key Findings**

Key findings from our first round of user research encouraged us to narrow our focus from the general population to parents of smaller children. In general, people shopped using web and mobile devices in a myriad of ways across many channels and product categories. Building an app that appealed to anyone with a mobile device seemed overly broad and complicated. We contrasted our interviews of people without kids to our interviews of people with smaller children and found that parents, particularly moms, were an interesting customer segment for us as they

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spent much more time researching a broader range of products than people without kids. Moms relied heavily on reading reviews on Amazon before making purchases, often making those purchases through another retailer. Moms also relied heavily on in-person contact, email and phone conversations to solicit product advice from friends and they did this quite often. Our initial research did not uncover an app that moms used to discover personalized product recommendations or product recommendations from friends.

Our second round of user research supported and expanded upon most of our initial findings. Once presented with our concept, moms were interested in the idea and expressed dissatisfaction with their current methods of finding product ratings and recommendations. All of the mothers we interviewed used Amazon to find product reviews and used Facebook, at least in a limited way, to stay in touch with friends, but none of the mothers had used or heard of any services that would allow them to access product recommendations from their friends.

The mothers we interviewed all agreed that their friend's reviews of products were more trustworthy to them than the reviews of parents that they didn't know. One mom elaborated by saying:

*"My daughter is only two. We spend a lot of time in play-dates and with other moms and kids. Since she's so little, I choose her friends and I choose them based on which moms I want to spend time with and who has similar parenting styles to me...I like this idea (toddle) since I choose most of my mom friends based on their values, so I trust their opinions more. I know their opinions are going to be close to mine."*

Trust was a continuing theme in some of our user interviews as moms discussed privacy and security. While some parents were unconcerned with posting pictures of their kids to websites or writing reviews online using their real names, many parents worried about protecting their own privacy and that of their children. Moms most frequently had issues with posting recognizable photos of their children online where they could be accessed by strangers. Since early versions of our app only allow users to view postings made by their friends, moms felt that the app was private enough for them to feel comfortable posting both pictures and reviews. Interviewees were very divided, however, on other privacy issues. Some moms suggested that postings could be marked as private to friends or public, and that they'd like to be able to see the Toddle postings of users outside their friend network, while others felt that even their network wasn't private enough. One expectant mother was concerned that within her network, she might not want coworkers, particularly male coworkers, to have the same access to her postings as her non-work friends. She pointed out that she would be more concerned with the privacy of postings for products she used personally, than for products that her child would use. On the other hand, other moms were concerned with the privacy of their kids information or photos but not at all concerned about the privacy of any postings for their own products. Lastly, we gained more insight into the importance of children's products to parents and the amount of time moms spend researching product performance before making a purchase. Many moms felt that safety was a major reason that they researched children's products more

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than they researched other types of products. Moms worried about the physical safety of their kids when products were being used, and the toxicity of products over the long term.

Examples that were frequently cited were: the safety of cribs, both the mechanism of moving crib sides and bars, and the ingredients in the crib paint or finish; BPAs in plastic toys and bottles; lead paint being used in toys produced overseas; car seat and stroller safety and reliability; and food pesticides and additives.

Overall, moms felt strongly that the products they purchased for their kids would determine their children's long-term safety, development and happiness whereas products they purchased for themselves had a much shorter term impact of their own well-being. As a result, extensive research was justified. As one mom explained: "You raise your child only once. You want to have the best products that he or she can use in that limited time frame."

## DESIGN AND ITERATION

We adopted a lean approach to our design and development process, with iterative cycles of brainstorming; product prototyping and development; and user research and testing. After our early phases of user research, we distilled interviews into the key value propositions that an app like ours could offer customers. Once we understood the added value that our app could provide to users, we translated these values to possible features. We then distilled our broad feature list into a ranked list of features, ordered by both importance to users (based on our user research) and our ability to implement features from an engineering perspective.

Our first release, or our minimum viable product (MVP), is the smallest feature set that still delivers a coherent, functional application to our users.

### Our MVP features include:

- User login and authentication through Facebook Connect
- Integration with Facebook SDK to allow users to connect with friends in their Facebook social network
- User posting of product photos taken by either the phone camera or retrieved from the phone's camera roll
- User posting of data related to each product, including: product name, product rating, where product can be purchased, and comments
- Search functionality that allows users to perform text search for postings by product name and age
- Viewing of posts created by any friends in a users social network

## FUNCTIONAL REQUIREMENTS

### Social Integration

A critical feature of our application is the ability of a user to connect with friends, and therefore friends' recommendations, through our app. Since there are well-established existing social networks that could provide us with a set of friends for each user, we had no interest in building our own social network and forcing users to manually input all of their friends and contacts into our app. Our first round of user interviews indicated that a large percentage of moms have Facebook accounts that they use at least sporadically, so integrating with Facebook would allow us to access the networks of most potential customers. Since Facebook's SDK also provides an authentication system, we chose to use the Facebook SDK for our first version so users can log into our site using their Facebook credentials, giving us access to users' existing social networks. This isn't an ideal long-term solution for us, but was the easiest and most efficient method for us to allow users quick and safe access to our site and their connections.

Some potential users have privacy concerns with allowing our app to access Facebook data and other users may not even have a Facebook account. In future versions of our product we'd like to allow users to access connections from their phone contacts or import contacts from email. Users without Facebook accounts or users with friends who don't have accounts would then still be able to use our app with all of their acquaintances. We'd also like to allow for creating login credentials during a sign-up process, rather than using Facebook credentials, primarily for the same reasons.

### Data entry

The primary source of data for the application would be user-generated content consisting of product pictures (or perhaps video) with additional metadata on each product. Pictures make the application look more attractive and also provide visual description of the product recommended. Since all iPhones and iPads come with built-in cameras, users of the app also have easy access to their existing photo streams and the ability to quickly take new photos. Users are also accustomed seeing pictures on other familiar applications like Facebook and Pinterest.

Users will have ability take pictures of the products (they love or hate) from inside the app to post them directly into their stream. Additional required pieces of information like whether they love or hate the products, the age group for which the product is appropriate and the category to which the product belongs will be required and users will be able to enter this data by choosing from set values on buttons or in a dropdown list. This allows for users to quickly perform data entry. We will keep the amount of required data entry using a keyboard to a minimum, since typing is slow on the phone. More importantly, this will ensure a consistent quality of data posted and prevent us from having to deal with vocabulary variation when the data is later available to users for filtering or search.

In future version of Toddle, our data entry module can be further extended to accept product data by scanning bar or QR codes, or by entering URIs to retrieve product photos and other information from e-commerce providers like Amazon or Etsy.

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## **Recommendation**

Given our target user group's limited time but their high interest in good quality baby products, we think a love-hate binary model is suitable for them to focus on highly recommended or discouraged products. So far, our user testing in this area is less clear cut, but users we interviewed have indicated that they don't appreciate "mediocre" or "2.5 star" ratings (on sites such as Amazon where ratings are out of five stars) and that they find these ratings confusing.

We want to encourage users to post products to Toddle when they either highly endorse a product and hope their friends buy it, or when they highly dislike a product and want to warn others against purchasing it. By doing this, Toddle can then provide users with a select product list curated by their friends, rather than a more exhaustive list of whatever is on the market. This love-hate recommendation model allows Toddle to start offering more personalized recommendations to our users and differentiates us from sites like Amazon or Babies R Us.

In the first version of our app, recommendation posting consists of users entering product name, a product image, age range for which the product is appropriate, product description or comments, and purchase place. Product name, photo image, age range and purchase place are mandatory information, while a description is optional. Users enter text for the product name and the place of purchase. Users can post one product image from their existing photos or by taking a picture instantly and love or hate is entered by selecting from radio buttons. Users can write why they like or dislike the product in a description field to give detailed information to their friends.

Our service provides search functionality for users on the product name field or the age group. When a user performs a text search in their product stream, the text entered is queried against the product name field and the age group in our database. Any recommendation postings containing the search text in the product name or in the age group that have been posted by any of the user's friends are then displayed. Future versions of our product will also allow users to filter postings by product category and by friend.

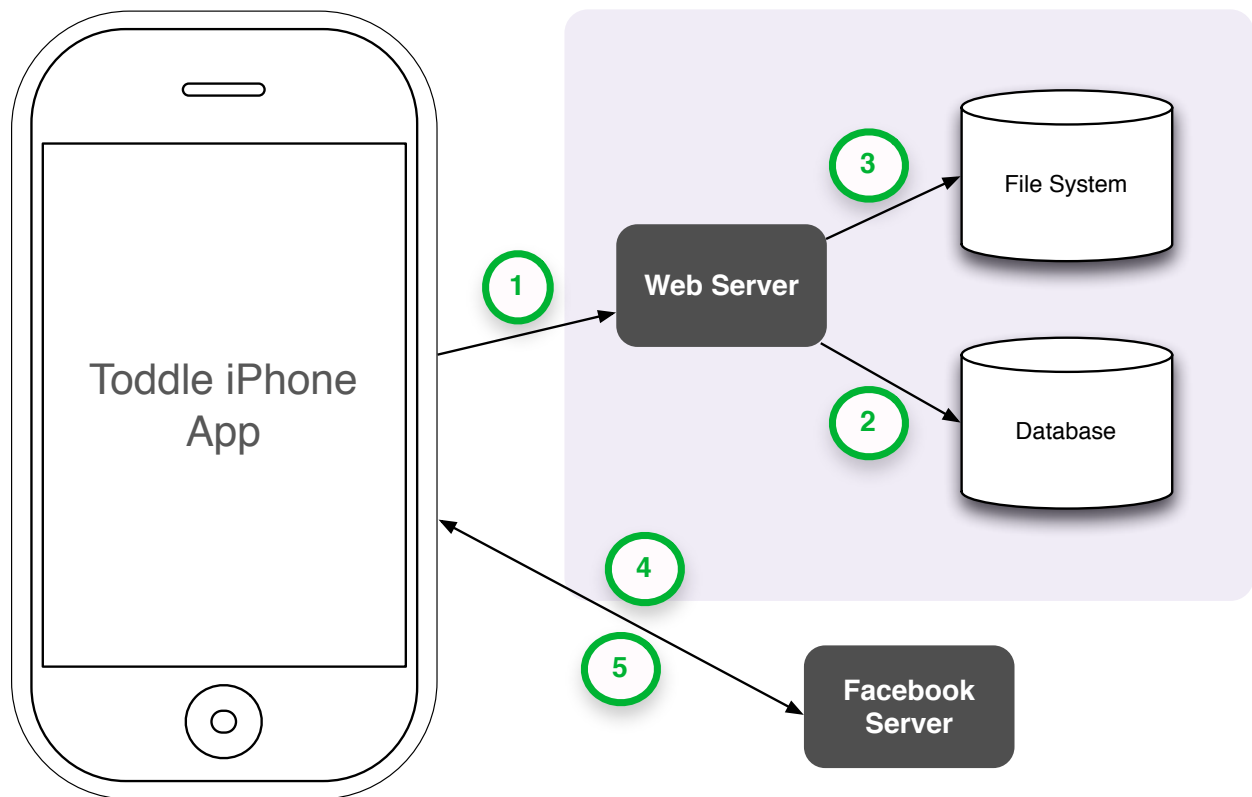
The first version of our app allowed only the user posting a product to input a comment or description about the product as part of the posting process. In the second version of our service we have added functionality for users to comment on others' postings. While reading a recommendation, a user can leave a comment asking for more information from the writer or to agree/disagree with the writer's rating. These comments become a part of the posting and are visible to any user who can access the post.

## **Technical Architecture**

The service architecture is based on a client-server model. It is comprised of client iPhone apps and a Web server which houses our database. Users interact with the Toddle app on their iPhone, and the app interacts with our remote Web server using Web service protocols (HTTP GET and POST). For user authentication, we use a Facebook authentication module.



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## There are five main information flows among subsystems:

- (1) Data and photo request and post between iPhone app and Web server
- (2) Data fetch and upload between Web server and database
- (3) Photo fetch and upload between Web server and file system
- (4) User authentication between iPhone app (Facebook SDK) and Facebook server
- (5) User information request between iPhone app (Facebook SKD) and Facebook server

## iOS

The Toddle iPhone mobile app is on the client side. It requests recommendation information from our Web server when a user either launches the app or logs in to the app. After receiving recommendation data, it represents this data in a table subview displayed on the users Stream view. 1

For faster access of information, we apply a 'caching' mechanism that stores data locally in the internal file system of each users iPhone. When a user logs in or opens Toddle, the app retrieves information from the local file system. Toddle then tries to access the remote Web server to attain newly added information that is not in the internal file system.

In addition to displaying a recommendation Stream view, Toddle enables users to post their product recommendations and to edit their profile page.

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## Facebook SDK

The iPhone app integrates with Facebook's SDK, which connects to a Facebook server for user authentication and user data access. Users login to Toddle using their Facebook ID. After users login, our iPhone app can read user information such as name, username, and friend relationships from Facebook. Toddle stores this information in the remote database in our Web server. Whenever a user logs into Facebook, the server checks Facebook's data against the data we've stored in our database to see if any of the social network information has changed. If the data has changed at all, we update the users information in our database.

## Web Servers

Our Web server runs on Flask, which is a light Web server framework written in Python. The Web server interacts with Toddle using Web service protocols (HTTP GET and POST) and JSON format. Upon data request, the Web server fetches data from our Sqlite database, converts it into JSON format, and sends the data to the user's iPhone app. For photo requests, the web server sends the image in the file system to the iPhone app. When the Web server receives post data from a Toddle user, it stores it in the Sqlite database. In the case of posted photos, however, the web server saves them in the file system.

We explored several platforms for hosting our web server. Our first choice was Heroku, but we couldn't move forward with Heroku due to incompatibilities with the sqlite database that we were using. Instead, we found and decided to use another platform called PythonAnywhere . PythonAnywhere is a Python development and hosting environment that displays in your web browser and runs on our servers. We migrated our server side files from the I School server where we were temporarily hosting, to PythonAnywhere with no compatibility issues.

## Database

We are using a Sqlite database which is a default database system supported by Flask. The database stores data in tables on users, relationships, and recommendations.

## USABILITY TESTING

After the first version of our app was built and deployed to phones, usability testing helped us to identify bugs, usability issues and feature requests. In the first version of Toddle, users had trouble properly posting ratings on products. The rating buttons were located at the bottom of the post page, were not very large, and defaulted to a rating of 'Love.' Users frequently missed rating the product so that the default 'Love' rating was applied. In version two, we created an additional view for the posting process and moved product name and rating to the first screen of the posting flow. Users take a photo and then are immediately prompted to enter the product name and rating. The rating buttons are larger and placed in the top half of the view. In follow-up usability testing, this redesign helped users post product ratings correctly. In our next release, we will change the rating buttons so that there is no default, making it impossible for users to skip rating a product or to accidentally use a default rating.

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Usability testing also helped us identify issues with our ratings icons, which are supposed to indicate to users whether the product a user posted was loved or hated. In version one, the rating icon (a heart or broken heart) was located next to product name, under the product photo. While users had an easy time seeing the Love and Hate icons, the placement under the photo caused them to think that the ratings icons were intended to be clickable, and many users thought that they could be used to indicate that a product was a 'favorite' or should be on their 'wish list.' In our second version of Toddle, we moved the ratings icons so that they cover the top left corner of the product photo. Placing them directly on the photo has helped parents to associate them with the product and users have been much less likely to assume that the icons are clickable. In future versions we will continue to experiment with the design and placement of our ratings system.

## FUTURE DEVELOPMENT

Based on our user research and usability testing of the first and second versions of our app, we prototyped several additional features for the next version of the app that will work well with the basic app and product sharing model. We plan on continuing to develop Toddle and will work on implementing the following features for the next release of our product:

**Ask Feature:** Users can ask their Toddle friends for recommendations about products that are not already posted. This feature not only helps users find products they want, but also works as a trigger for content generation.

**Sell/Give away feature:** During our early user research we found that kids grew out of products rapidly and often quickly lost interest in a toy as they aged or used it frequently. Parents would either save the products for their next child or give them away to a close relative or friends with kids of a similar age. Parents sometimes also wanted to sell some of the expensive items they had purchased and there were few options for this. Parents had posted items on community forums or on craigslist, but products often didn't sell or parents were uncomfortable selling items to strangers. Additionally, parents found it awkward to ask friends to pay for their products.

We think a Sell/Give away feature will fit well within our current model of product sharing. Users get the best advertising for their products amongst all their friends, who are more likely to have similar tastes. Additionally it also takes away some of the awkwardness that comes with money exchange, by allowing users to post their asking price along with the posts. Lastly, allowing parents to sell products through our app provides us with numerous opportunities for future monetization, such as product listing fees, sponsored listings, or commissions on sales.

**Comprehensive user profile:** During user research, moms requested more comprehensive user profiles for their friends. They were interested in being able to navigate to a friend's profile and see all of that friend's posts in one place, along with more information on that friend. They were also interested in more features for their own profiles, such as the ability to favorite

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products, add products to a wishlist and provide their friends with more information on their families. In version three of our app, we plan to provide user with the following:

- A full featured user profile allows that users to view all their posts in one place
- Users are able to bookmark products and view them at a later time on their profile page
- Users can view toddle friends and visit friends' profiles

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## Data Flow Diagram

