Case Study: Yomba

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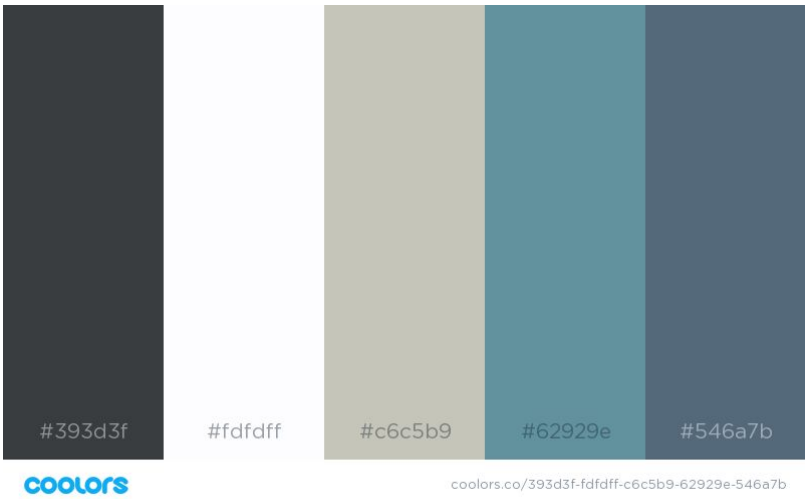
Project-Wide User Interface Specifications

1. Logo:

Yomba

2. Color scheme:



3. Background color: #fdfdff.
4. Dominant color: #62929e.
5. Font: Yomba will make use of the Helvetica Neue font family. As a fallback option, Arial will be used, as it is aesthetically similar and ubiquitously available. When emphasis is necessary, bold will be preferred. Contrasts in text color may

also be used to differentiate content. Ideally, italics and underlining will be kept to a minimum.

6. Page template: our web pages will make use of Bootstrap to ensure that all are pages are responsive in the same manner.
7. Simulation: we will use local storage and cookies to ensure that our website replicates a functional one.

Main Objectives of the System

Our web interface, Yomba, is an online community-driven video platform on which users can view, share, search for, and discover videos. Many of Yomba's features and functionality correspond to those of a traditional video-sharing website. That being said, our analysis of personas and of Netflix, YouTube, and Amazon Prime Video has made us realize that our tool will contain functionality that is distinct from mainstream streaming services. We want to create an application that harnesses the power of a collaborative experience in streaming. The users will be able to join communities that relate to their interests, and the content will be tailored to the focus of the community.

The main objectives of our system are as follows…

I. Provide a community-centric interface for encouraging interaction between users of similar interest
II. Allow users to browse, view, and upload videos across communities
III. Tailor content to the interest of the user through communities
IV. Make video selection, viewing, and discovered a streamlined, uncluttered process
V. Foster a community of individuals through technological innovation in the streaming video space

There will be different functionalities based on whether the user has registered or not. Our assignment submission allows users to log in and simulate the community experience. The version of the assignment we submitted contains features mostly available to unregistered users and are simulated, so it does not implement every functionality of a full user. However, it is still important to draw the distinction between registered and unregistered users.

1. Unregistered user (or standard) functionality

a. The user will be provided the option to sign-in or create an account. Both of these options are provided in the same location (following Van Duyne's H2 pattern)
b. The user can search for videos
c. The user can play videos
d. The user can consult video comments
e. The user can view different communities
f. The user can create and consult playlists of videos
g. The user can view specific communities
    i. These communities can be a collection of users interested in precise themes
    ii. These communities can be associated to a set of videos
h. The user can receive recommendations based on past viewing habits

2. Registered user (additional) functionality
    a. The user can manage his or her privacy (Van Duyne's E3 principle and many others).
    b. The user can view all of his or her account information in one place, where he or she can delete the account if it is desired (Van Duyne's H4 Account Management)
    c. The user can link his or her social media accounts
    d. The user can share videos to his or her linked social media accounts (Facebook, Twitter, etc.)
    e. The user can join specific communities he or she wishes to be affiliated with
    f. The user can message other users using a chat system.
    g. The user can share and upload videos to the platform
        i. These videos can be tagged as belonging to a certain community
        ii. These videos can have titles, descriptions, and thumbnails
        iii. These videos can have their metadata updated
        iv. These videos can be deleted
    h. The user can comment (or reply to comments) on videos
        i. The user can delete his or her comments
    i. The user is eligible to display occasional advertising before his or her uploaded videos (pre-roll advertising). In other terms, the user can participate in a revenue-sharing ad service with Yomba.

An interesting distinction between Yomba and sites like YouTube is that liking is not a part of the video experience. Yomba believes users will join niche communities with content geared toward their specific interest, so they end up liking all the videos in the

community. Yomba puts emphasis on a qualitative, human aspect and not a quantitative one.

Also, we do not have a “Watch Later” button, because Yomba automatically puts unfinished, watched in part videos in that category.

Knowing the User: Personas

Persona 1: Maria

Maria is a 23 year-old from Raleigh, NC, who recently graduated from Harvard University with a double major in Dance and Economics. She got a job as a financial analyst on Wall Street right as she graduated, but after a year on the job she is starting to realize that her passions lie elsewhere. She finds herself constantly stressed and bored at work, and her only escape is her love for dance. She is looking for somewhere where she can watch videos of people dancing and even discover new and exciting choreographies. She isn’t exactly sure what she is looking for so she is looking for something that can get to know her preferences and make useful recommendations about different types of dances based on previous ones she has liked. It is also important to her to get a sense of how popular those types of dances are and how much other people like them.

She just heard about Yomba from a friend and discovers it is a site where people can upload videos online and share them with the users of the site, and she decides to try it out as a way to discover new types of dance. She finds that she likes to create playlists of dance videos she has liked so she can share them with her friends. While using Yomba, Maria has been introduced to other communities that she never planned on joining, such as the Harvard Class of 2016 community, a community for theater lovers, and a community for novice cooking. While Maria knew has always been a member of her Harvard class as well as a theater lover, she never planned on finding a place for sharing videos with these communities. But, this is the beauty of Yomba; it is tailored to understand our users preferences and interests, and our recommendations engine is always recommending new communities that the user might be a good fit for. Since Maria is a recent graduate, she is always looking for new and simple recipes she can make at home.

Maria plans on using the site whenever she has time after work, likely in her commute home via the Yomba mobile app. Yomba isn't quite a replacement for actually dancing, but she's happy that she found a way to stay connected with her real passion, to be a part of old and new communities, and to finally have an escape from work.

Persona 2: Mr. P

Mr. P is a 50-year-old assistant volleyball coach for Penn State University. Watching videos is very helpful for work. For example, as the assistant volleyball coach, he is responsible for recruiting and uses sites like Youtube to search for athletes that could potentially join his program. He sometimes finds the videos through searches, other times when athletes directly email him the link. He also might look up different volleyball drills to use in practice or techniques that he could use to instruct his players. When he is not in games or practices, his time at the desk can get pretty boring. He follows many YouTube personalities and subscribes to them so that he can stay up to date on their latest videos. Since Mr. P still has a flip phone, it is clear that he is very unskilled with technology and is often overwhelmed by many websites and their content. He is also very protective of his privacy and his family's when they surf the web. To pass his time, he also watches videos of popular songs and with their lyrics. He first discovered Yomba when his 8 year old daughter said that college teams had seen her highlight videos uploaded on Yomba and had reached out to her through the website's chatting system. As a result, Mr. P made an account and joined different communities of players, coaches, and volleyball fans for recruiting purposes and for watching volleyball leisurely.

Persona 3: Miriam

Miriam is an 18 year old college student studying aerospace engineering. She is smart, outgoing, honest, and passionate. These character traits, along with her competitiveness and ability to work well in groups and under pressure, make her successful in school and her career. She loves learning about different cultures and hopes to work internationally after her graduation. She is very skilled

in social media and general technology skills. She hosted videos on a personal website that she shared with her friends and classmates for years, until she learned about Yomba. She was introduced to Yomba by one of her professors, who uses the community feature to create a space for his engineering class to share resources. As she spent more time on the site, she joined communities focused on international travel, her university, and productivity. The majority of her time on the platform is spent in her communities, with 25% of her time exploring related videos to discover new interests.

Analysis & Evaluation of the Similar Web Pages

We analyzed positive and negative aspects of Netflix, Youtube, and Amazon Prime Video using Nielsen's heuristics and Van Duyne design patterns. We then used our findings to make decisions about our user interface for Yomba.

Netflix

Positive Aspects

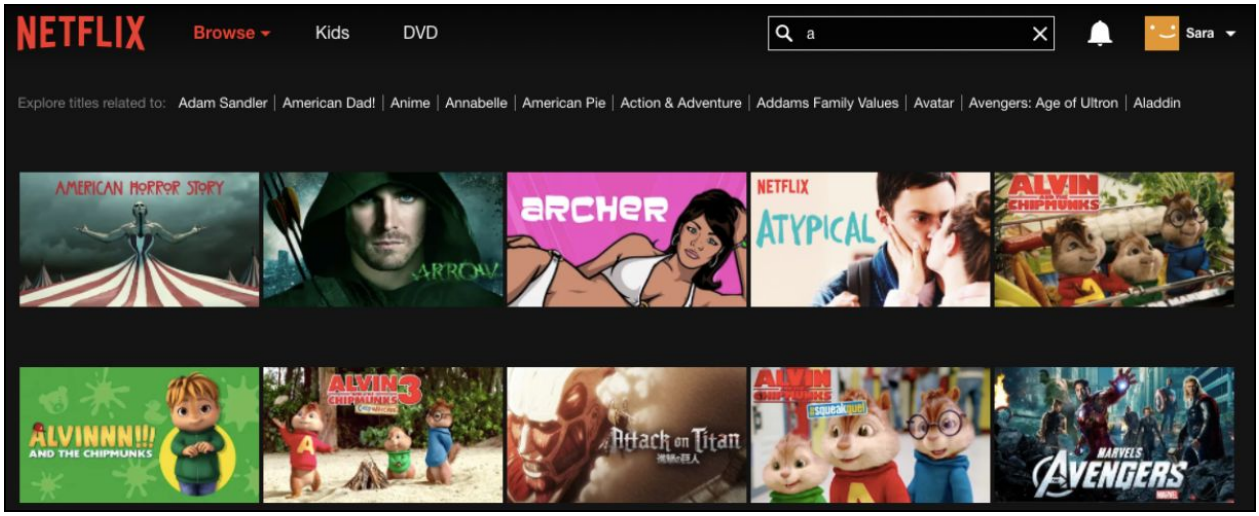
1. **Multiple Ways to Navigate (Van Duyne B1)**: This principle requires that the search function always be visible and at the top of the page. Netflix satisfies this requirement by conveniently locating its search function on an overlaid bar located at the top of the page. Even if the user scrolls, the search functionality remains available. In addition, the principle requires that additional navigation links exist, specifically at the bottom of the page. This again is satisfied by Netflix, which displays links like "Gift Cards", "Terms of Use", and "Jobs" at the bottom of its pages.
2. **Browsable Content (Van Duyne B2):** Netflix provides an ideal example of browsable content to display information in an organized way such that the navigation is consistent. They include navigation tools on pages so that you can move from one page to another in an intuitive way. The user is able to scan the page quickly to find categories arranged in hierarchical ways.

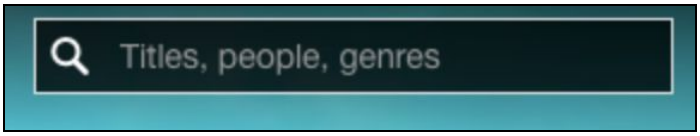
3. **Hierarchical Organization (Van Duyne B3)**: This principle requires that content be organized into categories to help customers find things. These categories

must be specific, must have a number of items inferior to 50, and elements can be present in several categories. Netflix very much follows this design pattern: on the website's primary page, we find the a number of categories, like "Exciting Movies," "Emotional Dramas based on Books," or "Goofy Comedies." These categories are extremely specific. In addition, Netflix limits the number of items in each category, and when the user clicks the next button, eventually the cycle of elements begins anew.

4. **Value Proposition (Van Duyne C2)**: This principle requires that the homepage (and other pages) include clear information pertaining to the site's value proposition next to the logo. Netflix satisfies this principle: currently, on its homepage for subscribers, the value proposition ("63 TV Shows and Movies added in the last week.") is clear and prominently displayed. This is true for its homepage for non-subscribers as well, which reads: "WATCH ANYWHERE. CANCEL ANYTIME. JOIN FREE FOR A MONTH."
5. **Aesthetic and Minimalist Design (Nielsen Heuristic):** this principle requires that pages be clear, without unnecessary material. Netflix follows this principle admirably. From its homepage for subscribers, to display films, only the posters for movies are shown under category names. If the user requires more information, it is given once s/he has clicked on the poster image. This way, information is only revealed when it is requested, and a minimalist aesthetic can be maintained.
6. **Site Branding (Van Duyne E1)**: This principle states that a website must be consistent in style, must have a moderately sized logo, placed in the upper left corner, and must reuse images to optimize speed. Netflix, both on its homepage and search page, has a moderately-sized logo located in the top left corner. Additionally, because the page is not reloaded when the user searches, it does not need to be downloaded again. Finally, Netflix's site is particularly consistent in style: the black and red aesthetic carries over to every page.
7. **Visibility of System Status (Nielsen heuristic 1)**: During video play, Netflix clearly indicates the loading progress. Streaming video is the site's primary function, and it keeps users updated on this progress by using a loading icon that indicates the percentage completed.
8. **Search Action Module (J1) / Predictive Input (H11)**: Netflix has built a search action module which appears across all pages with simple phrasing that indicates the search space for typing in words or phrases and have an action button to initiate the search. The search bar for Netflix (below) guides the user to search a title, actor/actress, or genre. Then, when you type in a letter, suggested searches don't appear in the dropdown but rather below the search bar as options to click on (*Explore titles related to*). Additionally, if you type in "a" for instance, all the

shows organized through an algorithm which shows the shows I might like the most best. The user can click on these shows to get more info/watch them. The search updates in real time, and immediately informs the user if something they searched isn't in Netflix's system, without having the hit enter. It also takes a search that is not present in a title, name, or genre, like "asd" and shows results for titles beginning in "add."



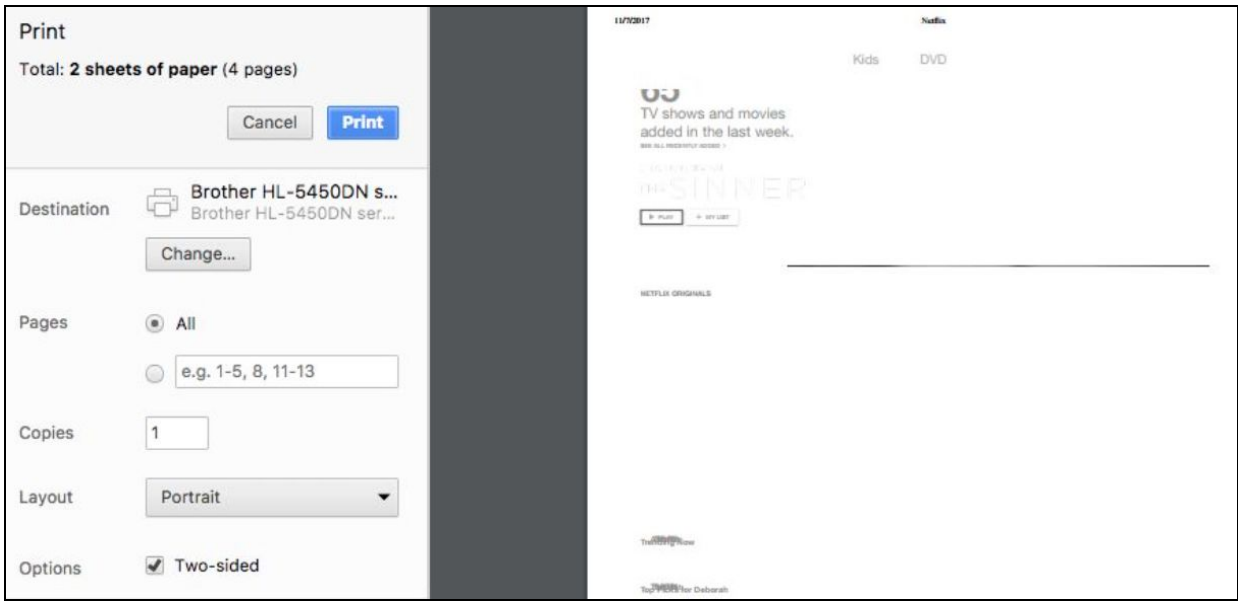


Negative Aspects

1. **Homepage Portal (Van Duyne C1)**: This principle requires that the homepage (and subsequent pages) make a strong, clearly stated promise about the site's functionality. It also requires that 95% of the space above the fold be dedicated to 95% of users, while the remaining 5% be used by the 5% of users. While Netflix's homepage has a lot of positives, it does not follow the second requirement. About 80% of the page above the fold is an advertisement for new Netflix content (*The Blindside*), something that a minority of users will be interested in. On the contrary, the remaining 20% is dedicated to a few "Netflix Originals," series that are quite popular with users. Netflix has disregarded the design pattern here, most likely to increase traffic to certain (less popular) areas of its site.
2. **Writing for Search Engines (Van Duyne D6)**: This principle requires that pages include an HTML title and descriptive <meta> tags to be processed by search engines successfully. While Netflix's page obviously include an HTML title, they often choose to ignore descriptive <meta> tags (instead, they use some <meta>

tags to tell Google not to translate their content): *<meta name="google" value="notranslate"/>*. Netflix obviously will still appear at the top of many searches on search engines, but they could do better by using more <meta> tags.

3. **Printable Pages (Van Duyne D8)**: This principle requires that a "printer-friendly" version of each page exist. This is a principle for which Netflix completely fails. Admittedly, Netflix users are probably not interested in printing content. That being said, trying to print Netflix's homepage for subscribers leads to totally mangled and unusable output (see image below).



YouTube

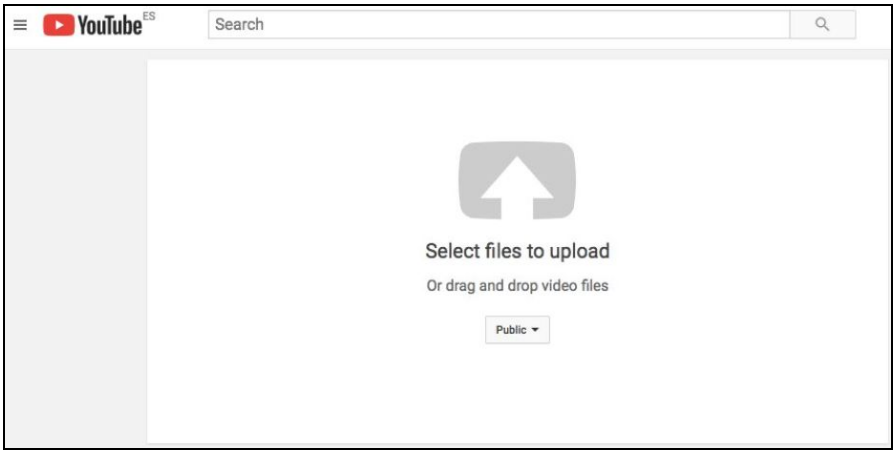
Positive Aspects

1. **Match Between System and Real World (Nielsen Heuristic)**. This heuristic requires that real-world conventions be followed, and that information be displayed in a logical order. While this is a subjective matter, we think YouTube generally follows this practice. On its homepage, a number of video thumbnails are shown, followed by the title, channel, and period of time since the video was posted. This metadata is displayed in the order it would appear for a book or painting in the real world: we say *Madame Bovary*, by Gustave Flaubert, published in 1857, for instance. YouTube successfully replicates uses our real-world media conventions to categorize content on its website.
2. **Fair Information Practices (Van Duyne E3)**: This principle requires that the website have a clear privacy policy, and that it be accessible from key pages. In addition, the customer must know how their information is used and be able to

change privacy settings. YouTube generally follows this principle: “Terms,” “Privacy,” and “Policy and Safety” links are available from the homepage. These pages are clear and easy to navigate (https://www.google.com/intl/en/policies/privacy/), and tell the user how to change their privacy settings using a “My Account” link.

3. **Secure Connections (Van Duyne E6)**: This principle requires that an icon (ideally in the menu bar) reassure the user concerning the web page’s security. An additional web page can also be used to explain security practices. YouTube, overall, follows this principle. The site’s pages are secured by https, as shown in the image below. However, while a number of pages are used to reassure the user about safety on the platform (https://support.google.com/youtube/topic/2946312?visit_id=1-636215676872628189-59 0074792&rd=1&hl=en, for example), we could not find pages dedicated to explaining secure connections.

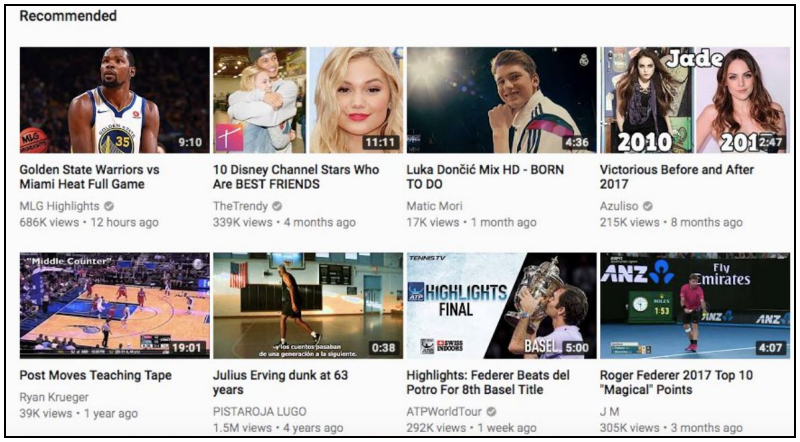
4. **Process Funnel (Van Duyne H1):** This principle stipulates that users needing to complete very specific tasks should be presented with a sequence of clear, uncluttered pages. This allows the user to perform less steps per page, removing confusion. YouTube users have one such process they often perform: uploading videos. In this regard, the platform follows the principle. The process to upload a clip is very much separated into several segments, where the user only needs to focus on one task at once (see the image below for the first part of this process). This streamlines the user interface, graphically speaking.



5. **Consistent Sidebars of Related Content (Van Duyne I6)**: This principle requires that sidebars be placed consistently, that they have a reasonable height,

and that they display related content. YouTube perfectly satisfies this requirement: from pages where a video can be played, the sidebar on the right displays related videos based on recommendations. This sidebar is always placed in this location; its length is limited; and the user can choose to load more recommendations by pressing “Show More.” In our opinion, this is one of the principles best followed by YouTube.

6. **Recognition rather than recall (Nielsen Heuristic 6)**: YouTube, a Google company, uses the well-known search engine-based autofill to provide results that may be most useful to the user. Instead of having to remember the exact term needed, users can search generally and recognize their target search query within what the interface recommends. They also use consistent icons and options throughout their site to reduce the number of functionalities the user must memorize.
7. **Grid Layout (Van Duyne I1):** This principle requires that all items on the page be aligned according to a grid, for visual and functional simplicity. YouTube follows this principle perfectly: on its homepage, the content naturally falls into grid form, which can easily be seen with the video thumbnails (see image below). The sidebar, navigation bar, and footer also are designed according to a grid pattern.



Negative Aspects

1. **Internationalized and Localized Content (Van Duyne D10)**: This principle stipulates that websites must adapt to international audiences. Because of this, code and text must be managed separately to allow for simple localization efforts. In addition, competent translators must be used. While YouTube does change its content’s language based on the user, it does so in perplexing manners. As we were analyzing YouTube for this assignment, we noticed that the homepage was in English, the privacy policy page was in Spanish, and the about page was in French. YouTube is making an effort to provide content in

several languages – it just needs to develop consistency to ensure the user is displayed the best possible language at all times.

2. **Help users recognize, diagnose, and recover from errors (Nielsen Heuristic)**: This heuristic requires that web pages aid the user in moving past errors they have made. During our analysis, we felt YouTube was somewhat lacking in this regard. The recognition and diagnostic of errors was very functional, but the recovering part was deficient. To test YouTube's error handling, we sought to upload a photo instead of a video. YouTube recognized the error and signaled it: "You uploaded an image file, not a video file. Turn your photos into YouTube videos using the slideshow creator." However, once we acknowledged the error message, we were left with an entirely blank screen, as shown in the image below. We don't believe this is good practice, and we felt it was almost shocking seeing it on a website as important and successful as YouTube.

Amazon Prime Video

Positive Aspects

1. **Internationalized and Localized Content (Van Duyne D10)**: This principle stipulates that websites must adapt to international audiences. Because of this, code and text must be managed separately to allow for simple localization efforts. Amazon Prime Video very much succeeds in this regard. When visiting the streaming website from Spain, we are alerted that: "Based on your location and settings, your language is now set to Español." We are also given the option to revert to English, or simply change our current language to a different one (see the image below).

2. **Sign-In / New Account (Van Duyne H2)**: The user must be given the opportunity to sign-in if they are already a customer (to retrieve content they have the right to consult) or be allowed to create an account. This process must take place on the same page, as well, according to Van Duyne. Amazon Prime Video (and Amazon in general) allows for this double functionality. The user is given the opportunity to sign-in or create an account, with more real estate dedicated to returning users (see image below). This is something we appreciated, as some companies assume the user is new, making returning customers click on one or two additional links to login.

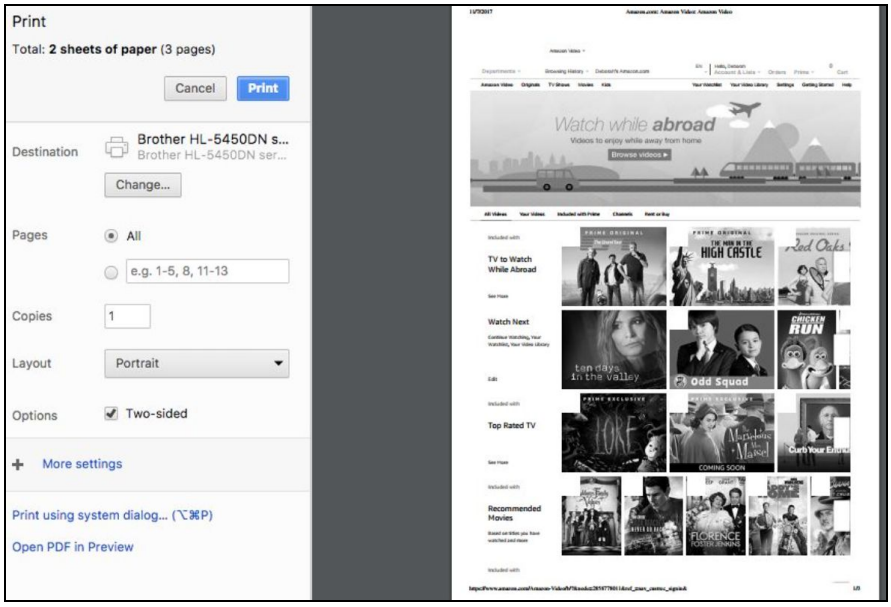
3. **Help and Documentation (Nielsen Heuristic)**: This heuristic states that the user has to be aided in his or her interactions with the website, preferably using a set of documentation pages. Amazon Prime Video fulfills this heuristic admirably, as it has a dedicated page designed to route users to the topic they need help with: https://www.primevideo.com/help/. Clicking on specific links leads the user to more specific issues they could need assistance with. As a last recourse, contact options are available.
4. **Homepage Portal (Van Duyne C1)**: This principle requires that the homepage (and subsequent pages) make a strong, clearly stated promise about the site's functionality. It also requires that 95% of the space above the fold be dedicated to 95% of users, while the remaining 5% be used by the 5% of users. Amazon Prime Video makes it extremely what it is providing to the user, with the following text on its (non-subscriber) homepage: "Watch movies and TV shows." More information is provided below this title: "With an Amazon Prime Video subscription, watch popular movies and TV shows including Amazon Originals The Grand Tour, Sneaky Pete, and The Man in the High Castle." In addition, 95% of the content of the page applies to 95% of users: it consists of content

most users would be interested in (proposition, links to purchase subscription). More niche content, like Prime Video benefits or privacy policies, are located at the bottom of the page.

5. **Clear Forms (Van Duyne H10)**: Forms must have clear labels, which are above or beside the fields they correspond to. Forms must be short, and ideally with a payoff that shows the user what they will be obtaining when they complete the form. Placeholders can also be used to guide the user's response and clarify potential uncertainties. Amazon Prime Video's "Create Account" form (which is the same as Amazon's normal new account form) generally follows these principles. Only 4 fields are required: name, email, password, and a repeating of the password. The placeholder "at least six characters" is provided in the first password field, as shown in the image below. The form is uncluttered: the advice given for the first password field is not reused in the second password field, for example. The minimum viable amount of information is provided.

6. **Clear First Read (Van Duyne I3)**: This principle states that each page must have a unifying focus, and that that focus must be announced clearly at the top of the page. In addition, special formatting like color, text size, and font should be used to ensure that the focus may be noticed rapidly by the user. We believe Amazon Prime Video satisfies the requirements for this principle, particularly on its non-subscriber homepage, where large font sizes and color contrasts are used to set the text "Watch movies and TV shows" apart from the rest of the page. The user knows what s/he is getting into, and cannot help but notice the page's first read.

7. **Printable Pages (Van Duyne D8)**: This principle requires that the webpage offer a printer-friendly version. As we noted earlier, film-streaming websites are not designed to be printed. That being said, Amazon Prime Video sets itself apart from its competitors (primarily Netflix) by allowing its pages to be printed (see image below). While this is not a common use case, it shows Amazon is preparing for many different users and uses of its service.



Negative Aspects

1. **Guest Account (Van Duyne H3)**: This principle states that websites must allow the user to access certain information and perform certain tasks before forcing them to register or subscribe. Amazon Prime Video does not follow this model. Indeed, Prime Video forces the user to register before watching films or TV shows. That being said, Prime Video does offer a "30-day free trial" that the user can take advantage of. It is hard to fault Prime Video for not following this principle, as most film streaming websites work the same way, but we could imagine a scenario in which the website is fully functional – until the user has watched one video.
2. **Organization - chronological, popularity based (Van Duyne B6 & B7)**: The site's first page, "All Videos," does not seem to be organized in any sort of logical way. The categories are rows stacked on top of each other, in a seemingly scattered order. This makes it hard for the user to find a category they are looking for, or to know where to look for that category.

Included with prime

TV to Watch While Abroad

See More

Watch Next

Continue Watching, Your Watchlist, Your Video Library

Edit

Included with prime

Holiday Favorites

Included with prime

Recommended Movies

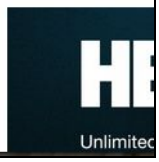
Based on titles you have watched and more

Included with prime

Amazon Original Series

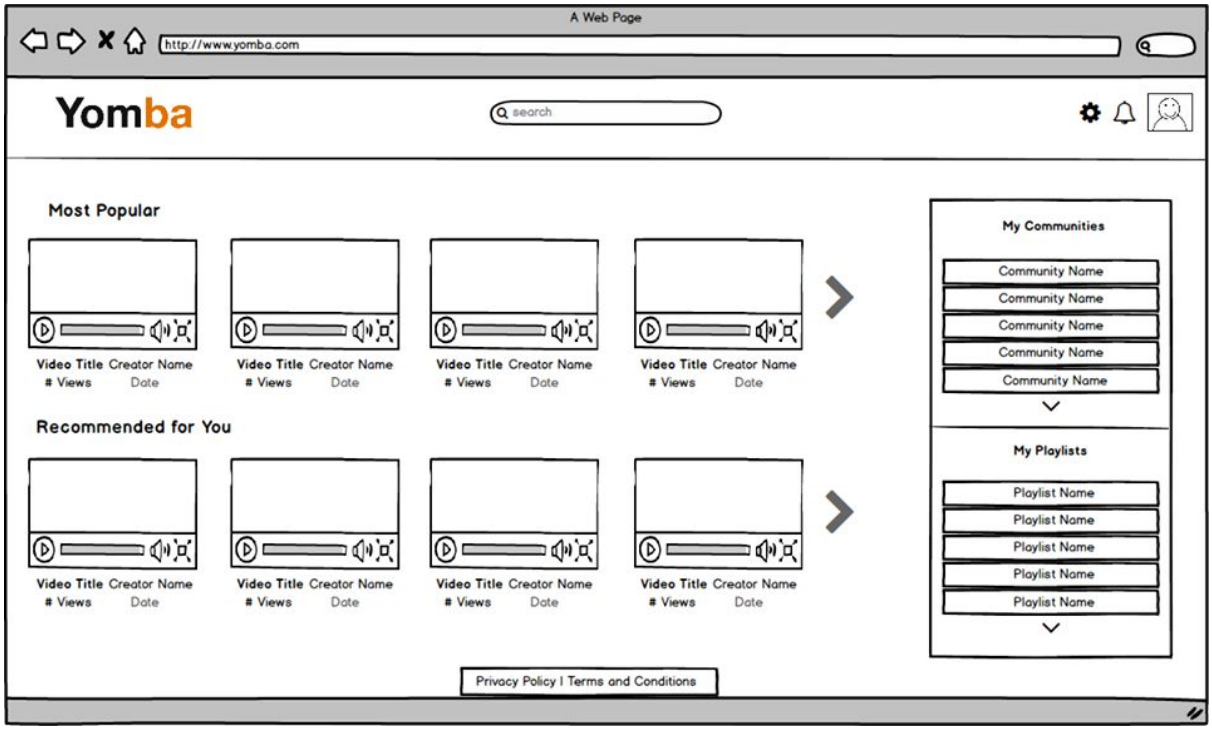
See More

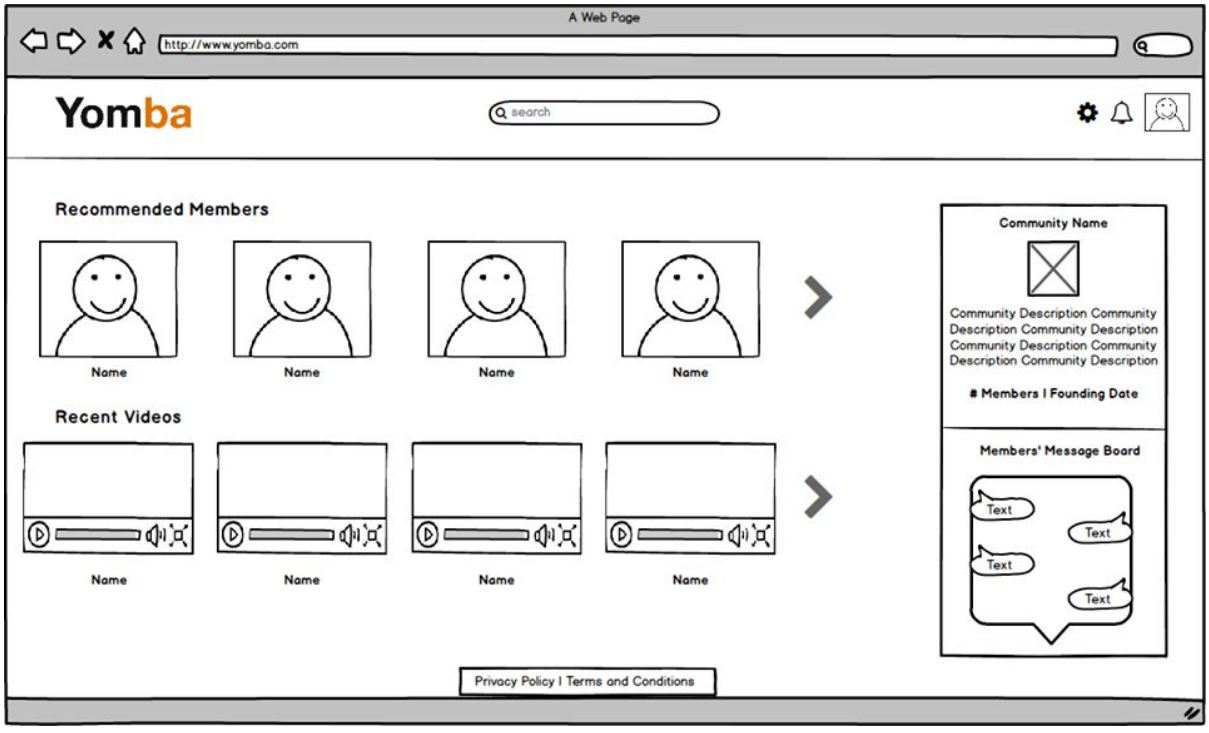
Amazon Channels



Description of the Team Prototypes

Prototype 1: Elliott





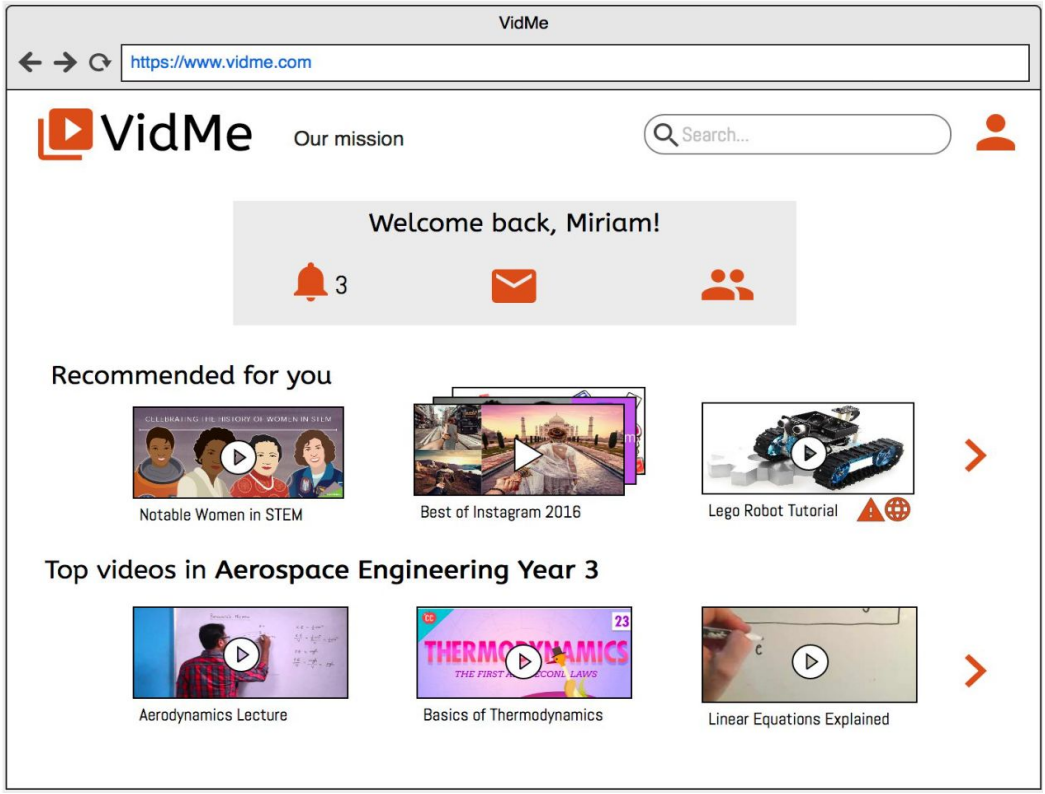
The design of this prototype emphasized community. The home page displayed popular videos and suggestions tailored to the user. The prototype also included a communities page, adding another type of interaction to the user experience and a distinguishing feature to the site as a whole. More than just a video platform, this prototype allows for interaction amongst users with similar interests and the ability to interact with content and other users in real time. The heuristics and design principles explained below were used in the creation of this prototype.

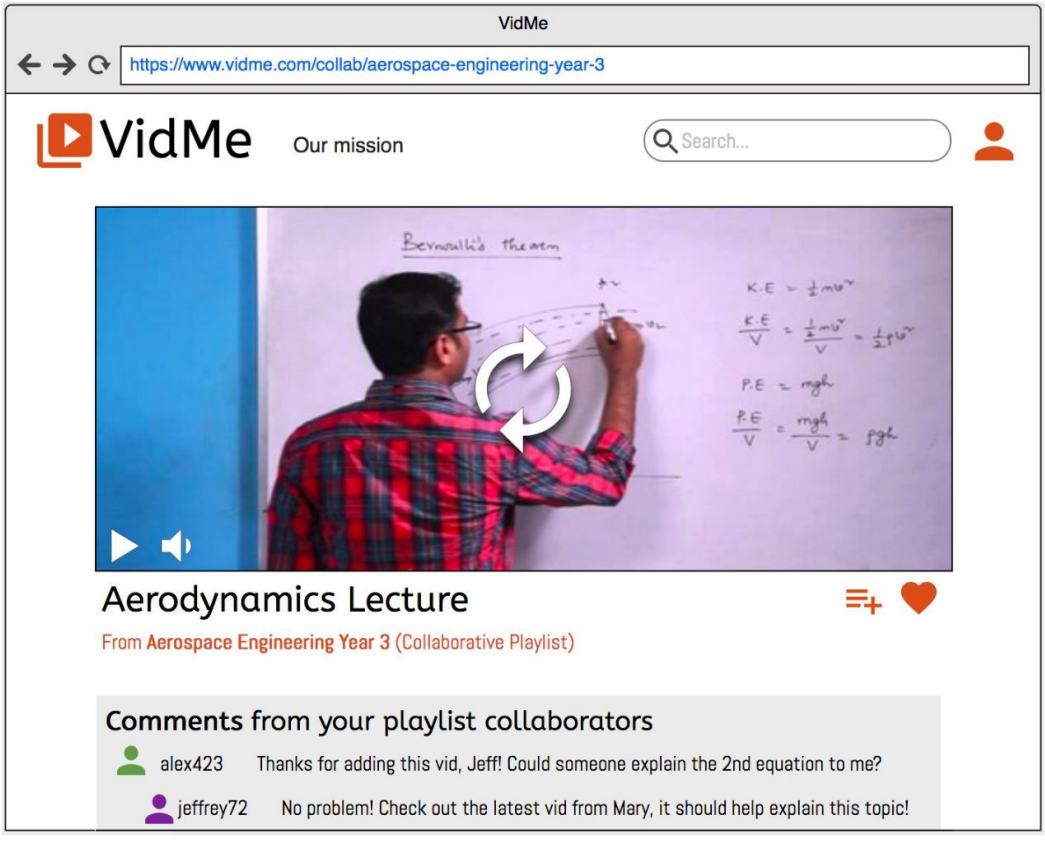
- **Multiple ways to navigate (Van Duyne B1)**: This principle focuses on enabling navigation of the page by placing the most important navigation tool in easy to see areas. He accomplished this pattern by placing our search bar in the top center of the page and by having several different ways to access the content, such as through personalized recommendations and most popular videos.
- **Popularity based organization (Van Duyne B7)**: This principle focuses on recommending content based on usage data and user recommendations. He implemented this pattern by making recommending videos on the first page based on the most viewed videos on the site.
- **Fair Information Practices (Van Duyne E3)**: This principle focuses on allowing users to know what is happening with their data. He implemented this design principle by placing Yomba's Privacy Policy and Terms and Conditions at the bottom of the home page so any user can easily feel secure about how their data is being used.
- **Homepage Portal (Van Duyne C1)**: This principle states that the home page must seduce visitors while simultaneously balancing many issues, including branding, navigation, content, and the ability to download quickly. He implemented this design pattern by making our home page very minimalistic but also very functional, showing useful recommendations of our main content while also making it easy to navigate to other sections of the site.
- **Personalized Content (Van Duyne D4)**: This principle states the importance of having content recommendations that are relevant to the user. He implemented this principle by using a recommendations engine which can analyze previously viewed and liked content of the user and then display custom recommendations based on the user's preferences.
- **Page Templates (Van Duyne D1)**: This principle states the importance of maintaining a common template layout across different pages on the site. He implemented this design principle by using the exact same layout for both our pages and just changing the necessary components for that page.
- **Headlines and Blurbs (Van Duyne D3)**: This principle indicates a style of grabbing user attention by having a hook headline which brings attention to the

content beneath it. He implemented this design pattern in the recommended videos section on both pages of our site.

- **Message Boards (Van Duyne D5)**: This principle recommends using a message board to create a sense of community in the site but emphasizes the importance of making the message board clear to use. He accomplished this by utilizing the traditional “text message” UI layout which will be familiar to customers.
- **Site Branding (Van Duyne E1)**: This principle states the importance of maintaining a consistent branding style across different pages so that the consumer feels confident about the safety and reliability of the site they are on. He accomplished this by maintaining a constant header on the site with Yomba’s name and logo.

Prototype 2: Anya





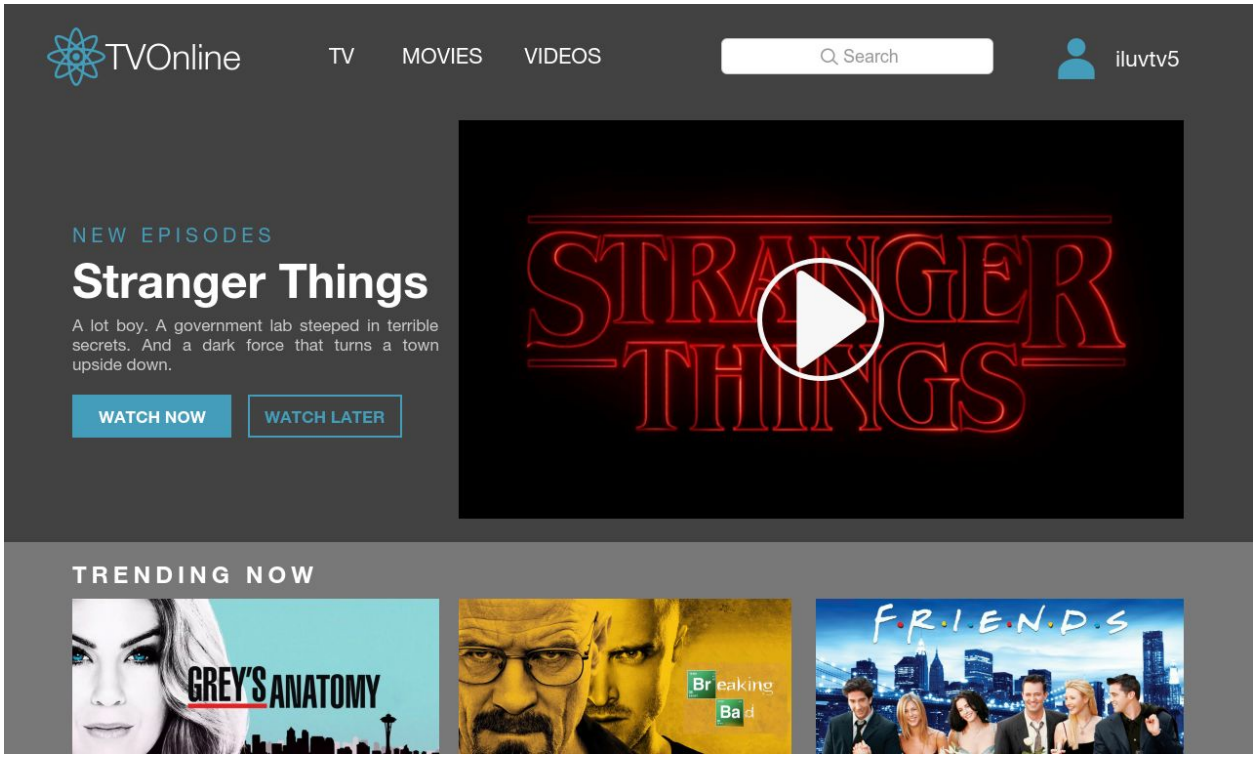
This prototype also reinforced ideas of community. The top of the home page is user-focused, with a welcome message and notifications, messages, and community links in the user panel. The video content is personal, with suggestions tailored to the user's preferences and access to collaborative playlists. Videos within collaborative playlists have comment sections that can be used for conversation. The heuristics and design principles explained below were used in the creation of Anya's prototype.

- **Visibility of system status (Nielsen 1)**: The tool will have a completion indicator similar to the one seen in Netflix. This is easier to understand than the YouTube red bar for users who aren't as familiar with technology, while still informing all users in a simple, clean way.
- **Error prevention (Nielsen 5)**: Videos with language and location restrictions will be marked as such before users must select them. This will help to avoid confusing users as they search for results relevant to their goals.
- **Recognition rather than recall (Nielsen 6):** Videos will have consistent layouts and controls, such as play, pause, and volume.
- **Flexibility and efficiency of use (Nielsen 7)**: Subscribed users will have a home page tailored to their interests and viewing history. They will also be able to view their personal playlists and favorites. Non-subscribed users will be shown general categories of content, similar to those on YouTube's home page.
- **Aesthetic and minimalist design (Nielsen 8)**: The tool will mimic Netflix's design, avoiding all unnecessary visual information and focusing on the essentials. It will follow a clean, simple color scheme.
- **Creating a Powerful Homepage - Homepage Portal (Van Duyne C1)**: The home page will be tailored to subscribers' interests. There will be a display for the user's profile at the top of the page, to easily direct their focus on their usual tasks. Non-subscribed users will be able to see top content in a variety of categories.
- **Building Trust and Credibility - Privacy Policy and About Us (Van Duyne E4 & E5):** A link to an "Our mission" page containing the company's policies, values, and mission statement will be visible in the header of the site, making this information easy to view for interested users.
- **Designing Effective Page Layouts - Clear First Reads (Van Duyne I3):** Category headers and actionable items will strongly contrast the background of the page to be more accessible for users.
- **Making Site Search Fast and Relevant - Search Action Module and Straightforward Search Forms (Van Duyne J1 & J2):** Accelerators would hypothetically be used inside the site to make search faster. To avoid the need for extremely specific searches, search results will autofill. They will have textual

displays like YouTube to avoid confusing or distracting users, and to help with textually specific searches (like Miriam's engineering search).

- **Making Navigation Easy - High-visibility Action Buttons and Descriptive, longer link names (Van Duyne K5 & K9)**: The layouts will have bold, visible navigation tools. The site will minimize the number of pages the user needs to navigate to by displaying all major categories on the main page, and making it easier to get information about an option without navigating away from the page.

Prototype 3: Carrie & Sara



Carrie and Sara's prototype also focused on community but focused on a more general interaction between users through comments and favorites. Their service was more subscription based and would allow users to sign-up and view their favorite television shows and movies. Users would be able to organize their content into playlists, react and offer feedback within a community of other users of our applications, and stream certain content even when they are not connected to the internet. They wanted to integrate the social media aspect of YouTube with the content selection and viewing capabilities of Netflix and Hulu. They focused in on the parts of Netflix, Hulu, and Youtube they liked and disliked in order to determine the heuristics and design patterns they would focus on in their prototype.

- **Browsable Content - Making browsing easy for the user (Van Duyne B2)**: They liked Hulu's browsable content the best because the navigation bar was most succinct yet in depth. We didn't like Netflix's browsable content because there were too many options to choose from and it feels a little overwhelming.
- **Homepage Portal - Keeping the user grounded (Van Duyne C1)**: They liked Netflix's homepage portal the most because access to the most watched and personalized content was easily accessible. In addition to the homepage bar, there are immediately movies and tv shows to choose from based on their title and picture, so users can easily navigate to the media they are most likely to

watch based on their account history. They did not like Hulu's because an advertisement took up ¾ of the home screen. They think the homepage should be tailored to the tendencies of the account user.

- **Site Branding - Create committed users (Van Duyne E1)**: Netflix's site branding (logo, color scheme, etc.) is the cleanest and most sophisticated, as well as our favorite. In reality, they are all very professional, so they wanted to emulate the style of the three websites.
- **Privacy Policy - Building trust with our users (Van Duyne E4)**: They liked Netflix and Hulu's positioning of the privacy policy best. At the bottom of the page, it's more easily accessible to users since this is where it's typically found. YouTube's was harder to find, so they wanted to make sure our design makes privacy very clear to the user.
- **Sign-In/New Account - Make a subscription based service (Van Duyne H2)**: They liked Netflix's sign in buttons as well as the fact that users only need to input email and password to make an account. They liked Hulu's sign up process because it shows all the necessary info the user, nothing extra (Netflix has extra pages to guide the user through the process which are unnecessary so this is something we want to avoid).
- **Search Action Module - Quick navigation on the site and Predictive input (Van Duyne J1 & H11)**: Hulu does the best job of integrating predictive search input and calling the user to watch the video. Youtube predicts searches but the user must hit enter before videos appear; Netflix shows videos before the user finishes typing but does not include predictive input while typing like YouTube does.
- **Recognition Rather than Recall - Sticking with the conventions users are use to (Nielsen Heuristic 6)**: Netflix uses many conventions in which the action associated with event on the page is related to recognizable patterns in real life. YouTube, on the other hand, uses symbols that mean absolutely nothing from just looking at them and require the user to click and investigate in order to learn more. Therefore, we will try to put images on the page that the user would recognize and have formed a convention across the digital world
- **Help Documentation - Easy experience for our users (Nielsen Heuristic 10)**: YouTube's help documentation did not lead the user to a new page like Hulu and Netflix. We are going to use this style in our design because we think that it's important a user can stay on whatever page they are asking help about. Therefore, they can simultaneously look at the problem and try to solve it.
- **Action Button (Van Duyne K4)**: Netflix's action buttons are stylistically differentiated from other parts of the site and clearly point users to the action the site would like them to achieve.

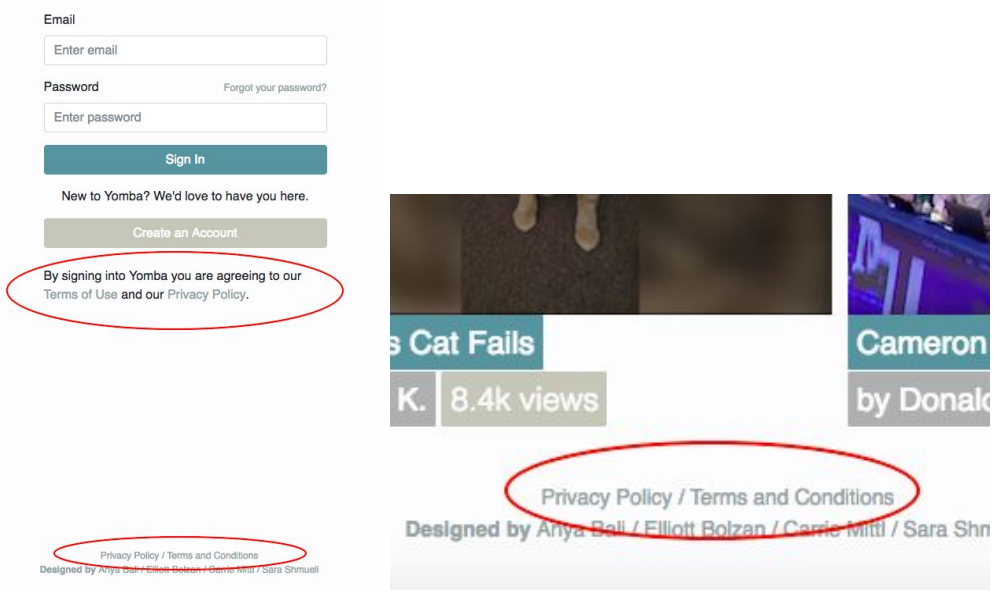
Chosen Prototype

Our group chose Prototype 1 because it included many features shared by all three of our designs and clearly demonstrated the implementation of a community interface. When evaluating the prior prototypes, we favored the focus on community present in Anya and Elliott's prototypes and the clean design of Sara and Carrie's site. We wanted a site that connected video browsing and viewing to the user's preferences and friends/connections. The community aspect provided usefulness to the site, and an uncluttered design makes this interaction easier and more intuitive for the user.

Yomba's focus on the user's preferences and interests is evident in the design of the site. Rather than a focus on likes or shares, video display focuses on content, community, the user that created the video, and how many times a video has been viewed. Recommendations are personal and displayed on the home page, as well as those related to the currently playing video. Community activity is clear even once the user leaves the home page, as video comments are displayed conversationally and access to communities continues into the video player page.

Application of Nielsen's Heuristics and Van Duyne Design Patterns to Prototype and Website

Van Duyne E3: Fair Information Practices. This principle focuses on allowing users to know what is happening with their data. We implement this design principle by placing Yomba's Privacy Policy and Terms and Conditions at the bottom of the home page so any user can easily feel secure about how their data is being used. While most websites typically show the Privacy Policy and Terms and Conditions next to the About, Press, Contact, and Careers links on the page, we have chosen to include the Privacy Policy and Terms and Conditions in the footer, while the others can be accessed on the sidebar, because the sidebar is not present on the login page. The Privacy Policy and Terms and Conditions are, therefore, accessible on every page on Yomba. When the user is signing up, they also are informed that by signing in, they are agreeing to our terms of use and privacy policy, with links access to pages which are accessible before signing up.



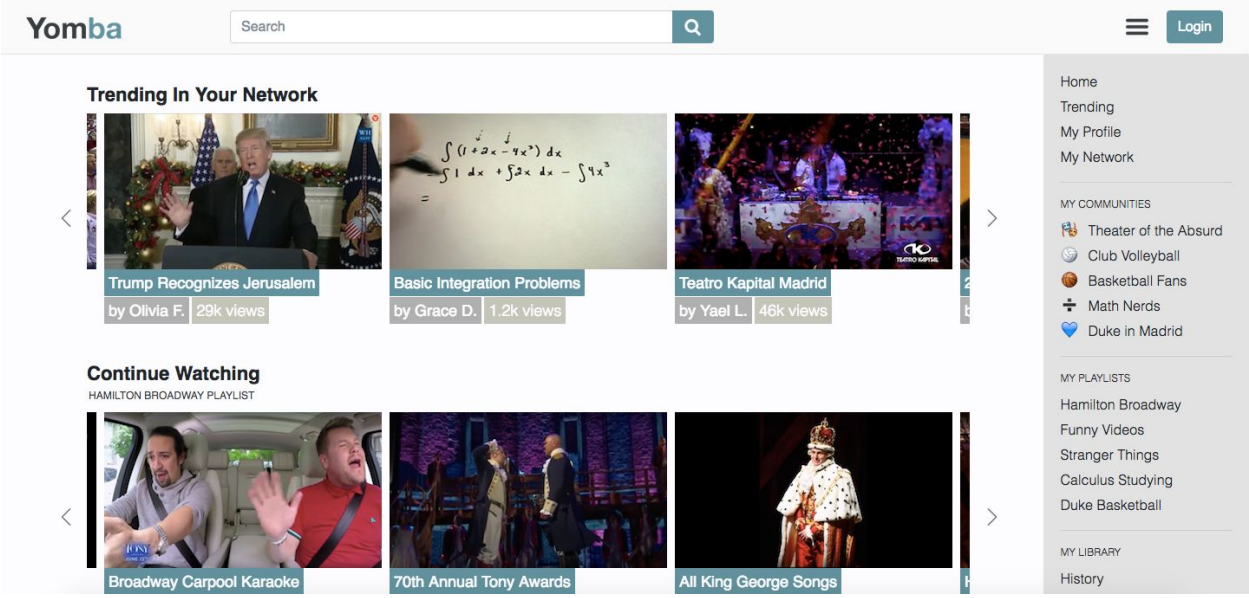
Van Duyne C1: Homepage Portal. This principle states that the home page must seduce visitors while simultaneously balancing many issues, including branding, navigation, content, and the ability to download quickly. We implemented this design pattern by making our home page very minimalistic, but also very functional, with lots of options to watch videos and explore the page. Overall, we carefully selected each feature on our homepage to be relevant to the user in order to facilitate navigation across Yomba.

The header present at the top and the sidebar are both consistent throughout the site and provide the user with useful ways to navigate the site. Users can access things from their profile and network, communities, playlists, and library. Additionally, the homepage features 5 slidable bars of videos (similar to Netflix's design), designed to provide the user with a variety of easily accessible viewing options, to engage the user to begin watching, without overwhelming the user with too many options. Each video has the information with the title, the member of your network who posted it, and the number of views. The reason we chose to leave out the time that the video was posted is because our account is focused on the members of your community and how many people in the Yomba community are viewing the videos.

The "Trending in Your Network" selection of videos introduces Yomba's message of community-centric video browsing. The second bar is "Continue Watching" which also draws the user in by directing them to continue listening to the Hamilton Broadway playlist on the website. The other slidable content bars are videos in a community (Theater of the Absurd), Recommended for You, and Watch Now. We have included a variety of types of video content, as opposed to all content from different communities for example, because the homepage is a centralized place from where the user should

be able to easily navigate the rest of the website. The subtitles (“Hamilton Broadway Playlist”, “Watch with your community,” and “Saved them for later? Now’s your chance to watch.” are minimal but very informative to the user, allowing our design to be clean and our homepage to be easy to navigate.

Lastly, the video content is randomized each time the page is refreshed. This allows the user to see different content each time they access the homepage, keeping content new and exciting!



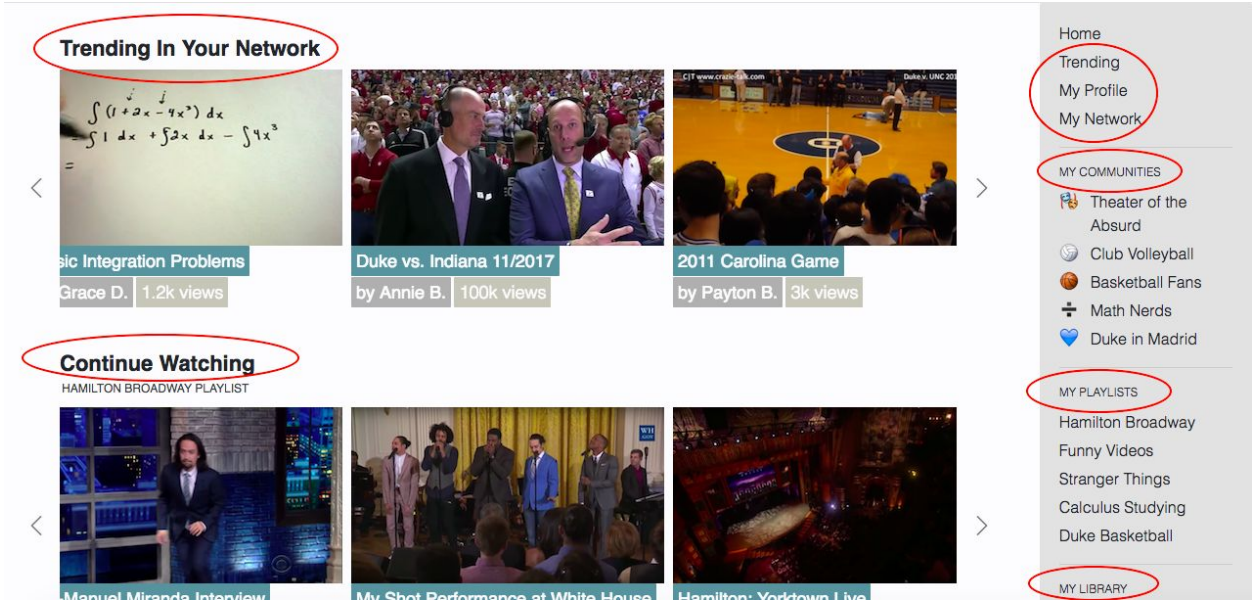
Van Duyne D4: Personalized Content. This principle states the importance of having content recommendations that are relevant to the user. We implemented this principle by using a recommendations engine which can analyze content that was previously viewed and commented on by the user and then display custom recommendations based on the user’s preferences. This engine also takes into consideration the content that is trending amongst the user’s network, which is made up of the variety of users in their communities.

The sidebar has the Trending button while the homepage has a section of videos that are “Trending In Your Network,” allowing the user to easily access the videos that their friends are watching and are likely to appeal to the user. In addition to “Trending In Your Network,” the homepage also displays videos that the user was previously watching and might want to continue watching, being posted in their community, recommended based off our recommendations engine, and videos that they never finished. The variety in types of video sections on the homepage provide a wide range of personalized content for the user.

In the sidebar, the user can access their own communities, playlists, and library. Since the user has selected their communities, playlists, and the content in their library,

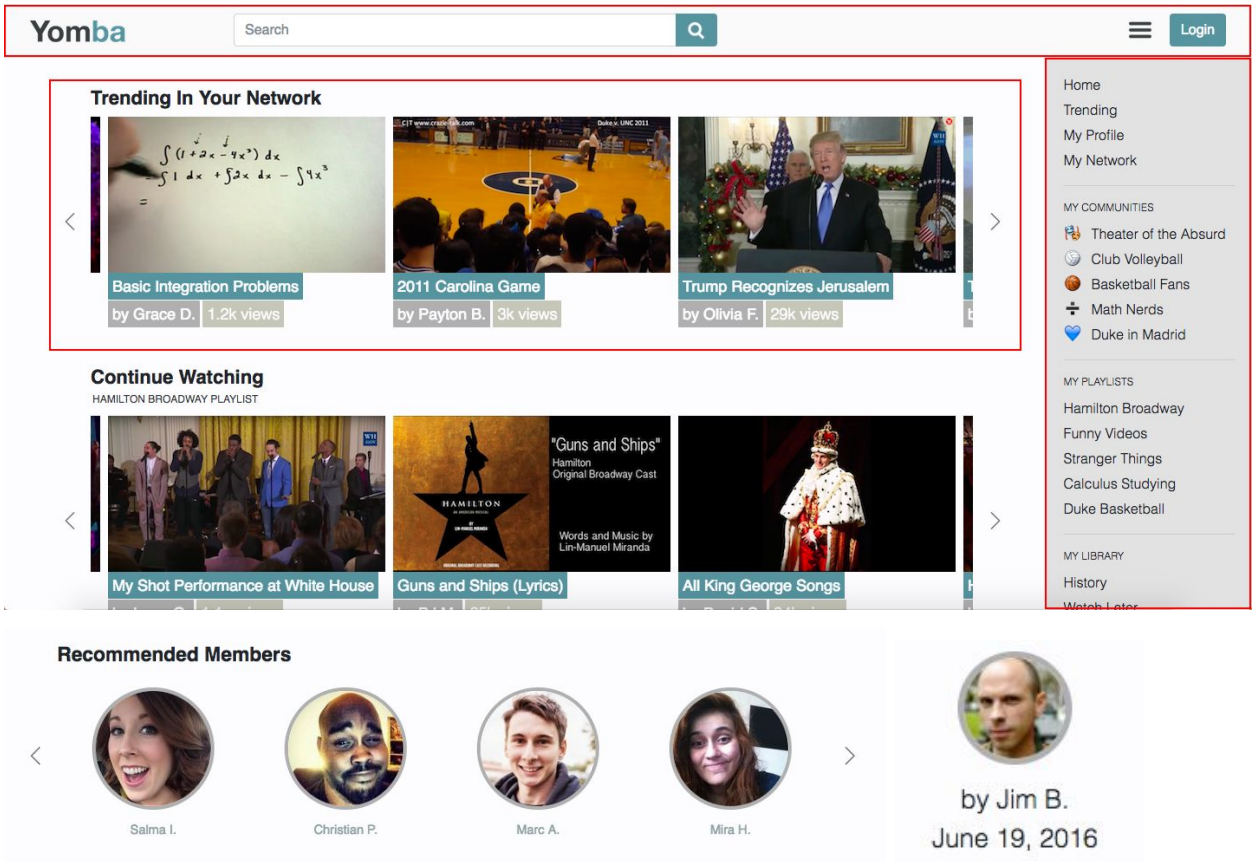
making this personalized content easily accessible in the sidebar helps to tailor content to the user. The emojis next to each community contribute to this personalization. All in all, the sidebar links make content that is specific to each user easily accessible.

On the video display page, in the “You’ll Also Enjoy” section, the user can access content (with the help of our recommendations engine) that is recommended based off the current video being watched.

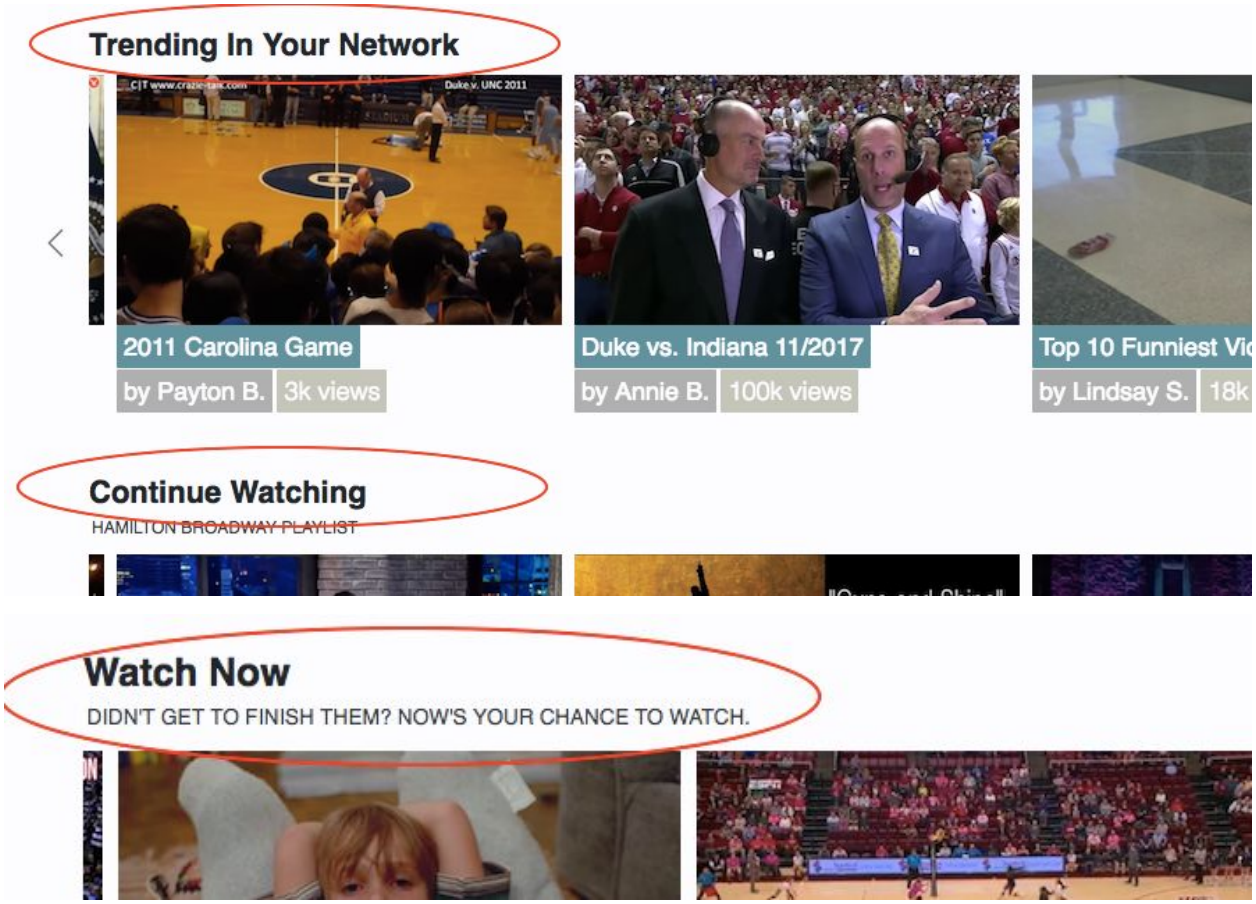


Van Duyne D1: Page Templates. This principle states the importance of maintaining a common template layout across different pages on the site. We implemented this design principle by using the exact same layout for both our pages in the prototype and just changing the necessary components for that page.

In the implementation of our website, we have maintained the same header throughout. The sidebar is also consistent throughout the site and can be opened and closed using the icon with three horizontal lines in the header. As seen in our project-wide specifications section, our color scheme, fonts, and logo are consistent. Bootstrap is used across the site as well, making the navigation experience consistent across pages regardless of the device or window size. Specific features and functionalities are consistent across the site, such as the slidable video bars (as seen on the homepage, communities page, and in the recommended content on the page of the single video). The title, user, and views formatting is also consistent across these three pages. The user icons are consistent as well, circular and with the same color outline (as seen below).



Van Duyne D3: Headlines and Blurbs. This principle indicates a style of grabbing user attention by having a hook headline which brings attention to the content beneath it. In the prototype, we implemented this design pattern in the recommended videos section on both pages of our site. In the execution of our website, we've included headlines "Trending in your network" and "Continue watching" as the first two headlines of the video bars to hook the user. Subtitles for this headlines on the homepage also hook the user, such as the subtitle for the "Watch Now" headline which says "Didn't Get To Finish Them? Now's Your Chance To Watch," a conversational way to engage with the user. On the Theater of the Absurd community page, the two headlines for the video bars are "Recent videos" and "Most watched," which promote the idea of watching videos that are recent and popular amongst the community. "You'll also enjoy" has the same effect; you'll also enjoy is a relatable and personable way to communicate to the user that these videos are recommended for them based off our recommendations engine.



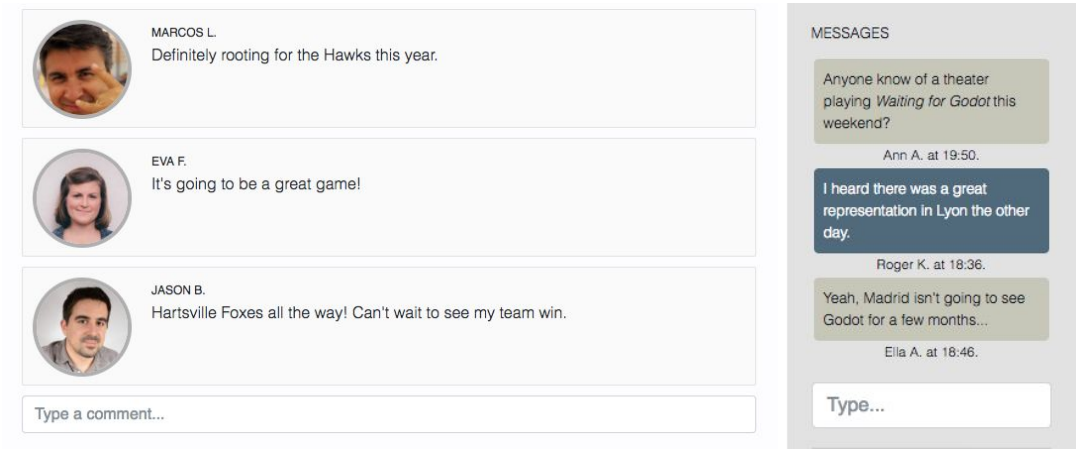
Van Duyne D5: Message Boards. This principle recommends using a message board to create a sense of community in the site but emphasizes the importance of making the message board clear to use. In the prototype, we accomplished this by utilizing the traditional “text message” UI layout which will be familiar to customers, which we also implemented in the development of our site.

Since Yomba’s mission is to create a community of video watching and sharing, the messaging functionality is a critical piece of our site. We have made the comments on video mimic a typical messaging board in some regards because we are aiming to promote conversation across the platform. Both the message and comment functionalities allow users to post simply by pressing enter, making the website simple and promoting communication. Users don’t have to go through the hassle of clicking a submit, making communicating on our site more fluid and natural, enhancing the community-feel.

To also emphasize the messaging aspect of our site, the message board is easily accessible on the Theater of the Absurd (and all other community pages) in the sidebar since communication is key to a cohesive community. Users can engage with

the members of their community in real-time through this messaging board as well as in the comments of their videos.

Both the message and comment functionalities also include “Type” in the message or comment bar to clarify their functionalities to the user. Posted content includes the user’s name as well as the time for the messages and profile picture for the comments. Lastly, we wanted to note that member names are in the format of first name and last name initital. We have selected this format for displaying names of the users in the message board (and across the platform) because it is a more personal way to call people, as opposed to a more formal first name and last name approach. Yomba is looking to create a personal, informal, and tight-knit community!

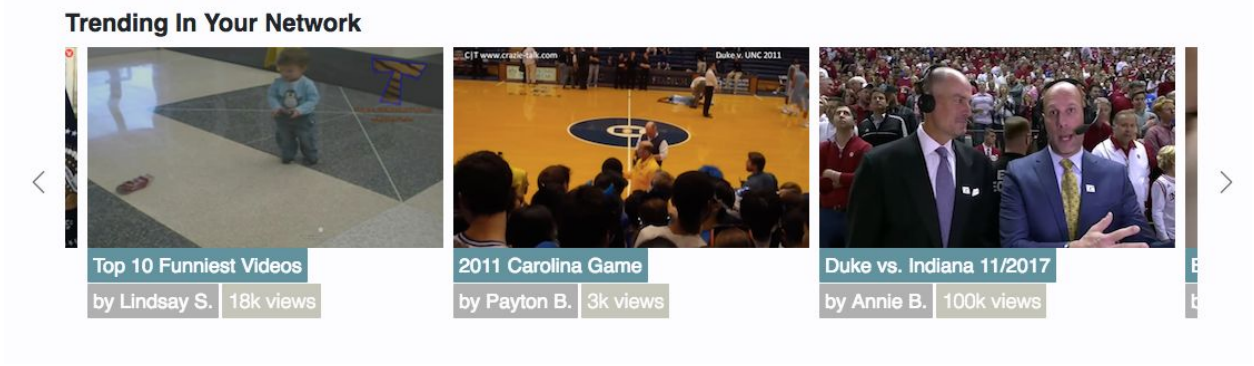


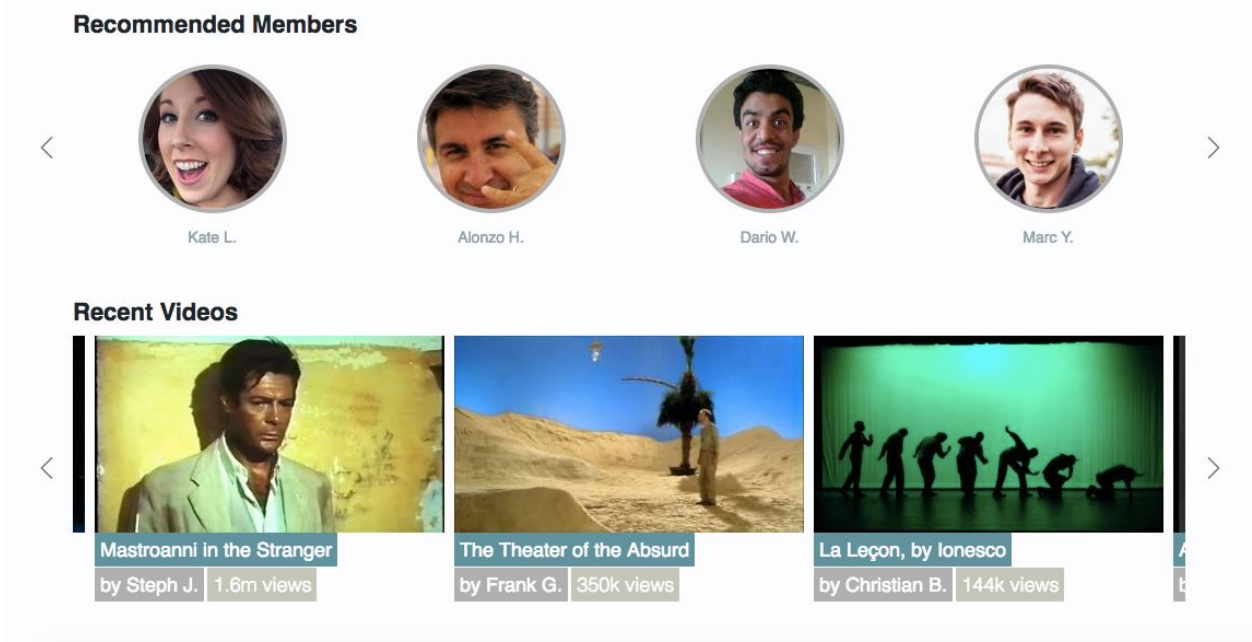
Van Duyne E1: Site Branding. This principle states the importance of maintaining a consistent branding style across different pages so that the consumer feels confident about the safety and reliability of the site they are on. We accomplished this by maintaining a constant header on the site with Yomba’s name and logo.

As we moved forward with finalizing the design and coding our site, we added several elements that solidified our branding efforts, many of which are included in the project-wide specifications. For example, our color scheme, consistent page layouts, and our font. Additionally, we have included a favicon to reiterate the Yomba brand and to ensure the user feels safe while navigating the site.

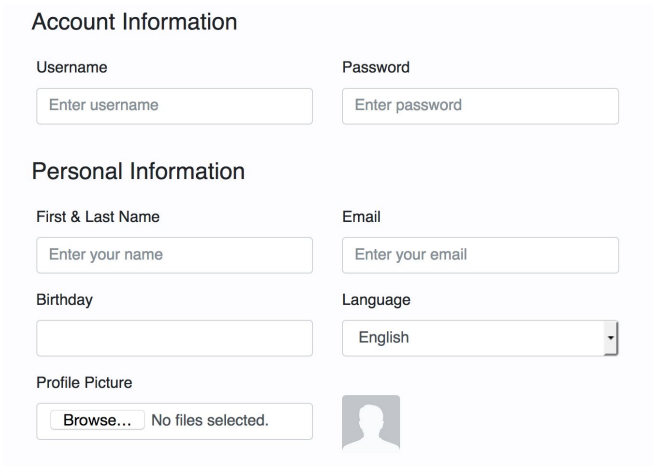
Lastly, since Yomba is based around communities, we have branded our site to promote this very idea, which can be seen in features including our Communities section towards the top of the sidebar, video recommendations based on what is trending in your network, and messaging and comments to promote community engagement.

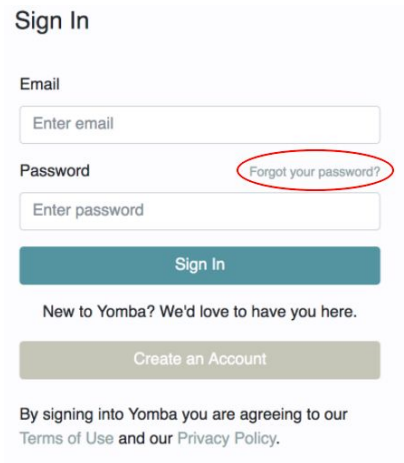
Van Duyne B8: Category Pages. This principle emphasizes the importance of utilizing a consistent layout for category pages to facilitate easier navigation on the site. In our prototype, we implemented this by keeping the content recommendations in the same place across different pages, adjusting actual content displayed by page. We modified this a bit in our final design, but recommended videos are accessible through video carousels across all pages. In addition to consistency with carousels (featuring videos or users, as seen below), all pages have a sidebar which can be opened or closed with the icon in the header.

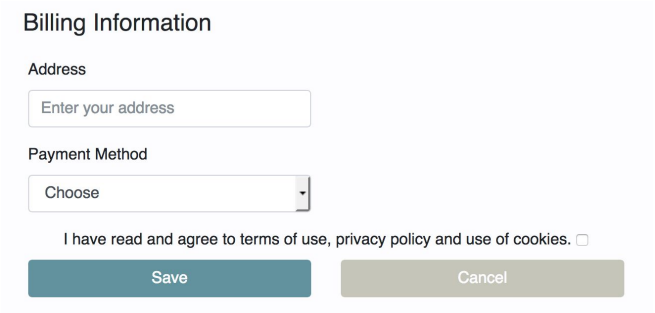




Van Duyne H2 - Sign-In / New Account This heuristic says that the user must be given the opportunity to sign-in if they are already a customer (to retrieve content they have the right to consult) or be allowed to create an account. This process must take place on the same page, as well, according to Van Duyne. It also says there must be a way for handling forgotten password. In our final design, we make it clear to the user that they can navigate somewhere to retrieve their password. We allow the user to sign in or create an account and collect the minimum required information to make an account. It is easy to navigate to these options as well as logout.



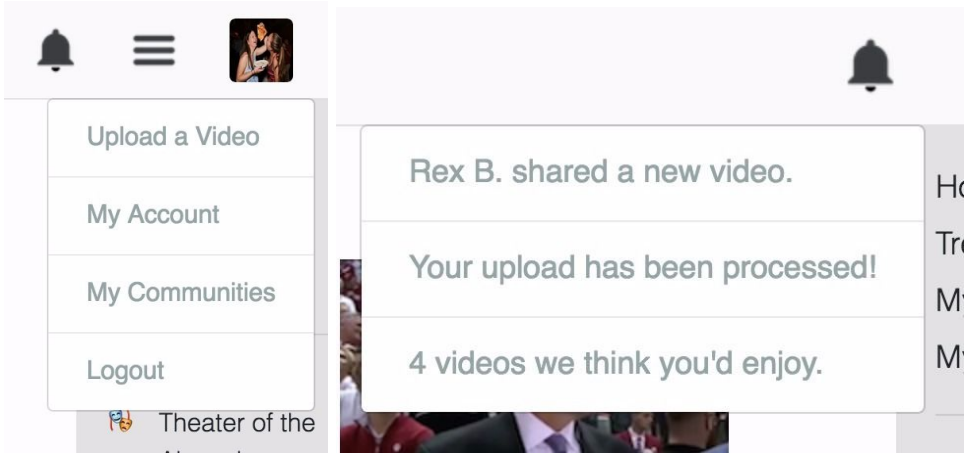




Nielsen Heuristic #6: Consistency and standards. This heuristic says that users should not have to wonder whether different words, situations, or actions mean the same thing. Follow platform conventions. This is achievable by creating consistency across our platform.

In both our prototype and final design, we included a header that is consistent across the site, with icons to open and close the sidebar as well as view notifications and explore other functionalities when you click on your user icon (as seen in the photos below). Additionally every time the search bar is selected, the user is directed to input “communities, users, and videos.” Regardless of the page, the functions seen in the header are consistent.

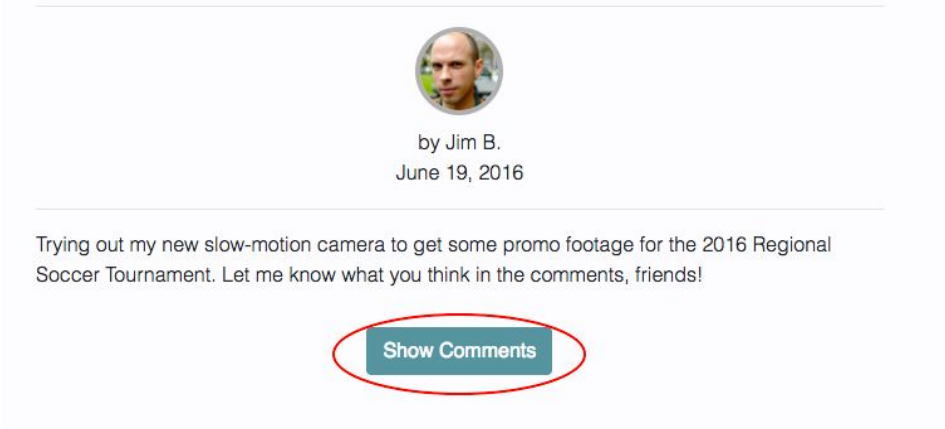
We have also achieved consistency by making the sidebar accessible throughout the site, creating a simple and clear way to access communities, playlists, and more. Other examples of functional consistencies include our slidable content bars, clicking on videos to access the video player page, and pressing enter to post messages and comments. Additionally, our videos on the homepage and communities pages are uniform in the way they display their info making this clear to the user.



Nielsen Heuristic #9: Aesthetic and minimalist design. This heuristic states that dialogues should not contain information which is irrelevant or rarely needed. Every extra unit of information in a dialogue competes with the relevant units of information and diminishes their relative visibility.

We have incorporated a minimalist design by including various functionalities to make content accessible but able to be hidden as well. For example, the sidebar can be closed and opened simply with the icon in the header, as can the notifications and user functionalities (as seen in the picture above). The comments on the video player page can be shown or hidden, simply by clicking the “show comments” or “hide comments” button below the player (as seen in picture below). Additionally, we have chosen to

display videos in horizontal carousels by category, rather than listing them across the page (similar to how you might see on an e-commerce website). Rather than overwhelming the user with infinite video options, the user can select which carousels/categories of videos they'd like to explore (for example, Recommended For You or Trending), and access these specific videos by navigating their respective carousel.



Application of the Personas to Yomba

We will talk about how Yomba account for the needs of each persona we created through design patterns and heuristics.

Persona 1: Maria

Maria has joined Yomba and found her home amongst the page's various communities from her passions of dance and theater, to practical groups like her class from Harvard to novice cooking. She loves this communities aspect and spends the majority of her time sharing videos and engaging in messaging and commenting with the many members of her network.

- Maria is often navigating the various community pages she is a part of and wants a smooth experience across all pages.
    - Yomba has consistent page templates (Van Duyne D1), making watching videos, exploring content to watch, and engaging with users through comments and messages easy no matter the page she is on. Each community page maintains the same template--a carousel of users, two carousels of videos, a sidebar with community info and a message board, and a header that is consistent across the site.
    - The site maintains consistency and standards (Nielsen Heuristic #6) across each of the community pages that Maria is a part of. In addition to

maintaining the same page template, the functionalities of each element on the site are the same. For example, Maria can always access the message board by going to the sidebar or the comments under each video with the “Show Comments” button. At the end of typing her message or content, she can always press enter to post these. Furthermore, all the carousels across the site (regardless of content) are slidable using the arrows on the sides of the carousel or by using your cursor to drag the content.

- Maria is 23 and a Harvard grad. She is therefore very tech savvy and wants a website with a modern, clean aesthetic. Yomba is an escape from her rigid worklife on Wall Street and she’s looking for an uplifting experience, after all.
    - Yomba’s site branding (Van Duyne E1) gives it a modern feel. With an aesthetic and minimalist design, Yomba has little excess information, making it intuitive and easy to navigate after a long day at work.
- Maria’s favorite part about Yomba is the communities where she’s been able to reconnect with her passions and former classmates and explore new interests. She likes to engage with the members of her communities.
    - Yomba’s community pages each have a message board (Van Duyne D5) in the sidebar so that Maria can easily get in touch with her communities as well as navigate the unique conversations and topics in each community that she is in. The message boards mimic typical message boards (i.e. Maria’s sent messages on the right, different colors for Maria’s messages, a type bar at the bottom), making it clear to follow. Additionally, names above the messages, timestamps, and hitting enter to send a message allow Maria to engage with her network naturally and in real time.

Persona 2: Mr. P

- Mr. P is very protective of his and his family’s privacy. Since Yomba implements the Fair Information Process (Van Duyne E3), he knows exactly what’s happening with his information and can easily navigate to the specifics of the Privacy Policy and Terms and Conditions from any page.
- Mr. P never wants to be ignorant and is clearly very insightful. Therefore, having an About Us page (Van Duyne E5) visible in the sidebar explaining the company’s purpose, goals, and contact information will calm his fears and allow him to focus on the video content he actually cares about.
- The process funnel (Van Duyne H1) should guide Mr. P through the actions of making account in a very logical order. One step should lead to another and only

essential information should be required when making an account. He doesn't like to give away more than he needs to about himself and his finances. Clear Forms (Van Duyne H10) made creating an account and signing in very minimalist for him.

- Mr. P is not that technologically savvy. Therefore, the Nielsen Heuristic #9, which focuses on an aesthetic and minimalist design, will help him not be overwhelmed by information and focus on his core objectives for using the site.
- The implementation of Nielsen's Heuristic 2, matching between the system and the real world, has also helped old Mr. P overcome his hatred of technology on Yomba's platform. Each button in the header of the site alludes to the actions it will perform, such as the bell for notifications and the three lines which symbolizes more information.

Persona 3: Miriam

Miriam uses Yomba for school and to discover new interests. She makes use of the account holder and community functionalities, as well as the messaging within a community. In a typical scenario, Miriam logs into Yomba, checks her notifications, and visits one of her engineering communities to find videos on class content or help other community members in the comments. The following aspects of Yomba are important to her experience:

- Miriam is an engineer, and therefore very conscious of product design. She likes creating things that work and that look beautiful. She enjoys Yomba's site branding (Van Duyne E1) because it has a consistent style in its header and sidebar, a moderately sized logo always located in the upper left part of the page, and it loads quickly. Yomba's brand is clear and consistent, which appeals to the designer in Miriam.
- Design also comes into play in Yomba's aesthetics. Yomba avoids unnecessary text by focusing on content and icons. Its aesthetic and minimalist design (Nielsen heuristic 8) keeps the user's focus on the page content and prevents distraction by irrelevant dialogues or unnecessary information.
- As a technology-savvy college student, Miriam is exposed to a wide variety of web tools every week. She liked being able to explore Yomba before creating her account. Once she decided to sign up (Van Duyne H2), she appreciated the easy account creation process and how straightforward it was to log in upon return to the site.
- Miriam quickly became an avid user of Yomba and utilizes all of its features. She moves around the site quickly, whether working on school or exploring personal interests. Having multiple ways to navigate (Van Duyne B1) is important to her

experience. The search and browse navigation tools are always located in the page header, as is accessibility of the menu bar. This helps her move around the site while avoiding tedious searching.

Typical Scenario of How Yomba Will Be Used

Typically, a non-registered user will open an internet browser and head to Yomba's website to view relatively niche videos. Upon arriving to the website, the user will most likely use the search function. Indeed, popular videos will be displayed on the homepage under categories such as Trending, Continue Watching, Community Specific Thread, Recommended for You, and Watch Now, but many of our users will be actively seeking quite specific content. As the user's search results are displayed from top to bottom, s/he will have an opportunity to consult each video's name, title, description, like count, thumbnail and view count. Using this information, the user will make a decision and click on a video thumbnail.

A web page playing this video will be opened. The user will engage with the video content. When his or her attention lulls, he or she might look at the comments by other users beneath the video. Then, as the video comes to an end, the user might visit a community the video is tagged as being a part of. This will allow the unregistered user to identify and discovery similar videos.

Then, as the user looks at comments and consults community pages, he or she will want to partake in the Yomba discussion through the chat system. In this possible scenario, the user might create an account to be able to join communities and exchange messages with fellow community members. They would click Login in the upper right hand corner of the webpage. Then the user would click Create An Account and put in their information to join Yomba or login if they are already a member. Later on, as the user's familiarity with the community system increases, he or she might feel emboldened and upload a video. Generating content is the heart of Yomba as a tool, and in this sense, the user will feel a sense of belonging and creativity. This first video can then be shared (through social media networks) with the user's friends, family, and acquaintances on different platforms to reach a wider variety of people.

A registered user will be able to consult the communities s/he joined on the sidebar under "My Communities." The user will also be able to save favorite videos to different categories under "My Playlist" in the sidebar. They can join as many communities as they would like and become as passive or engaged in the community as they want to

be. If the user needs to logout, they can click their profile picture in the upper right hand corner to navigate to that option. The user can also personalize their account through other options displayed when clicking on their profile picture.

Down the road, this user might become successful and rightfully seek to derive a profit from the content he or she is creating on Yomba. These opportunities will be available, and Yomba will offer to display advertising before the user's videos are played. The profits will be shared with the user, who will be incentivized to further use the platform and recommend it to his or her social circle.

Description of the Technology Used in the Implementation

The technology used in our implementation was meant to simulate the user-focused experience we designed.

By using Bootstrap (https://getbootstrap.com/) in our code, we made our website responsive for different screens, including mobile displays. Because the personas we developed were concerned with accessing Yomba during commutes, we felt that providing a responsive experience was crucial. Additionally, using Bootstrap as a technology ensured that each of our individual pages used the same system to adapt to phone and tablet screens: we didn't want all of our pages using different CSS column mechanisms. In this way, Bootstrap was used as a code-streamlining technology.

Bootstrap also helped unify the function and feel for different elements of the website that were repeated across pages, such as action buttons. Our "Login", "Sign In", "Create Account", and "Show Comments" buttons all look extremely similar, and this is by design. We thought that Bootstrap, in this regard, could help us provide a consistent experience to the user. In a similar way, we used Bootstrap and Popper.JS to display dropdown menus from our header on all of our webpages. To guarantee consistency, limit code duplication, and prevent errors, it made sense to use an external library.

We also frequently used a JavaScript and CSS plugin called Slick.js (http://kenwheeler.github.io/slick/) to implement our video thumbnail and member carousels / galleries. From the prototyping stage, we were aware that a carousel design would significantly improve Yomba's overall offering as a product, but we were also concerned with the difficulty of implementing such a system from scratch – particularly

in the context of a responsive website. As a result, we used Slick.js to quickly implement our galleries (“Recommended Members”, etc.) and ensure they remained consistent across the three web pages they appear on. We believe the end result is a more aesthetically pleasing interface, which increases the user’s interactivity by inviting him or her to browse through our thumbnails – or swipe through them on mobile devices.

In addition, we chose to make use of jQuery UI in our project. This GUI library was used to provide autocompletion results to our users when they used Yomba’s search bar, for example. We felt this provided a more realistic user experience, as most video-streaming and video-sharing websites today include an autocompletion function. While implementing such a function from scratch would have been difficult, jQuery UI made the process practically instantaneous.

Finally, we made use of HTML5 localStorage and traditional cookies. These technologies ensured that logged-in users could choose their own profile picture, for example. We are of the opinion that this furthered Yomba’s emphasis on the individual and his or her experience within online communities.

Overall, each of our choices of external libraries, plugins, or technologies was informed by our desire to make Yomba the most visually and functionally pleasing for our prototypical user.

Implementation of the Web System

To implement our Yomba design and functionality, we use one common JavaScript file which all of our HTML files import. Additionally, each HTML file has its own, far smaller JavaScript file. This two-pronged approach had several benefits, in our opinion. It led to:

- Less code;
- Less code duplication;
- A low risk of confusion during development (methods used in several files are found in one place, and one place only, *common.js*);
- A streamlined process in terms of development. If four people share a common JavaScript resource, they will not seek to reimplement functionality that other developers have already worked on.

Similarly, we use one CSS file for the entire site. This strategy made sense for the reasons listed above, and the following ones as well:

- Ensured that we did not implement conflicting styles;

- Allowed us to unify our user interface and design very rapidly;
- Made it far easier for our web pages to be visually harmonious and cohesive.

Both our centralized JavaScript and CSS files also allowed for efficient troubleshooting. Because much of our commonly used code was stored in one place and called from many, changes could be made to all 4 of our HTML pages by changing one line of code in *common.js* or *yomba.css*.

The timeline of our implementation followed a series of steps. First, we collaboratively designed, implemented, and formatted boilerplate code for the web pages we would individually develop. This boilerplate was comprised of import statements, general structure, a header, and a footer. Then, each team member implemented a fully functional web page (home page, communities page, login page, or video page). Finally, we shared our work with each other. During this final process, we abstracted common JavaScript code into the centralized script, and homogenized our webpages using our common CSS stylesheet.

Finally, to provide the prototypical user with a more realistic experience, we chose to implement randomization in our user interface. Using random number generation, we we designed algorithms in our common JavaScript file to create random member names. These were placed in our member profile picture carousel and chat system log, for instance. We believe the consequences of these algorithms were important in terms of user interface design: instead of seeing 16 profile pictures with the same names on each reloading of the page, the user is exposed to 10,556 different combinations of profile pictures and first and last name. Similarly, we implemented a variation of the Knuth shuffling algorithm to ensure that our carousel content (video thumbnails and profile pictures) was displayed in a different order each time Yomba was opened.

Overall, we came to the realization that the illusion of a variety of content could be created using relatively simple randomization and generation techniques. We think that the extra amount of work we put into designing these algorithms considerably improved the prototypical user’s experience on Yomba.