MASTER'S THESIS

Optimizing web design processes and aligning design work

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True collaboration isn't throwing designs over the wall.
It's designers, engineers, and the rest of the team sharing
the responsibility to build a quality product.
— Diana Mounter

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Lausanne, 20 August 2021 Costanza Volpini

ABSTRACT

The demand for web pages has been growing steadily in recent years; consequently, the web teams at Logitech have grown a lot. However, due to difficulties in scaling with the increased demand, teams often had to leave out some good design resulting in a design debt. The latter comes in many forms, such as accessibility requirements not being met or inconsistencies across web pages. This thesis aims to explore design systems as a solution to enable more effective collaboration and to ensure consistency across pages without compromising designers' creative flexibility. A design system is defined as the set of interconnected patterns and shared practices for efficiently and consistently delivering digital products. Moreover, a design system also represents a centralized resource that will be referred as the single source of truth by all the web teams, therefore enabling a better collaboration. A large part of the research focused on what value a design system would bring to the organization. Many qualitative methods, e.g. interviews and usability testing, have been used to build our system iteratively and to assess how much each version was aligned with the users' need. Constructive positive feedback has been received, and next steps, that will be tackled after this thesis, have been identified. Lastly, Apollo's Logitech web design system confirmed that different teams can collaborate thanks to a shared vision.

CONTENTS

GLOSSARY

Accessibility Practice of making a website usable by everybody (e.g., people with disabilities, mobile users).

AEM Adobe Experience Manager is a CMS (content management system) for building websites.

Apollo Logitech web design system.

Author Alternative name for content ops.

BG Business group (stakeholder).

Component Reusable building block that has been designed and coded to solve a specific design problem. A component has a defined style and iteration.

Component Library An organized collection of components. It can be used to search for examples and to learn about all possible variations and states of components.

Content ops Content operations, also called authors, are responsible for building web pages on AEM and much more.

Copy Written content produced by copywriters.

CMS Content Management System.

Comps Design composition or layout.

Confluence Web-based corporate wiki.

Design Debt All the dark corners that have formed due to some good design solutions being skipped to achieve a short-term goal. For example, by skipping user testing or some accessibility requirements.

Design System Set of interconnected components and shared practices your organization needs to efficiently and consistently deliver digital end products.

Design System Manager Reference website with pre-built capabilities to quickly set up a design system.

Design Tokens Design decision expressed as data (platform-agnostic).

Figma Design and prototyping tool used to build comps and components.

Foundations Set of structural and visual elements that characterize a brand.

Guidelines Rules or best practices to follow.

InVision A tool used to convert static screens into interactive prototypes.

LP Landing page.

OKR Objectives and key results.

Page archetypes In Apollo, page archetypes are defined as abstract pages determined by the position of their frame on the page.

Pangea components The core group of reusable components that are used on all Logitech sites.

Pattern Reusable solution that solve a common design problem (e.g., the green color is used to indicate success).

PDP Product detail page. It goes into detail about a particular product and is designed for conversion and sales.

PLP Product listing page. It gives an overview of a product or several products.

QA tester Quality assurance testers test and evaluate the web pages.

Reference website The entry point to access a design system.

SEO Search engine optimization.

Style Guide A document that provides brand rules from a design and content perspective.

Sketch Design and prototyping tool used to build comps and components.

Template In Apollo, templates are concrete page archetypes defined by the type of components allowed and how they are displayed within the page.

Web team The entire Logitech team composed by web designers, QA testers, developers, content ops, SEO and accessibility specialists.

Wireframe A set of diagrams (e.g., simple shapes) used to represent a web page's layout at the structural level.

Work in the open Working in the open means that designers have to share their work without being worried that it is fully finalized.

Zeplin Hand-off tool used to inspect comps.

Zeroheight Design system manager platform.

1 INTRODUCTION

1.1 Background

1.1.1 Design for more

In the last years, designers have observed a growing demand for compelling web experiences driven by an increased number of devices differing in the way of interacting with them, e.g., mouse vs. touch, and in the screen sizes. Nevertheless, when users visit a website, they expect it to work and look good regardless of their device. Since it became unfeasible for designers and developers to create web pages for each type of device(see Fig. 1.1), they had to find an alternative approach of working together to meet this new design demand.

Figure 1.1 – Devices with different viewports.

1.1.2 Modular Web Design: a new way of working

Designers and developers have started breaking down web pages into smaller blocks to enable greater reusability and versatility.

> *"A component is a chunk of a page design."*
> — Nathan Curtis

As Stephen Hay said, by fragmenting pages into smaller chunks, we are shifting from designing pages to designing systems of components. This new approach, called

Modular Web Design, uses this ecosystem of components to build interfaces while reducing the amount of effort.

1.1.3 Design Systems

While on the one hand, the new modular approach helped to speed up the creation of interfaces, on the other hand, it made it very easy to lose the view of the whole. As a consequence, most likely, web pages would not look coherent, mainly due to the fact that their components were used inconsistently. In order to ensure that components are always combined together according to a certain standard, a larger process that guides and defines the latter is needed. Design Systems aim to provide guidelines, documentations to build a shared language and learn how to connect the different parts of the system.

1.2 Motivation & Novelty

Nowadays, design systems have become an industry standard. Creating an effective design system or even defining what it is, however, is considered a challenging task. There is no one-size-fits-all design system, as it is a highly customized solution tailored to the needs and style of a specific organization. Therefore, while it is important to research and learn from the design systems implemented by other companies, it is futile to copy them naively. For example, most Design Systems tend to list and document all the components, giving less importance to the various processes that drive team collaboration. However, This approach does not fit Logitech's way of working and mentality. Therefore, we decided to invest in how we could improve our collaboration process and how to share the knowledge across all the involved teams. We have prioritized the following goals: (1) design a simple system that covers all the various teams' needs and that can ease the onboarding process of employees, (2) implement the design system by adding in a sequence of releases new component documentation and (3) explore the possibility to create a multi-brands design system.

Logitech web design system is reachable through a website, structured on multiple levels. Overview pages provide essential knowledge in an easy-to-digest way to get everyone the essential needed knowledge. At the same time, other articles are proposed to allow to deep dive into some topics (e.g., accessibility, inclusivity). Finally, this design system allows maximum creative flexibility while ensuring consistency across web pages by sticking to already implemented components.

1.3 Design Process

In a working environment, most of the time is not feasible to adhere to one single methodology. In particular, such environments are not controlled and involve many factors that drive the design and testing choices, for example, stakeholders' requirements and limitations, availability of resources. For this reason, the idea of following strictly one methodology has been discarded. Instead, various methods, depending on what was the most suitable at the time, have been preferred. The design process consisted of four phases: research, modeling, build & test, listen. Each phase was intended to be cyclical and may occur in parallel with another one, appear in any order, or be repeated multiple times. Moreover, two processes, exploration and iteration (see Fig. 1.2), may arise individually or together during each phase.

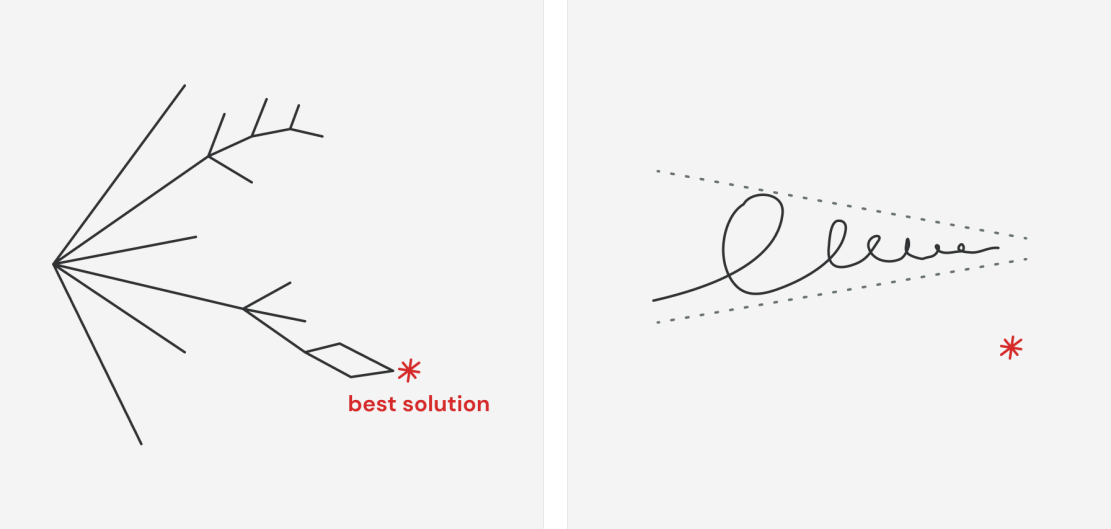

Figure 1.2 – First explore the options and then iterate on the best one. In the image, from left to right: exploration and iteration processes.

Design process phases:

1. **Research**.
   Methods and Activities: Stakeholder interviews, workshops, surveys, POV, literature review, stakeholder constraints, and requirements.
2. **Modeling**
   Methods and Activities: personas, competitive analysis, getting buy-in, inventory (Figma library), list of content (define topics).
3. **Build & Test**
   Methods and Activities: Stakeholder requirements, build the system in rounds (alpha, beta, v1), advocate the design system, vision alignment across multi-teams, interviews, usability testings.

4. **Listen**[1]
   Methods and Activities: identify new content, regular design system meetings, office hours, up-to-date road map, advocate the design system, establish maintenance and support structure.

This process is cyclical: each time new feedback is received and a new user need must be re-identified, a new iteration of exploration begins to identify the best solution.

1.4 Report Structure

This thesis is structured into six chapters. Chapter 2 focuses mainly on the *research phase*, which comprises both an analysis of the needs of Logitech's web teams and a literature review. Chapter 3 discusses the *modeling phase*; by focusing on identifying the personas and then concludes with the selling points to get buy-in. Chapter 4 outlines the *build and test phase* by showing screenshots of the design system created, the results of user testing, and includes as well some of the major design choices that were made. Chapter 5 contains all of the results obtained and some planned next steps for the project.

[1]The *Listen phase* starts with the release of the first version of the design system.

2 RESEARCH

To build an effective design system, we need first of all to understand the primary needs of the web teams. Stakeholder interviews, workshops, and surveys have been used as research methods. A literature review has been conducted to find, collect and evaluate the different approaches and methodologies. A study about the best industry practices in the field through conference talks, articles, investigation of design systems of other companies have been used as a starting point for discussion about how to realize an effective system.

In the following sections, we will first describe the research that has been done to understand how Logitech web teams are structured and their needs. Then, we will dive into a literature review summarizing related work.

2.1 Understanding Logitech

2.1.1 Logitech Web Teams

The very first step in building a design system is understanding the organization. In particular, it is crucial to know which teams collaborate and which processes they follow in creating web pages. At Logitech, there are many Web Experience teams which sum up to around 130 employees, spread across multiple countries and time zones. In particular, the team is composed of quality assurance (QA) testers, front-end developers, back-end developers, designers, and content ops specialists. Moreover, due to the increased demand of web content in recent years, these teams are constantly growing. Every launched web page is the result of a collaborative workflow of these web teams but also includes various cross-functional teams (e.g., marketing strategy, copywriters, business groups).

2.1.2 Stakeholder Interviews

Lack of a shared vision is one of the main reasons a design system could fail; therefore, it was crucial to organize and meet with the main stakeholders to build one. Another key benefit of collaborating with stakeholders is to facilitate the adoption of the design system by the web teams once it is ready. All the team managers/leads have been interviewed on a 1:1 video call which lasted around 30/45 minutes (see Appendix A.1 for the interview structure and the interview transcripts). The main objective of the interviews was to determine the pain points and frustrations that arise from the collaboration and workflow levels. Moreover, stakeholder interviews helped better understand if/where there was room for improvements and how our design system, called Apollo, could help.

2.1.3 Workshop & Surveys

In addition to the insights obtained thanks to the stakeholder interviews, a survey has been shared with the entire web team, and a workshop was organized. The survey was useful to identify the categories and topics to be covered in the design system and at the same time get an idea of who would like to contribute to it in the future. The workshop was essential to creating alignment, clarifying any doubts, and understanding each person's needs and point of view (see Appendix A.2 for the survey results and the workshop's activities).

2.1.4 Insights from interviews and the workshop

The interviews and the workshop allowed us to identify the following insights and needs.

Documentation and guidelines
One of the primary desires of the web team is to have a knowledge-sharing tool listing all the guidelines unambiguously to facilitate communication across the different teams. All the teams agreed that we should have a unique source of truth that contains design choices, styles, and components.

Work process and collaboration
Many people would like to improve the current work process. Designers should work in the open. Working in the open would mean that designers have to share their work without being worried that it is fully finalized. This would require creating a shared ecosystem where each team can see the work of other teams, thus bringing more trust and better collaboration between teams.

Components
Web components evolve a lot at each sprint, making them hard to maintain. A library

would help to identify reusable components resulting in a reduction of unnecessary developments.

Templates
Ready-to-use templates are another highly wanted requirement. Templates are pre-build skeletons for web pages that would allow authors and designers to potentially save much time by using them.

2.2 POV

To identify the gap between the current state and the desired state in an actionable way, a point of view (POV) statement has been developed. The statement is composed of three parts combined to form the pattern: [A User] needs to [need] because [surprising insights].

> Logitech Web Teams **need** a way to centralize their reusable resources **because** they want to become more efficient and guarantee consistency across their products

The above POV is user-focused, as we are referring only to web teams. It is broad, but at the same time, it provides guidance about the user's needs.

2.3 Literature Review

In addition to understanding the company itself, it is crucial to perform extensive research to understand the concepts behind design systems and the best practices for implementing one. In the following sections, we will first define a design system and then explore the atomic design methodology as a suggested way to build a library of components. Lastly, some best practices will be reviewed.

2.3.1 Design system definition

There is no well-defined definition of a design system; sometimes, people tend to confuse it with a style guide or a component library. However, a design system is, first and foremost, a system that aims to solve problems at scale mainly through the creation of a shared language. One of the most complete and concise definitions was given by Alla Kholmatova in the book Design Systems:

> *"A design system is a set of interconnected patterns and shared practices coherently organized to serve the purpose of a digital product."*
> — Alla Kholmatova

Inspired by this definition and the insights gathered in the research phase, Apollo has been defined as "our centralized collection of interconnected patterns and shared practices coherently organized".

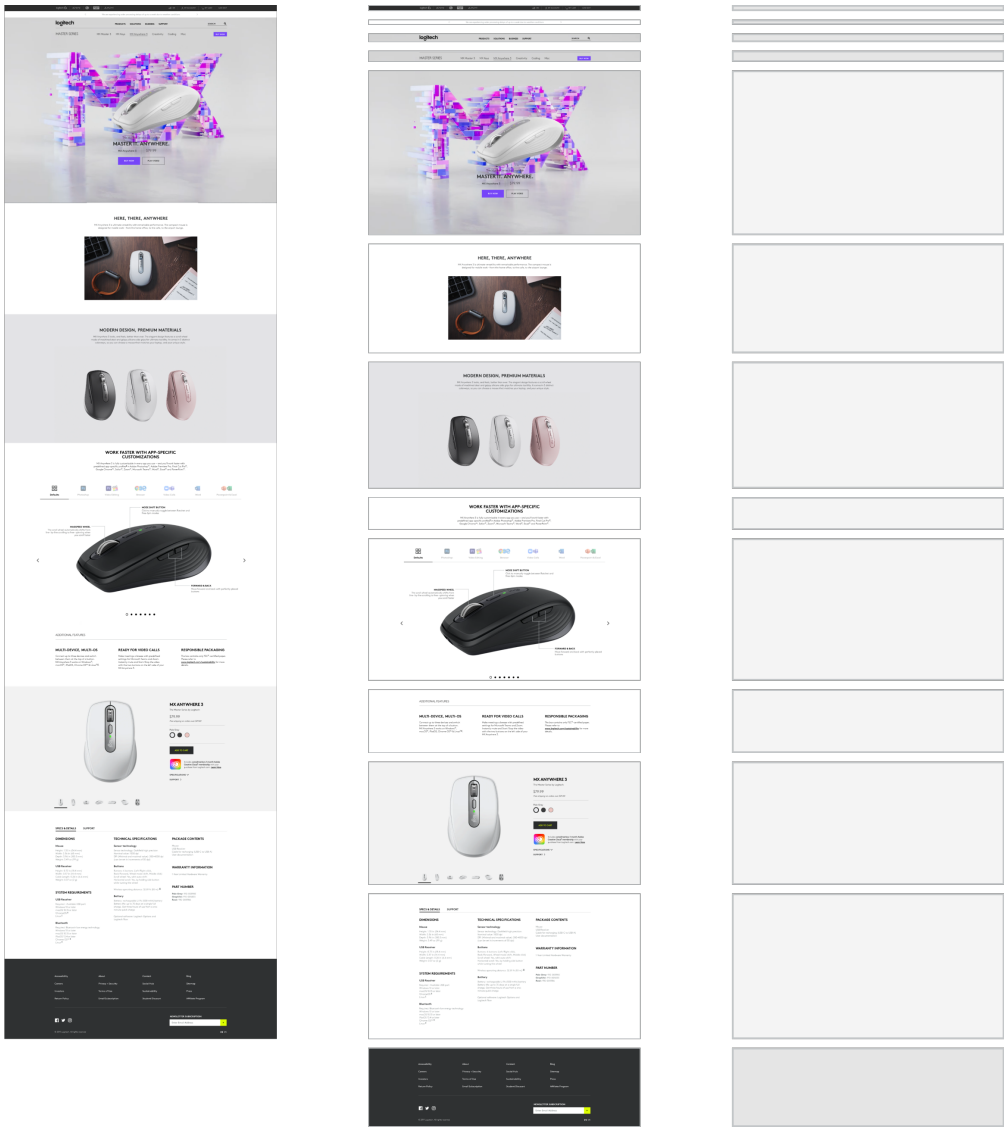

Figure 2.1 – From left to right: the original web page, page fragmented into components, single component. It is possible to notice that components look like nestable rectangles due to their code nature (`<div>` tags).

2.3.2 Atomic Design

As we have seen in the introduction, modular web design (see Fig. 2.1) has brought several benefits; one of them is to increase the reusability of components in more pages with minor or even no modification. In order for design systems to benefit from this approach, we need, first of all, to create a shared language by assigning an unequivocal name to each component that will be shared and used across all the teams. Then, we will need to create a structured component library.

Atomic Design, pioneered by Brad Frost, is one of the most famous techniques to organize a library. This methodology aims to provide guidelines on how to build a component library by thinking about web interfaces as a system of components. To achieve this, Brad Frost used atoms, molecules, and organisms to refer to web components as they share similar properties: atoms are combined into molecules, which, in turn, can be combined to create organisms.

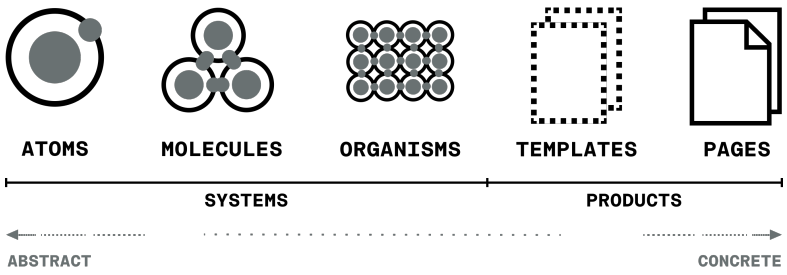

Figure 2.2 – Atomic Design links systems with the end products by establishing an interconnected and hierarchical way of thinking.

Therefore, we can see how Atomic Design expanded the Web Modular Design approach by establishing an interconnected and hierarchical mindset. This methodology comprises five distinct stages that coexist concurrently: atoms, molecules, organisms, templates[1], and pages (see Fig. 2.2). Atoms are the most simple web component (e.g., buttons) that have their own characteristics. When atoms are combined into molecules, they take new properties, and therefore they become new components. Organisms (i.e., groups of molecules) are usually the most explicit chunks people can notice on a webpage (e.g., navigation, forms). Templates are structural layouts that articulate design choices (e.g., wireframes) composed of atoms, molecules, and organisms. Pages are instances of a template (i.e., they have the content in place) and represent the end products. The most significant distinction between atoms, molecules, organisms versus templates and pages is that the latter is more concrete as they provide a more precise context that depends on the final purpose. Atomic Design aims to help designers not to lose the view of the whole by allowing them to

[1]Note that templates in atomic methodology do not fully correspond to Apollo definition of a template.

easily zoom out at a page level and zoom in at a component level.

2.3.3 Best Practices

Reviewing the design system implemented by other companies allowed us to identify their different approaches and implementations. As mentioned earlier, it is pointless to copy the design system of another company as it reflects the company structure, processes, team collaborations, and culture. Nevertheless, it allows to identify general best practices and as well bad practices. Depending on their needs (e.g., provide better consistency across their products), some companies decided to create a strict design system by establishing very rigid dogma. However, with such an approach, it is common that designers fall into the belief that a design system could hinder their creativity. To avoid this and a consequent system failure, it is important to create a balance between the amount of guidance provided and flexibility: a stringent system will not leave room for creativity, a too flexible system will not provide enough guidance leading to loss of coherence in the end products. Moreover, it is essential that designers understand that designing with more constraints (e.g., "Every page should be committed to the accessibility standards") often introduces a challenge that can lead to novel solutions. Another significant difference that we can notice across the companies' various design systems is determined by how they structure their content. E.g., sections such as colors and typography are always present on all the systems; however, depending on how the company chooses to interpret them, they have been structured differently. For some organizations, they are typical elements of the design team or, at most of the front-end developer one. For others, it is content owned by several teams (e.g., designers, developers, and brand teams). Similarly, some companies have preferred to group colors, typography, and grid under a category called "foundations" or "fundamentals". In contrast, others instead used "CSS variables" or "design" to indicate them (see table in Appendix A.4 for all the names used to indicate these sections).

3 MODELING

In the following sections, we will start by defining Apollo's personas and their needs. Then, we will perform a competitive analysis to understand what areas Apollo should cover. After that, we will discuss all stakeholder requirements and define system architecture to get buy-in.

3.1 Personas

Usually, the primary personas of design systems are designers and developers. In our case, since the external agency is focusing on a solution for developers and content ops, to avoid overlaps, we decided that Apollo will serve designers as the primary persona (see Fig. 3.1 and Appendix A.5 for the complete analysis). Secondary persona will be represented mainly by developers and the remaining web teams such as content ops, QA, and accessibility specialists. Serving secondary audiences less optimally is a necessary compromise.

Cross-functional teams and external parties (e.g., business groups, product managers, agencies) will be the supplemental personas since their needs will be completely satisfied by the solution designed for the primary and secondary persona. Lastly, our served persona will be represented by logitech.com visitors since they will not be users of the design system, but they are affected in the sense that they will benefit from a better user experience (see Fig. 3.2). Knowing how difficult it is to have a good adoption of the system, we decided that even if many teams are not part of our primary persona, we will involve them as much as possible in the usability testings to understand if they share some needs with the designers. Moreover, when the system becomes more mature, all the web teams will become part of our primary persona, and all their needs will be integrated into the design system.

Andrea

User Experience Designer

Position

Designer, Logitech

City

Newark, California

Age

33

Who I am

Andrea is a lead designer at Logitech. She started working here a few years ago and has excellent knowledge about the brand and the different teams. The design team has grown a lot over the past few years, and to ensure brand consistency and coherency, Andrea often finds herself mentoring and onboarding new designers. She has noticed that the comments and feedback she gives to newcomers, regardless of their level (junior or senior), are always similar and are mostly related to the company's design choices that have not been adequately documented. Andrea spends a good amount of her time doing onboarding, support, and lots of back and forth discussions with different teams during her workweek. The remaining time, she works on PDPs, and to speed up her time, she usually tries to recycle an old (and unfortunately out-of-date) template she made in the past.

Andrea would like to invest more time in improving and designing new components, improving the accessibility levels of the site.

Activities

- → Design web pages (e.g., new products pages).
- → Explore new components and design solutions.
- → Mentor and onboard new designers.

Tools

- → Design Tools: Figma, Photoshop.
- → Authoring tools: Adobe AEM.
- → Communication tools: Zoom, Slack.

Goals

- → Reduce the amount of similar/repetitive tasks that could be automated.
- → Improve design hand-off.
- → Learn/teach more about design choices.
- → Be able to have an overview of all available components to detect possible enhancements needed.
- → Be able to easily contribute to the design system by providing component enhancement and documentation.
- → Get more alignment between the designers.

Frustrations

- → Too many meetings that could be avoided with a shared language.
- → Repetitive tasks and comps recreation.
- → Spend time providing the same feedback to multiple designers.
- → Lack of a centralized resource where to find documentation, guidelines, resources.

Figure 3.1 – Apollo primary persona.

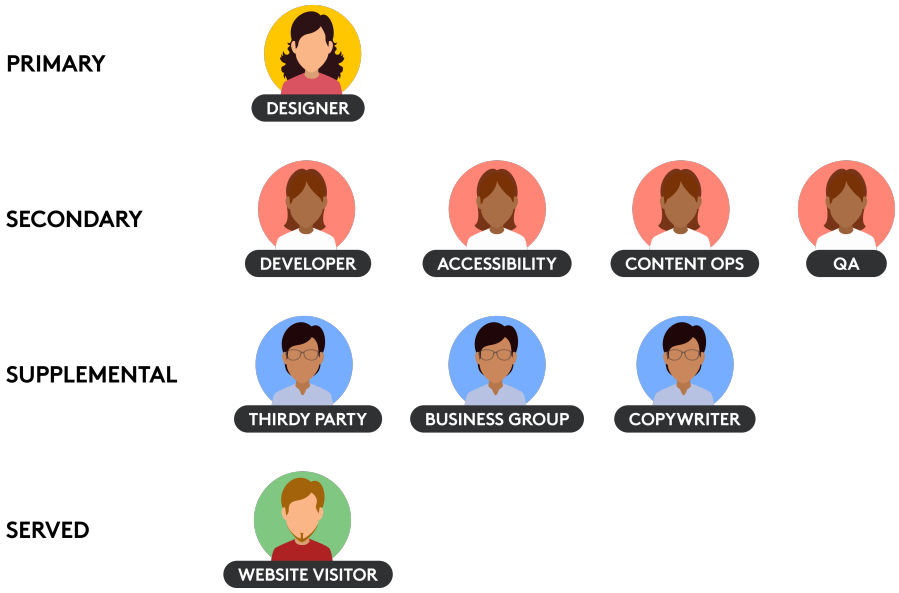

Figure 3.2 – Apollo personas.

3.2 Competitive Analysis

A competitive analysis was helpful to identify the current deficiencies and how our design system could cover them. Moreover, to create a solid proposal and get the buy-in from the web director, all the benefits that Apollo could potentially bring at Logitech, in terms of costs and efficiency, had to be explicitly identified.

Logitech web teams have been expressing their desire for a design system for quite some time and, as a matter of fact, there are and have been initiatives both involving external and internal parties. Internal initiatives very often offer a solution tailored to the needs of a specific team and are currently well adopted by such team, rather than a solution for all the web teams. In addition to such internal initiatives, and parallel to our Apollo project, another external agency had been hired to help to improve the current process. This agency was initially in charge of proposing an Agile environment and implement Continuous Integration (CI) pipelines. At first, it seemed there was no overlap between their project and Apollo. However, during one of the various meetings organized with the stakeholders, it was mentioned that this agency would have created a sort of design system as well. It became essential to get in-depth information on both these internal and external initiatives and conduct a competitive analysis to understand how and if it made sense to pursue our design system (see Fig. 3.3).

The internal tools and resources that have been analyzed are: web content ops website, the potential design system that the external agency will develop, component libraries,

dev Logitech spaces website.

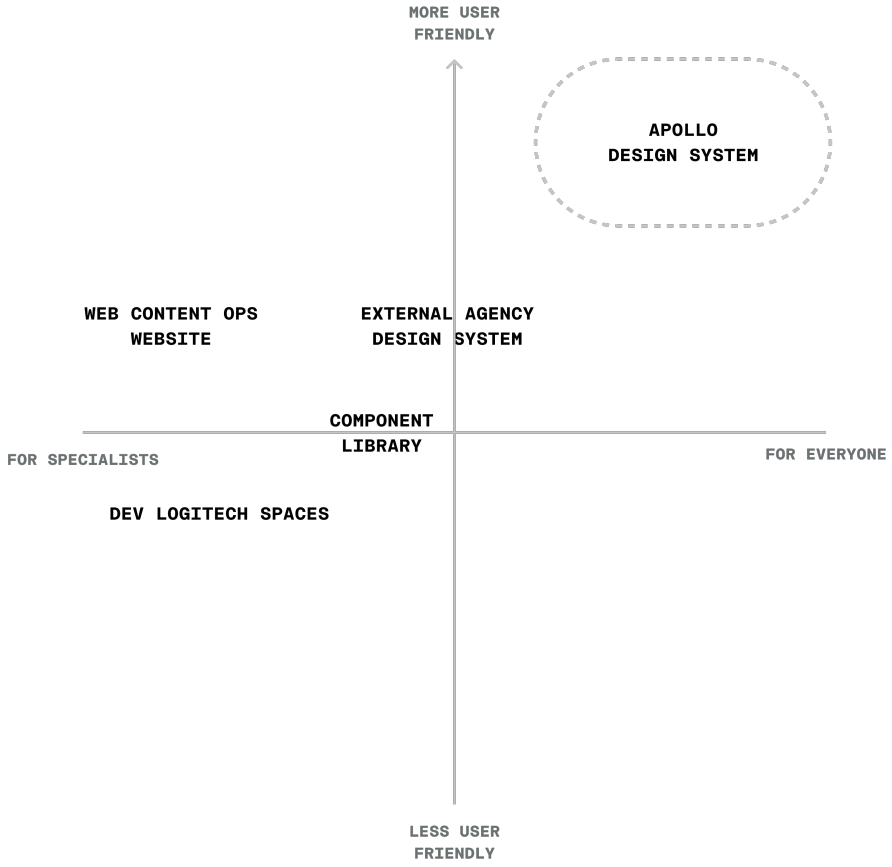

Figure 3.3 – Competitive map. We can notice how Apollo will expand mainly over an area that the other solutions will not cover.

External Agency Design System

The external agency aims to build the system on AEM. Their idea is to document all the components and use these pages as a showcase. There are several reasons why this system could not become the sole and primary design system for Logitech Web.

First, by being built from an external party, it will be more difficult to capture all the needs and processes that characterize Logitech's web team. Moreover, the agency's primary focus is documenting the various web component specs and parameters only for the AEM platform, without including guidelines and design choices (e.g., when to use a button vs. when to use a link). Finally, it is important to note that all teams agreed that design would be the source of truth for the design system, since design influences code. Therefore, the design system better be, at least initially, devised by the Logitech design team in order to ensure that the Logitech design principles and culture are respected.

Web Content Ops Website

The content operations team benefits from an exhaustive website, which contains many resources and articles that their manager has gathered in the last years. This resource acts as a primary source of truth specific to the ops team only and, therefore, does not cover a broader audience.

Dev Logitech Spaces

The back-end and front-end teams have started documenting their processes and their tools on the confluence website, called Logitech spaces. Containing more sensitive information, the team would like to keep it private and not share it publicly.

Design and Code Component Library

Component libraries are only a part of the design system and not the system itself. However, component libraries have also been included in the competitive analysis since many people interchange them with design systems.

Apollo Design System

Apollo aims to include design choices, to be a friendly shareable public resource in line with Logitech style and aesthetic choices. Apollo will not contain all the component documentation in the first release to avoid any possible overlap with the external agency. They may be added in the future, depending on feedback and user test results.

3.3 Getting Buy-in

Getting buy-in from the director and the various stakeholders was one of the most important milestones. They noticed that designers were experiencing repetitive tasks, design debt was rising, developers started spending more and more time styling every component, and style inconsistencies were increasing. Moreover, investing in a design system has a high initial cost since it involves many steps: research, build the system, and convince all the teams to adopt it. Only when the teams will start adopting it, they will notice a concrete improvement. Therefore, in order to get the approval, we had to build a strong case for it.

3.3.1 What is the value of a design system to Logitech?

A design system will bring many benefits and values to the company:

- Improve the collaboration across teams thanks to the creation of a shared language that standardizes concepts and processes.
- Share knowledge across teams.
- More conversions and revenue in the long term due to the improved consistency on the web pages.
- Higher web experience quality, as teams will have more time to focus on higher-level tasks.
- Minor design debt, easier to test, better performance.
- Ship our web pages faster (agile) as we could reuse components and design choices.
- As a natural consequence of the above, save time and money.
- Design systems have become an industry standard, which, therefore, will bring value to the company.
- Apollo is meant to be shared publicly. This might generate more interest in Logitech and therefore attract good candidates.

3.3.2 Stakeholder requirements

Stakeholders expressed various requirements that need to be met in order to have the system approved and supported by them:

- A resource open to internal and external use without the need of Logitech Credentials. The primary purpose of this should be to share with the business groups (BG), regional teams, external agencies, content team, new designers, QA, developers. This means it needs to live somewhere easy to share without creating Logitech credentials (but can still be gated).
- It should have or link to an easy-to-use component library.
- We should be able to version the design systems at various levels when we decide to make minor or major enhancements.

3.3.3 In-house versus third party solutions

Another important part of getting buy-in was to provide recommendations on what technology to use and where to build the system. We started exploring the value that a design system manager[1] could bring. Once we convinced everyone that a design system manager was essential, we discussed whether we should build our own or use a third-party solution.

[1] A design system manager is a reference website with pre-build capabilities to quickly setup a design system (e.g., in-built options to sync and show design files directly on the website).

Given the amount of resources assigned initially to Apollo (the design system team was mainly composed only by Sarah Cheng and myself for the first five months), we decided to opt for a 3rd party tool, Zeroheight, to build a system quickly. In this way, we could focus mainly on the content without worrying too much about the implementation side. Moreover, Zeroheight is natively integrated with design (e.g., Figma) and code (e.g., Storybook) tools. It also provides a collaborative authoring interface (e.g., CMS) that would be very beneficial if other people contribute to the design system.

3.3.4 Architecture Proposal

The following architecture represents what we decided to include in the design system (see Fig. 3.4 and 3.5):

- **Component Library**: Set of reusable web components. The library should be easily accessible through a link and include all the component states (e.g., on hover, on focus) and variations (e.g., primary, secondary). Ideally, it should include automated visual tests to ensure components do not get broken when changes are implemented.
  Proposed tools:
  - Figma: designers can use it to build a library that can be shared with external agencies.
  - Storybook: developers will be able to build and test components in isolation.
- **Design Tokens**: Used to store visual foundations (e.g., colors, typography, spacing) as data. An example of a design token could be `$button-background-color-primary=#2f3132`, where `$button-background-color-primary` will represent the design decision name and `#2f3132` represents its value. Design tokens improve the process and efficiency since they are platform-agnostic and allow design at scale. Design tokens will be added to the Apollo design system as a phase 2. The suggested tool for design tokens is Style Dictionary due to the pre-configured synchronization with Zeroheight.
- **Website**: It will be our reference site and entry point for Apollo. It will include all the documentation and guidelines and our design choices, components, and links to various resources. The suggested tool is Zeroheight since it is easy to use for everyone (text is written in markdown), allows multi editors, it is versioned, and it offers an integration with Figma and Storybook.

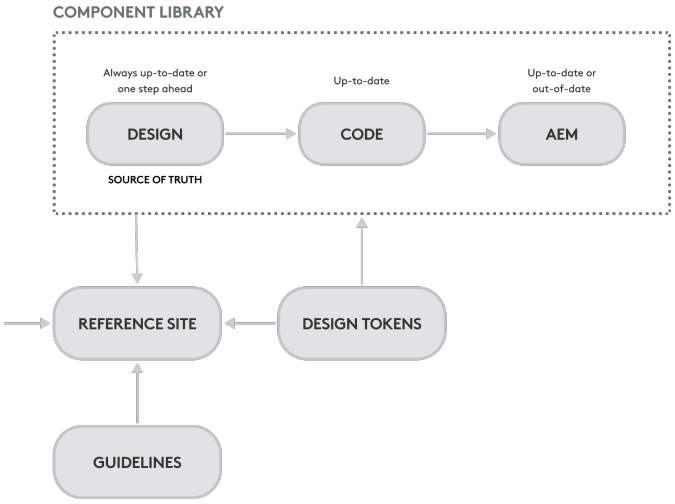

Figure 3.4 – Apollo structure: component library, design tokens, reference site.

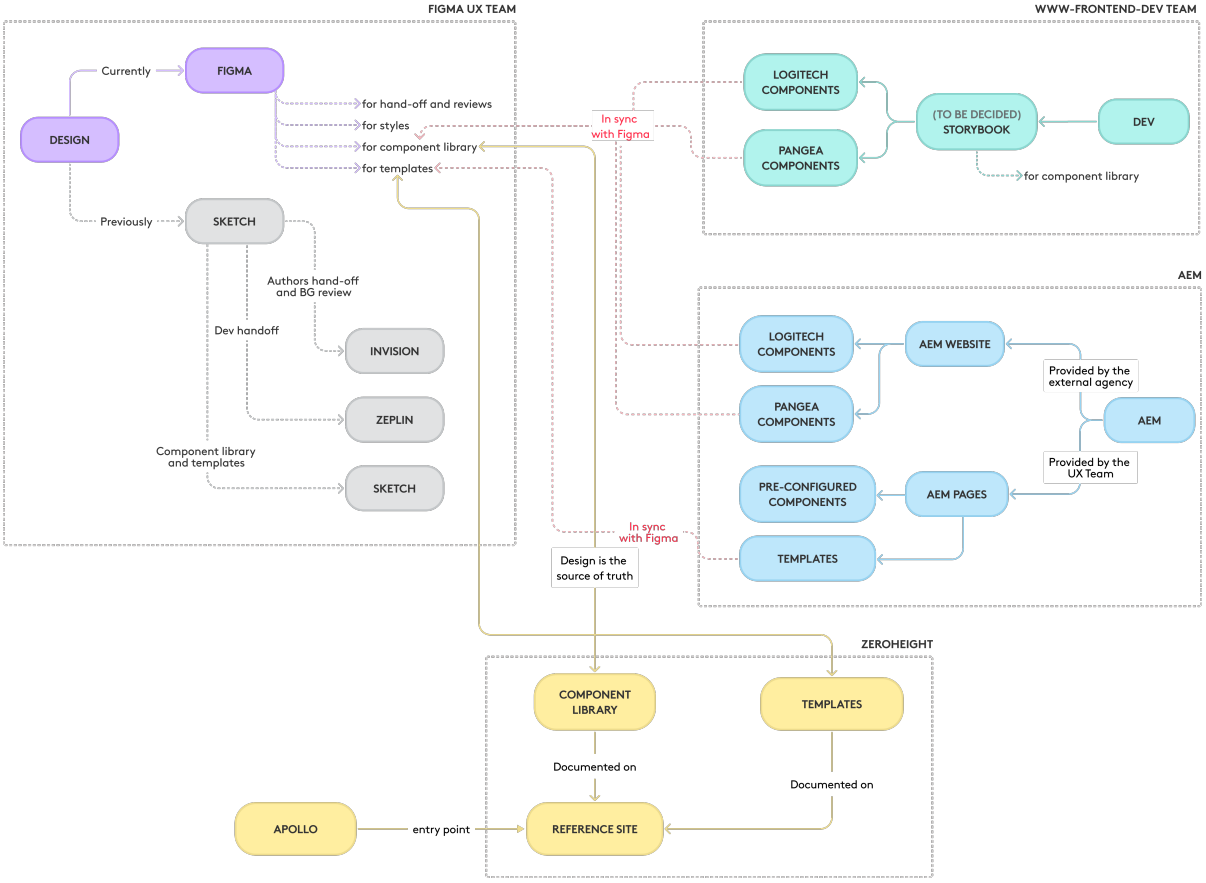

Figure 3.5 – Components and templates pipeline. Design will be the source of truth; all the component libraries and templates will be in sync. Figma templates and components will be documented and referenced on the Apollo website.

4 BUILD & TEST

Apollo is the result of three iterative rounds. On July 1st, we have released the Alpha release with the web experience team only (i.e., designers, developers, QA, and content ops). Then we collected feedback (e.g., through 1:1 usability sessions with some cross-functional team members) that helped identify improvements addressed in the beta version, released on August 1st. Finally, on August 13th, we have launched the first version. In September, an official email will be shared across the company. The idea is to create a newsletter where people can subscribe and stay up-to-date about Apollo's status. The following sections explain what was included in the Alpha, Beta, and v1 releases and give some insights about the testing results.

4.1 Alpha Release

The first iteration was needed to understand if we were proceeding in the right direction and, particularly, to identify if the system met the stakeholder's expectations. At this stage, Apollo consisted of three main navigation tabs: Logitech, Design, Resources. Alpha-version has been released with the following content:

1. **Logitech tab**: Web Design Principles, Logitech vision, mission and purpose, instructions on how to set up and use Figma account for collaborating with Logitech teams.
2. **Design tab**: Foundations (colors, grid system, typography), content (imagery guidelines, how to design for RTL languages, writing guidelines).
3. **Resources tab**: Tool kit (fonts, Figma libraries, extensions, and plugins), resources (material to learn Figma, links to external resources covering various web-related topics)

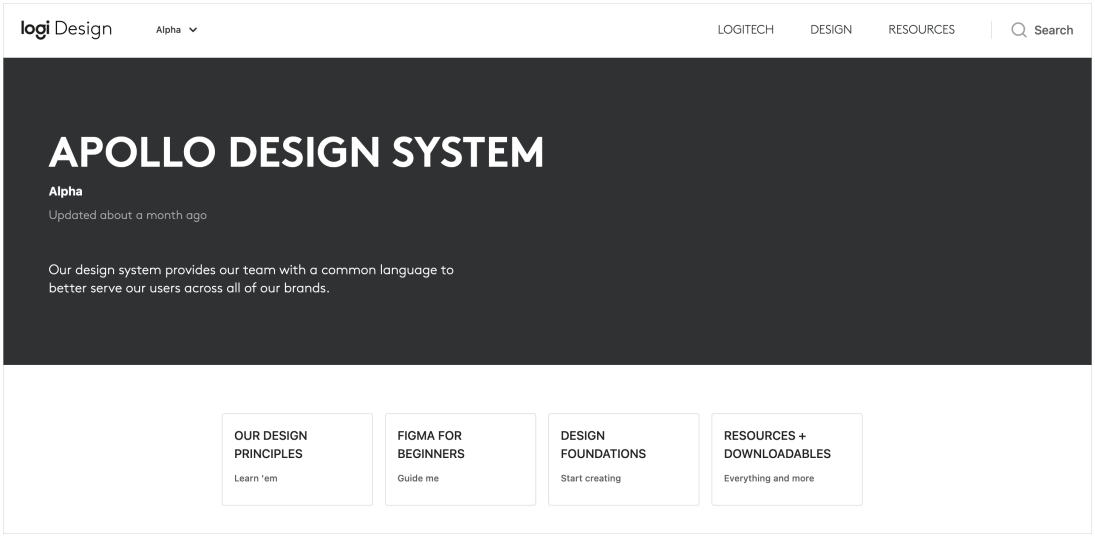

Figure 4.1 – Apollo alpha version. A snapshot of this release is reachable via *https://design.logitech.com/43c9a7773/v/12818/p/76d9a0-apollo-design-system*

Test results

The first iteration was one of the most important ones, and our priority was now to collect feedback. However, since people seemed hesitant to utilize "submit feedback" at the bottom of the page, we organized user interviews, which helped gather both positive and pain points. Here are some interesting insights:

- Design Principles are too abstract and do not provide a clear direction (feedback received by a senior frontend software developer).
- Business groups, which are the ones requesting web pages for their products, are interested in knowing which components are available for designing product detail pages (PDP). The interviewee mentioned that she had to browse the website and screenshot what she likes to provide directions on what she would like to have in her PDP. The process is tedious and not reliable as, for example, old pages might contain deprecated components or even some bad design choices (feedback received by a brand manager associate).
- All information that causes recurrent conversations (e.g., where can I find this resource? how do I access it?) should be documented and easily accessible via links (feedback received by a web operations manager).

The interviewee from the business group has been identified as a potential partner to advocate the design system. She loved Apollo, and she mentioned that it would be extremely useful for business groups.

Another important consideration is that, while people found it user-friendly and helpful,

they seemed reluctant to adopt it. In general, it is challenging to convince teams to start using new technologies and/or follow new processes, and the most effective method is often organizing training sessions. Therefore, we have organized 1:1 meetings to speak and show Apollo, which resulted in the best method to achieve a higher adoption rate.

4.2 Beta Release

The second round of iteration focused mainly on defining the content to be added to Apollo. We reviewed all the user tests collected after the Alpha release and addressed them. For example, to provide more clarity on the design principles, we added for each one of them all the questions that a person should ask themselves in order to ensure they are complying with that principle; Fig. 4.2 shows an example of the Inclusive design principle.

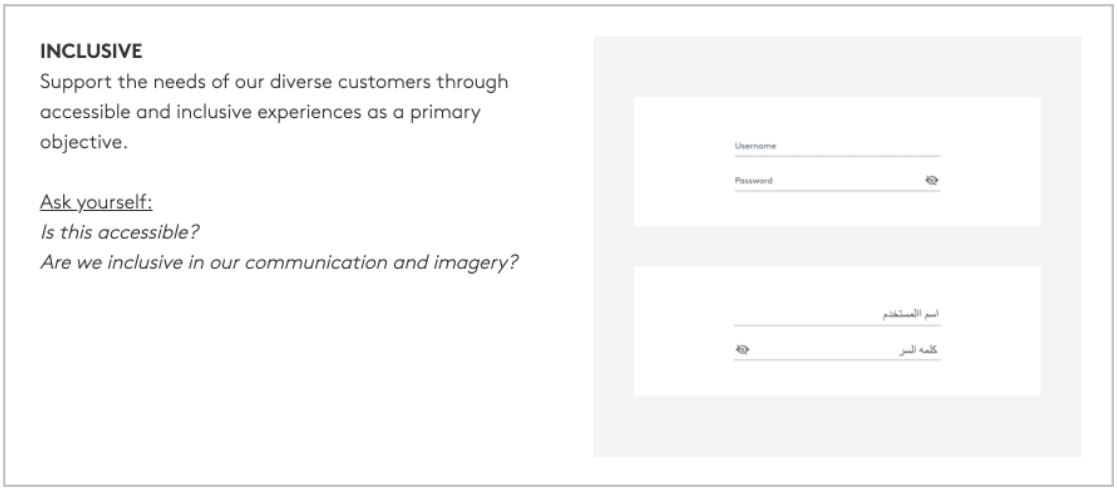

Figure 4.2 – "Ask yourself" questions provide a quick way to learn and apply our design principles.

The most significant change that has been introduced in the beta release concerns components and templates. In particular, we added a component overview page, some helper components for designers, page archetypes and templates, described in the following section. Lastly, to improve the discoverability of the various content, some shortcut tiles have been added on the homepage, as shown in Fig. 4.3.

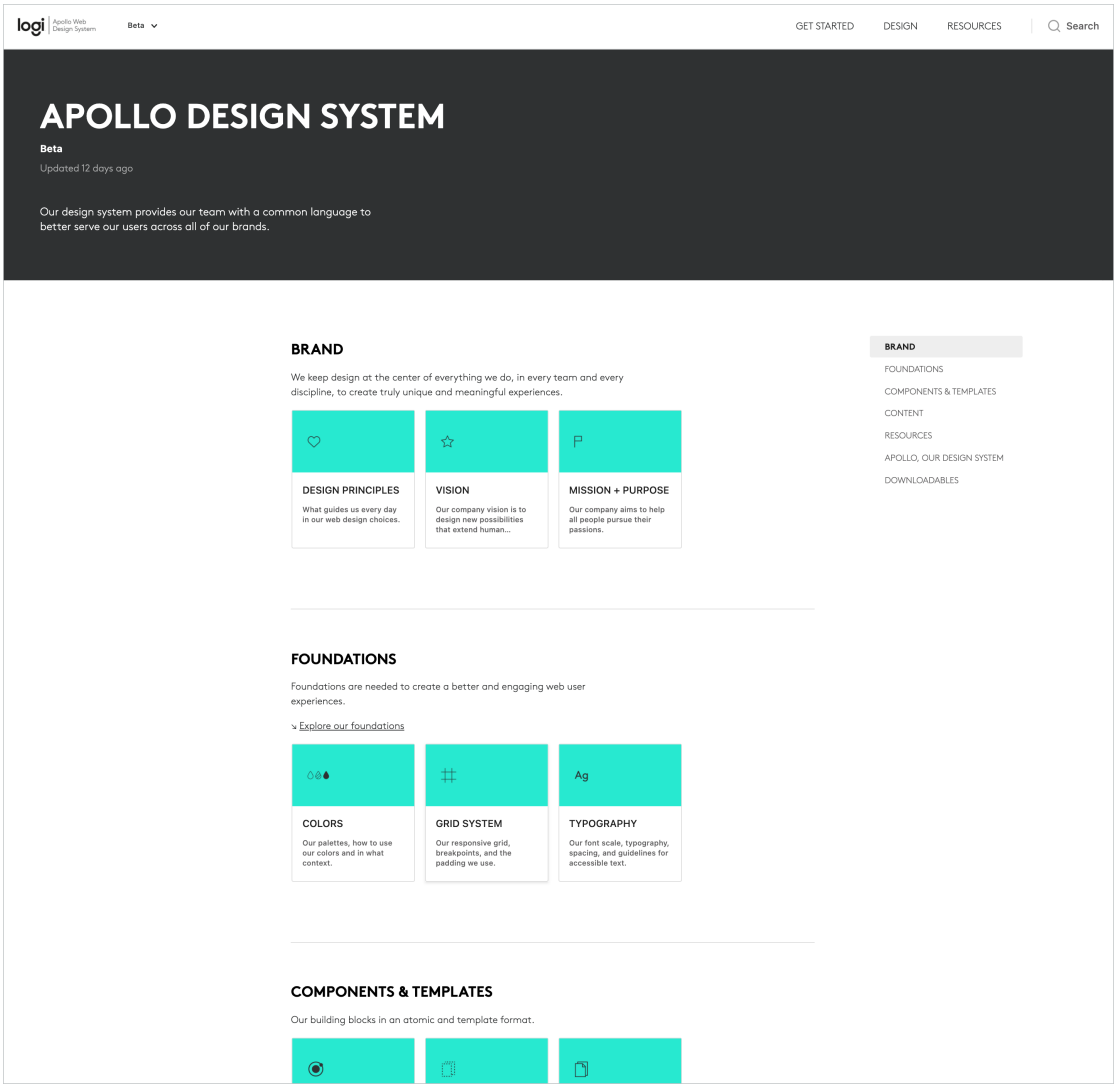

Figure 4.3 – Apollo beta version. The homepage contains a list of shortcut tiles to let visitors easily browse, discover and access the topics. A snapshot of this release is reachable via *https://design.logitech.com/43c9a7773/v/13473/p/76d9a0-apollo-design-system*

In the following paragraph, we will introduce the concept of components, templates, and page archetypes as it is a fundamental prerequisite for understanding the needs of our users.

4.2.1 Components, Templates and Page archetypes

There is a relation between the system and the products, as shown in Fig. 4.4. The two parties influence and inform each other. Components and page archetypes, as

shown in Fig. 4.5, are part of the Apollo system. Templates and web pages are part of the end product, and they are driven by our market and UX research.

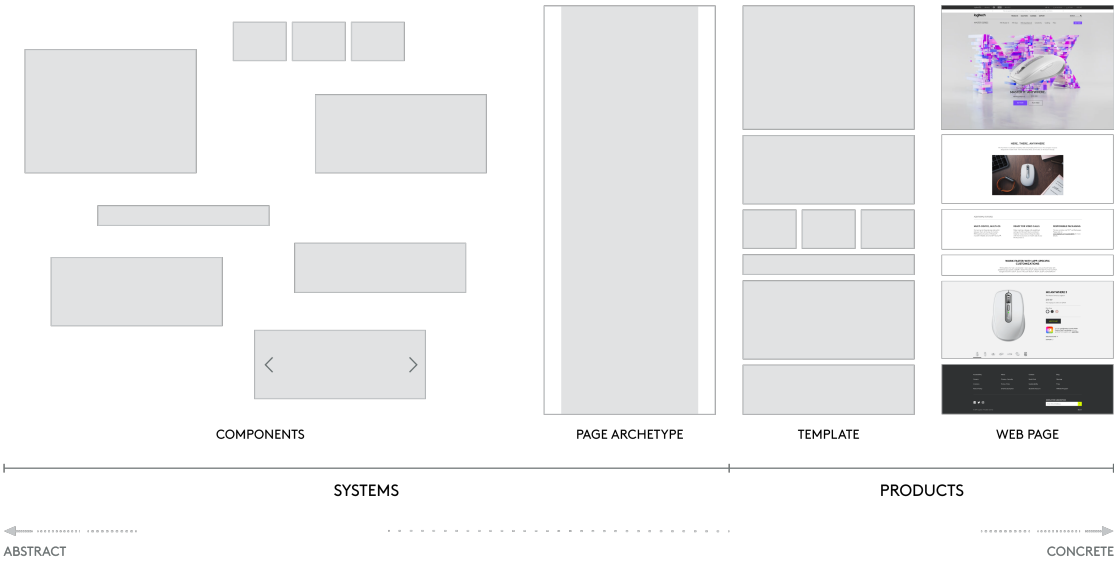

Figure 4.4 – Components are reusable building blocks for building web pages. Components are combined in a structured way to create templates. From left to right: component, page archetype full width, PDP template, PDP web page.

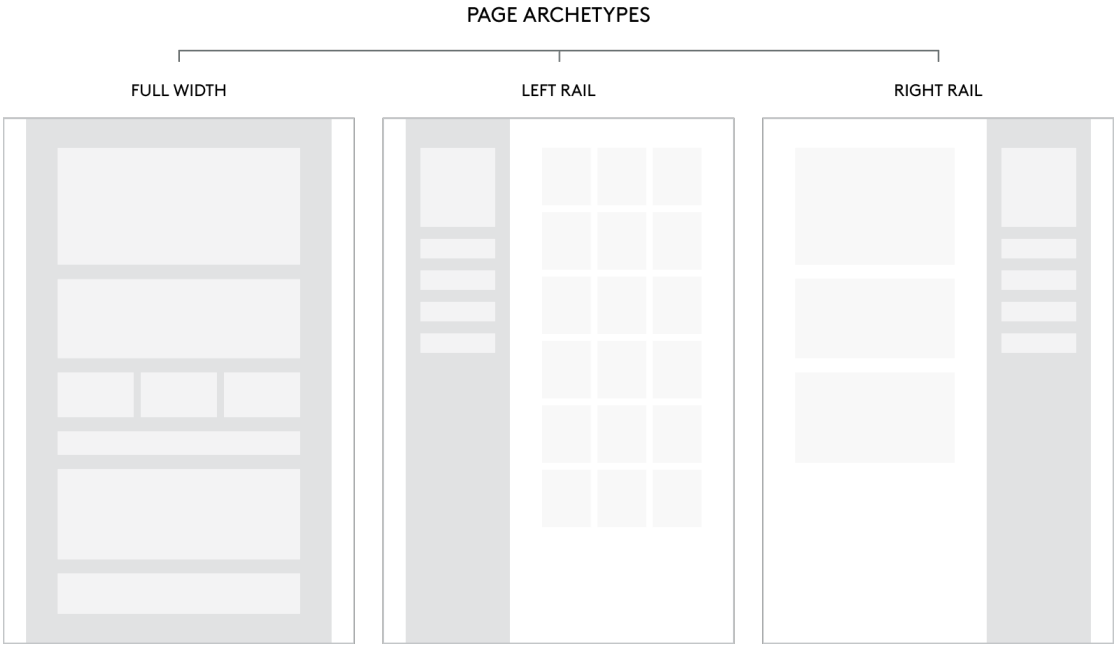

Figure 4.5 – Apollo has three types of page archetypes: full width, left rail, and right rail. Each Page Archetype gives rise to several templates. Full-width page type is used to offer immersive content, left rail whenever there is much content on the page that requires filtering capabilities (filter on the left), the right rail for focused shop pages (meta keywords on the right).

These concepts have been elaborated and inspired by atomic methodology. Indeed, Atomic methodology defined how to connect systems to products by going from something abstract like atoms to something more concrete like the web pages. Thinking hierarchically by identifying the connections between Apollo and the final products is one of the most fascinating deliverables of the design systems.

There are two types of users involved in a design system. Design system makers are the people responsible for building and maintain the system, and design system users are the ones who will use it. In some cases, design system users and makers can overlap; but most of the time, design system users are the ones with a more in-ground view (e.g., designers that work on end-products), while design system makers are the ones with a bird-eye perspective (e.g., people that maintain the library and try to set a cross-disciplinary workflow). In the following paragraphs, we will analyze their different needs. It is crucial to understand how the two different types of visitors browse and utilize Apollo as it influences how it is structured.

Apollo for design system users

Design system users, mainly visual designers and business groups, are interested in knowing how they can benefit from the system to build their end products. From the user tests of alpha release, we discovered that business groups need more clarity about the structure of web pages (i.e., templates), which components they can use, and how. For the moment, given the amount of effort needed to create template documentation, only one template page has been added to Apollo to evaluate how much value templates could bring. The template page consists mainly of an overview page about the template structure and detailed information about each component offered in both a visual and descriptive way (see Fig. 4.6, 4.7).

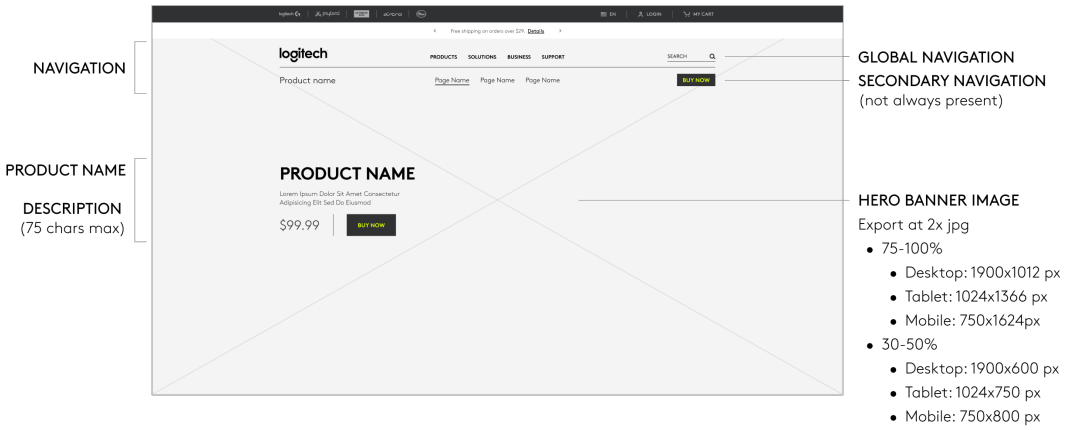

Figure 4.6 – BGs and designers can refer to visual examples to learn what is customizable/editable on each component.

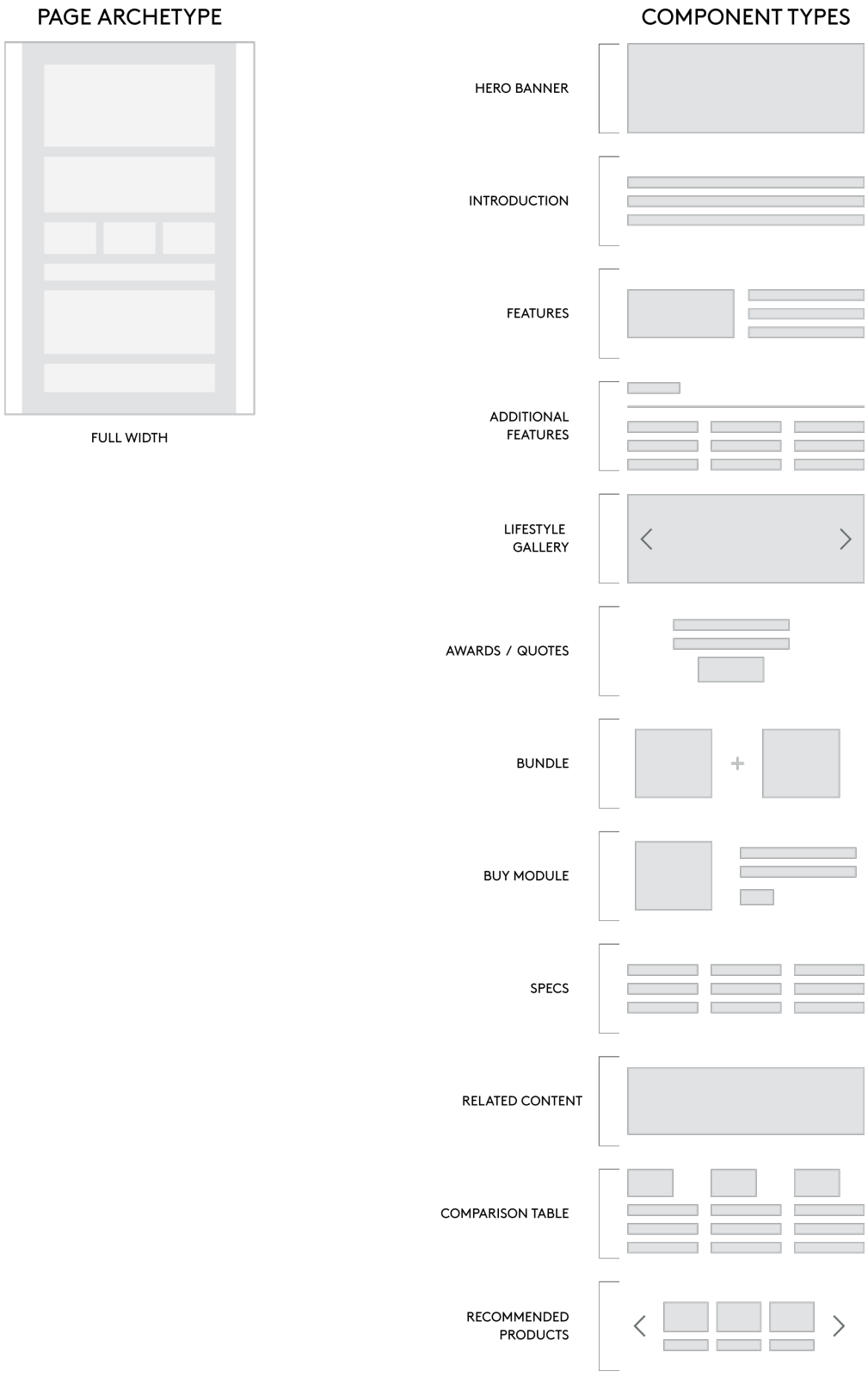

Figure 4.7 – The product detail page (PDP) template uses a full-width page archetype. The image shows all the types of components that can be used and the order they are displayed on the page.

Apollo for design system makers

Design system makers have a more holistic view as they are interested in knowing the abstract structure of the web pages to decide how to design and build components. Therefore, they are more interested in detailed component documentation.

Therefore, on the one hand, we expect that design system users will browse Apollo starting from topics closer to the end products (e.g., templates); then, they might deepen their knowledge by visiting the component documentation pages. On the other hand, design system makers will navigate starting from the smaller blocks for building web pages (i.e., the components), and they will continue across page archetypes and then templates.

Test results

For the beta release, we decided to start sharing the design system with some cross-functional teams to collect their feedback. The latter allowed us to identify potential partners and contributors, and as well as to discover why some teams were reluctant to use Apollo. In particular, some teams were considering Apollo as only for designers. Therefore, our next primary goal is to restructure Apollo to emphasize that design systems are for everyone and serve to build at scale.

4.3 Version 1

With the third release, the content was refined, sections proposed by the contributors were added (e.g., accessibility), and the visual aspect of Apollo was improved. Moreover, the whole navigation was revised, and it was decided to remove the word "Design" where possible to avoid people mistakenly thinking the design system is only for designers. Thanks to the possible partnership with the developers, we decided to start enriching the section on components to make it more prominent. Therefore, in-depth component-related content, such as their lifecycle, an overview about them, and last, button component documentation, have been added. To this release, many more people (e.g., content strategist, visual designer, accessibility specialist) actively participated and contributed to the release demonstrating a greater degree of adoption.

Test results

During the development of this version, some user testing was done. The following insights will be mostly addressed with the release of v2:

- The user found very helpful to have videos that explain things step by step. However, she would prefer to be able to enlarge them to full-screen size (feedback received by a creative project manager).
- The user started reading all page archetype content; once she reached the end of the page, she did not know where to go (feedback received by a brand manager associate). As a solution, we could consider adding an "Up Next" section at the bottom of each page. The latter could link relevant content in order to create a suggested flow for reading and navigating Apollo.

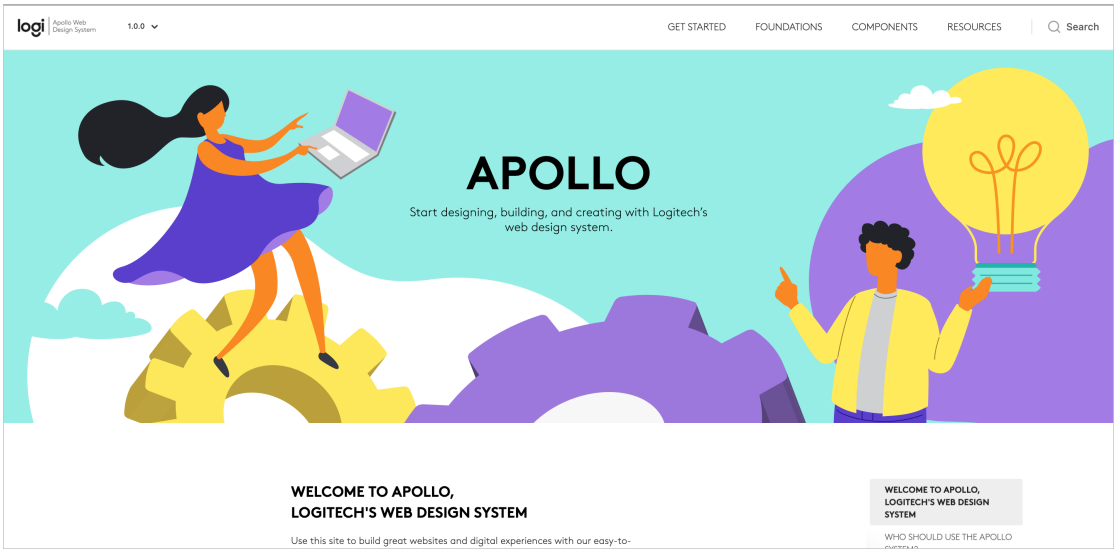

Figure 4.8 – Apollo v1 is public and reachable on *design.logitech.com*

5 CONCLUSION

5.1 Results

The first release was the result of a great team effort and the start of many collaborations. Creating a group of design system enthusiasts was one of the most effective ways to advocate the design system and facilitate its adoption. Nevertheless, the contributors by supporting Apollo will also feel part of it, and they will help spread out the content and train others.

Being only at the first version of Apollo, it is hard to measure its value as its adoption across the teams just started. Therefore, we used as a metric to track our goals and progress the following objectives and key results (OKRs) that have been accomplished:

1. **Plan the adoption**
   Objective: tackle primary persona needs into phase 1.
   Key results: phase 1 (composed of alpha, beta, v1 releases).
2. **Team**
   Objective: create a "team" of long-term committed collaborators.
   Key results: active participation and feedback from multiple teams, also initiated partnerships and collaborations.
3. **Community**
   Objective: create a group of design system enthusiasts.
   Key results: discuss topics, provide feedback, support Apollo, create a Slack channel.

All the 3 OKRs have been met with the last release. However, the value of Apollo will only be measurable by how much web teams will use it to build web pages. Though, this can only be assessed with time.

5.2 Next Steps

There are many next steps that we would like to tackle during the subsequent releases. Here we will mention the most important ones.

First, we expect Apollo to grow and, therefore, we will have to build a team of dedicated people and contributors. Growing the number of contributors will represent one of the key strategies to enhance the adoption of Apollo. A communication plan should be established to connect with all the various teams and make sure that the design system remains aligned with their need. This latter could be achieved in multiple ways, for example, office hours, Slack channel, newsletter.

Second, we will have to define a clear process for maintenance (e.g., how to handle requests for new resources to be added, report bugs) along with proper approval processes for proposed changes.

Third, since the design system will keep growing, its structure should be re-discussed. For example, given the limitations of the tool currently used (i.e., Zeroheight), should Logitech spend more resources and implement a more versatile and complete internal solution? Moreover, how can we scale the design system to support various Logitech brands, e.g., Astro, Logitech G, within Apollo? A possible solution to the latter could be implementing a system of systems, explained in the next section. This solution had already been discussed previously and then discarded for a possible phase 2, as it would have meant to start with a too complex system that could have compromised Apollo's adoption.

5.2.1 System of systems

At Logitech, there are multiple brands (e.g., Logitech G, Astro Gaming, Jaybird) that have different products, culture, and principles. However, their websites share the same core functionality. For this reason, at Logitech, we have some core components that help maintain the code for all these brands: Pangea components. Pangea refers to a core group of reusable components that are used by all brands. They come unstyled and have only the core functionality defined, which has to be in common across all the various brands. The brand-specific styles and functionalities will be overridden at the brand level. Moreover, in addition to Pangea components, there is a set of components that have been created to support specific brand's needs.

The Pangea components section should be shared across all the brands on the Apollo design system to reflect this structure. Inspired by a talk about Spotify Design System, it has been considered the option of building Apollo as a system of systems (see Fig. 5.1). This topic was discussed with the stakeholder in April 2021 and moved by the conviction that designing a complex system from the beginning might risk a failure; we

decided to start instead with building Apollo only for Logitech (as phase 1). Therefore, we started with a simpler approach with the intention of enhancing it only when a stable and well adopted system is obtained.

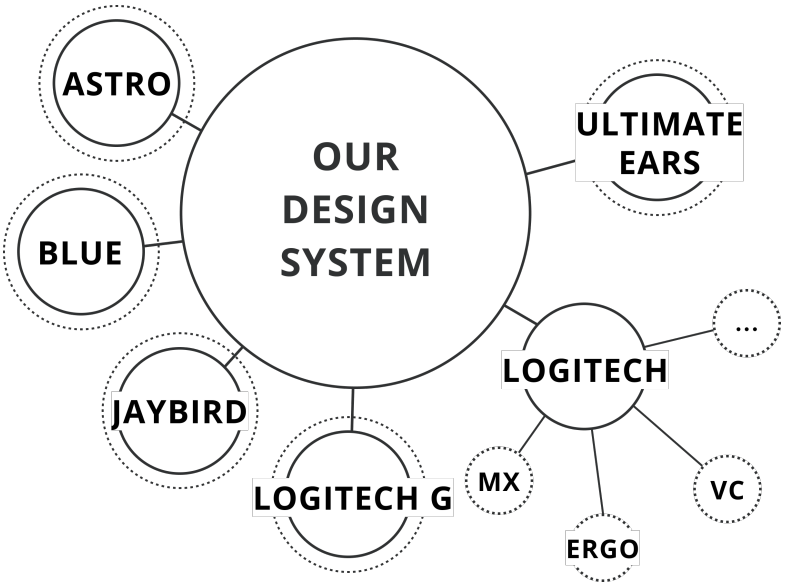

Figure 5.1 – Each brand, e.g., Astro, will be a system and will share the same Pangea components. Apollo could become the larger system that includes Pangea components and will link to the various systems. Each brand will have its foundations, values, and principles. All the sub-brands (e.g., MX) will inherit the style foundations from the brand: colors, grids, typography, and web components. A sub-brand will become a fully working design system that relies on a parent system for foundations but has its own values, content, imagery, and tone of voice. This model will lead to a more decentralized structure.

A APPENDIX

A.1 Stakeholder Interviews

In total, 6 people have been interviewed on a 1:1 video call which lasted around 30/45 minutes. The tone of the interview was kept as informal, open questions have been preferred over direct ones.

Interview Structure

1. Icebreaker questions about themselves and their role.
2. Generic questions about their work and workflow to better understand what they care about and their vision.
3. Their current work process and if there are any frustrations.
4. (optional) Questions about design system expectations and fears.

Interviews' Transcript

Designer, Manager

They spend most of their time on:

- Manage design team.
- Various design tasks.
- DesignOps.

Things that frustrate them:	• Difficult to find a good balance, they ends up doing things/tasks due to tight timing and/or skill lacks in the team. • Spend time on providing the same feedback/info on multiple people (i.e., that could be solved by using a DS).
What would they like to be improved:	• Improve skill-set in the team to get more alignment. • Shared resources for self-training. • Shared files (e.g, comps, docs) between teams. • Improve onboarding experience.
Content for DS & DS Requests:	• Documentation. • The final website must be easy to use. • Shared files (e.g., comps, docs). • Guidelines. • Must be easy to update and maintain. • Must be easy to navigate.
Concerns about DS:	• Too much content that require a lot of collaboration and adoption by teams. • A team might perceive the design system as a resource for the design team only and might not use it.

Content Ops, Manager

They spend most of their time on:	• Manage teams. • Motivate the team by being positive. • Find new ways on how to bring the team to the same knowledge skillset.

Things that frustrate them:	• Time zones are different, it is difficult to keep consistency. • A bigger team makes more difficult to ensure quality • Components change fast, they evolve at each sprint. Maintenance could become harder. • Current component process. Designers should be the ones that approve a component that developers have built. We should have documentation on how to use the component alone and within other components.
What would they like to be improved:	• Improve the process for a new component: documentation, usage, design sign-off, guidelines. • Add more knowledge transfer sessions every sprint about new components, so all the teams can have the same knowledge. • Better documentation and guidelines. • Find a better process. Currently, authors spend a lot of time inspecting information (e.g., padding) to reproduce design comps. • Provide more training to the team. • Collaboration between teams.

Content for DS & DS Requests:	• Onboarding resources formatted in a nice manner. • Library for each component that shows all the possible variations, so that authors can easily copy & paste them. • Component documentation. • AEM templates for authoring. • Section on Apollo that redirects to tutorials on AEM. • Design Principles. • Visual content. • The design system should show how inclusive we are and how we collaborate.
Concerns about DS:	-

Frontend Developer, Manager

They spend most of their time on:	• Manage the dev team. • Meetings, meetings and meetings. • Focus on how make the dev team more productive. • Prepare documentation. • Onboard new people.
Things that frustrate them:	• Bureaucracy in having the work done is growing. • They are less "agile" and they cannot produce as fast as in the past. • Lack of communication between teams and business groups.
What would they like to be improved:	-
Content for DS & DS Requests:	• (Maybe) code snippets and SASS variables. • Components from Designers and Developers point of view . • (Maybe) coding style guide.

Concerns about DS:	• Apollo is a living thing and require maintenance. • Need a project manager for Apollo.

Backend Developer, Manager

They spend most of their time on:	• Manage multi-teams (e.g., Pangea team, Galaxy team). • Moving towards Agile. They are considering the option to make the teams decentralized so that they can be more independent. • Onboarding documentation: related to environments, how to set up them and sync.
Things that frustrate them:	• The complexity of the ticket. Brands style information (e.g., 10px padding for Logitech G, 50px for Astro) is stored in the backend and added manually in Jira tickets. • Nested and complex web components.
What would they likes to be improved:	• Having a resource where to store all the style values for each brand. • Guidelines about design so that they can double check if they have doubts. • Use templates and standardize more the components. Having many options/fields on components cost a lot (everything must be tested). Templates will reduce authoring time and will improve page performance.
Content for DS & DS Requests:	• Brand- and component-specific style values. • Templates. • Component documentation and style guide.

Concerns about DS:	-

QA Tester, Manager

They spend most of their time on:	• Manage QA team.
Things that frustrate them:	• Design sharing links (on the InVision tool) are not updated and create inconsistencies.
What would they like to be improved:	• Reduce disconnection between QA and design. They would like to have a design walk-through after the comp has been built. • Comps should be shared earlier in the process. • Be able to see documents about web style guides.
Content for DS & DS Requests:	• Template examples. • Style guide (e.g., colors).
Concerns about DS:	-

Web Experience, Director

They spend most of their time on:	• Many meetings with web and cross-functional teams. • Writing many emails to connect people to each other.
Things that frustrate them:	• Some unnecessary development could be avoided simply by knowing "how we structure the page" or "what components we have".

What would they like to be improved:	• Reduce unneeded developments. Development is very expensive and time-consuming. • Make web scalable (e.g., enable regions to design and/or author. Currently, regions work with different external agencies. Agencies need a resource where to learn about our design choices, templates, and components). • Have a unique source of truth so that all the resources are in a centralized repository, and everyone can pull information easily. Moreover, it allows easier maintenance.
Content for DS & DS Requests:	• Apollo must become the go-to place for communicating and showing how stuff works.
Concerns about DS:	-

Table A.1 – Stakeholder interview transcripts

A.2 Survey

In total, 27 people answered the survey (Fig. A.1 shows the people that participated split by their role/team). Of those 27 people, 70% expressed interest in contributing to the design system in the future. The top 3 categories that people would like to see on

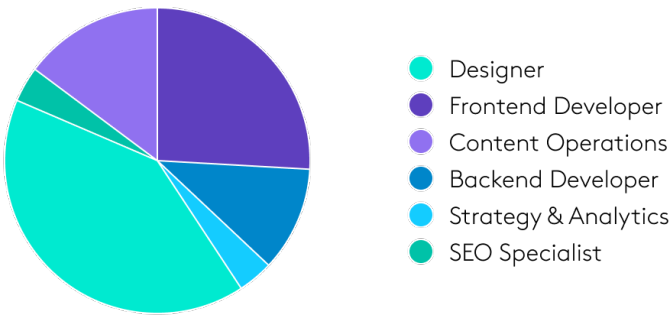

Figure A.1 – Role/team of the survey respondents.

Apollo are 1) components, 2) layout grids and, 3)templates. In particular, the most wanted categories organized by team are:

- **Backend Developer**: Foundations (layout and typography), components, templates, resources.
- **Frontend Developer**: Foundations (typography, layout, spacing and colors), components, design principles.
- **Designer**: Templates, components, foundations (layout, typography, spacing, colors).
- **Content Operations**: Templates, components, foundations (layout and spacing).

A.3 Workshops

The workshop was organized in two sessions depending on the time zones of the participants; in general, we reached about 12 people per session.

Structure

1. Introduction: Overview of agenda and objectives.
2. Ice-breaker activities to learn mural (see Fig. A.2).
3. Slides about design systems (introduction, benefits, structure).
4. Activity 1: identify a category at brand or multi brand level.
5. Activity 2: What would each team member find valuable in each category? (see Fig. A.3).
6. Activity 3: What are the top X topics to include in Apollo? (to identify possible changes from the survey results).
7. (optional) Activity 4: Feasibility / Importance Chart.
8. Next steps.

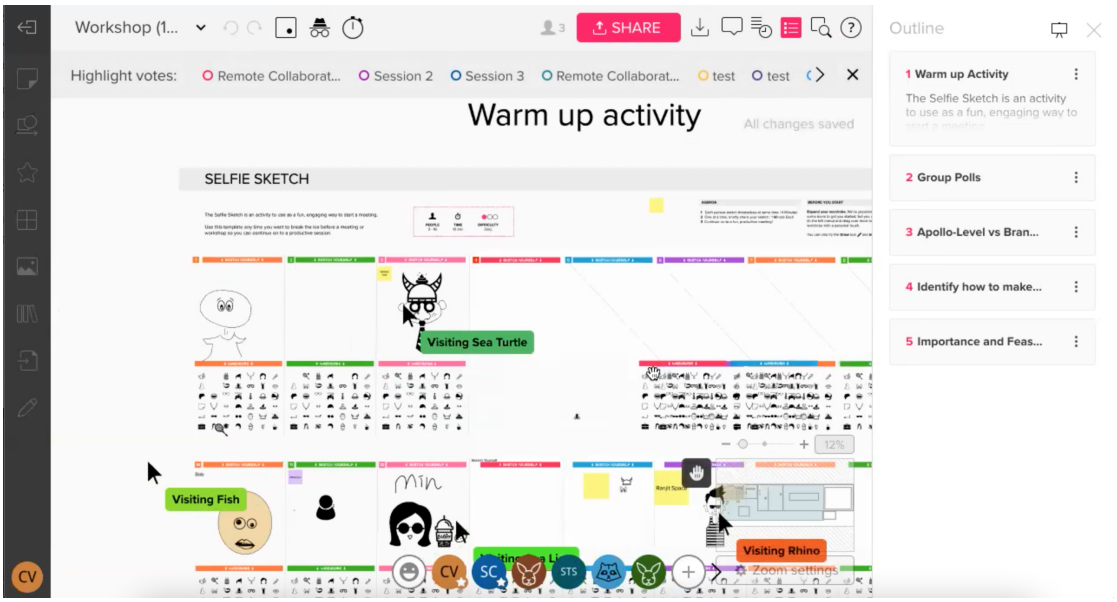

Figure A.2 – Icebreaker activity: each person has to draw themselves.

Figure A.3 – In this activity, participants were to write cards such as "As a designer, I want to be able to copy hex code quickly". The main objective of this activity was to identify functionality desires/requirements.

A.4 Best Companies Practices

In the following table, we will explore how the various design systems have named the category that includes color, layout, typography, and spacing.

Term	Used by
Styles	*HubSpot*, *GOV UK*, *Microsoft*
Foundation(s)	*Atlassian*, *Adobe*, *Gitlab*, *Kiwi*, *Google*, *Github*
Fundamental(s)	*Merck*
Design	*Shopify*, *Zendesk*,
Brand	*Booking*
Global Styles	*Ant*
CSS or Variables or Tokens	*Buzzfeed*, *US GOV*, *Salesforce*
Visual Language	*Morningstar*
Design Guidelines	*IBM*

Table A.2 – Different ways of organizing "colors", "typography", "grid" sections on the design system. Inspiration: Nathan Curtis.

A.5 Personas

A.5.1 Personas Hypothesis

To identify the persona hypothesis, all the subjects were first grouped by role and behavioral and demographics variables.

Roles in business and consumer domains

- Designers who are enhancing a component.
- Designers who need to know the components available.
- New hire that has recently joined the team.
- 3rd parties that need to know Logitech style guide.
- Front-end developers that need a component overview
- Back-end developers who need to find component documentations.
- Content ops who need to know all the available customisation of a component.
- QA testers who need to check a style.
- Business group that want to know more about our web pages structure.

Behavioral and demographic variables

- Desire to contribute (from small to big contribution).
- Motivation and need to use a design system (from low to high — from having an overview about Logitech values to read high-detailed documentation about our design choices).
- Frequency of use of a design system (from everyday to rarely — from referring to templates to reading on-boarding tasks).

A.5.2 Pattern Variables

After gathering various information about several users' needs (mainly through stakeholder interviews and Logitech workshop), behavioral patterns have been identified. This iterative process consists of dividing the users into groups. A persona represents each group.

1. **Anna** (Visual designer and design system user):
   (a) Recently joined Logitech.
   (b) Need to learn as fast as possible Logitech style guides and processes.
   (c) Love to quickly read do/don't guidelines rather than spending time reading long and complex documentation.
   (d) She only use design tools (e.g., Figma) and she does not have any knowledge about tools used by other teams.
2. **Luke** (UX designer and design system maker):
   (a) Passionate about coding in his free time.
   (b) He loves to analyse processes and optimize them, currently he is looking on how to optimize component hand-off.
   (c) Curious about the tools used by the other teams.
3. **Sophie** (Senior front-end, design system user and sporadic contributor):
   (a) She would like to have an overview about all the web components used at Logitech.
   (b) She firmly believes that we should unify all our documentations to save time in the future.
   (c) Strongly believer of reduce, reuse, recycle components.
4. **Jacob** (Manager front-end and design system user):
   (a) He needs an accessible resource about our design foundations to share with his team and 3rd parties.
5. **Samantha** (Back-end and design system user):
   (a) She joined the company recently.
   (b) She needs a resource where she can quickly learn all the existing components, architecture, styles.
   (c) She spends a lot of time asking for clarifications from designers. She believes that designers should provide more detailed hand-off reports.
6. **Mark** (Content ops and design system user):
   (a) He works at Logitech from a long time.
   (b) He needs a resource to see all the available variations for each component.

(c) He can see how a design system can help him and his team saves time (using templates).

(d) He is not interested in having too much documentation.

7. **Laura** (QA and design system user):

(a) She would like to learn more about Logitech design choices and style.

(b) She struggles to see an actual use case for a design system.

(c) She is more interested in having a better process for hand-off, more than a real design system.

8. **Nick** (Business group and design system user):

(a) He would like to have a friendly resource where he can easily find everything he needs, from components to images, style guides, etc.

(b) He needs to put together a design brief to hand off to designers. For this reason, sometimes, he has to try to put together some components screenshots to create a sort of comp.

(c) He will not be a strong, active user of the design system, but he wants to access it whenever he needs it.

A.5.3 Analysis & Insights

- 3 most common tasks and activities
  1. Look for resources (e.g., I need to design a *login*, do we already have a component or some guidelines for doing it?).
  2. Back and forth discussions between designers, content ops, and devs (e.g., change the padding to 20px).
  3. Reproduce comps (e.g., while authoring, while designing a similar page, while coding a similar component).
- 3 most common problems and frustrations right now
  1. Lack of a unique resource for knowledge transfer.
  2. Repetitive tasks (e.g., replicating similar pages on AEM or Figma).
  3. Lack of reference pages and guidelines (e.g., "how do I do it?", "do we have a component for this case?").
- 3 most common user goals and motivations of why they might need the product
  1. Knowledge transfer (personal and shared).
  2. Save time and speed up processes.
  3. Improve consistency.

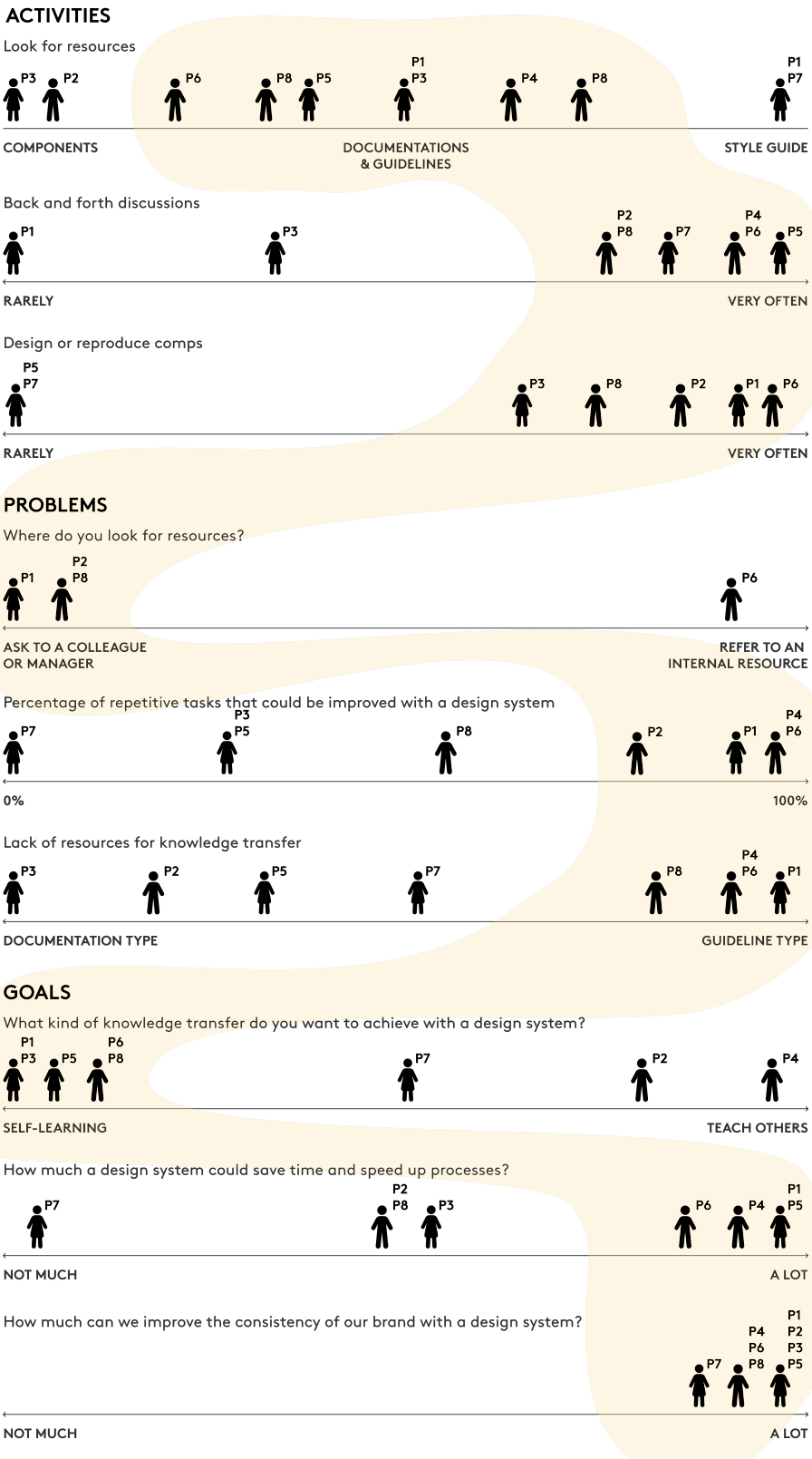

Figure A.4 – Pattern variables: 1) most common tasks and activities, 2) problems and frustrations, 3) user goals about why they might need a design system.

A.6 Figma for Web UX Design

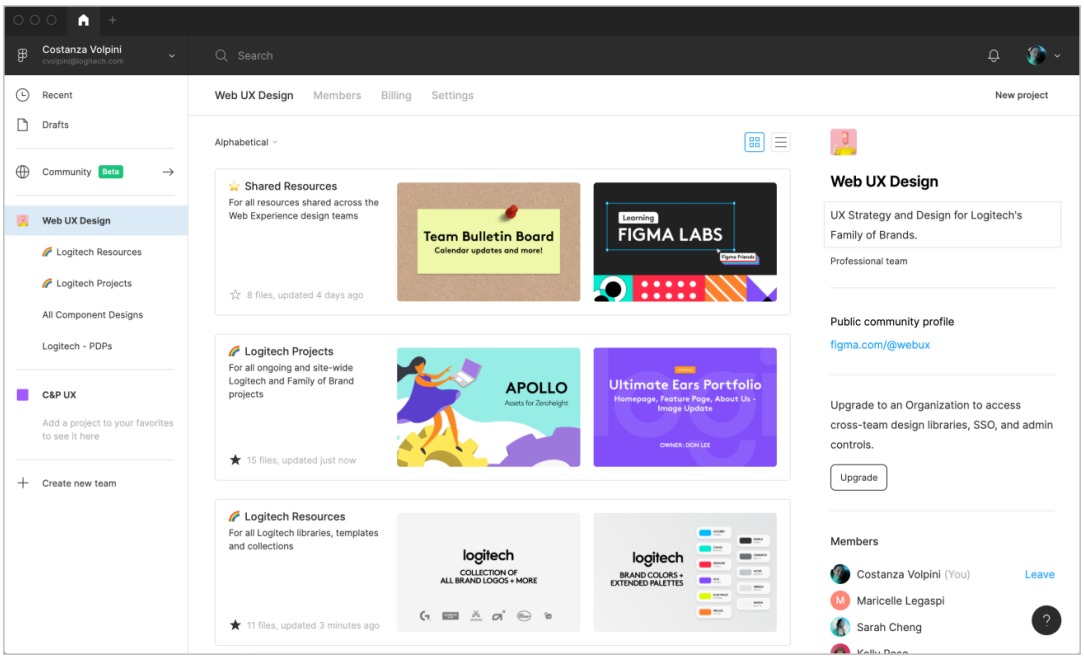

Figure A.5 – Web designers at Logitech use Figma as a design tool for creating comps and components. Figma is also used to distribute libraries (i.e., component library) and collections (e.g., icons and logos).

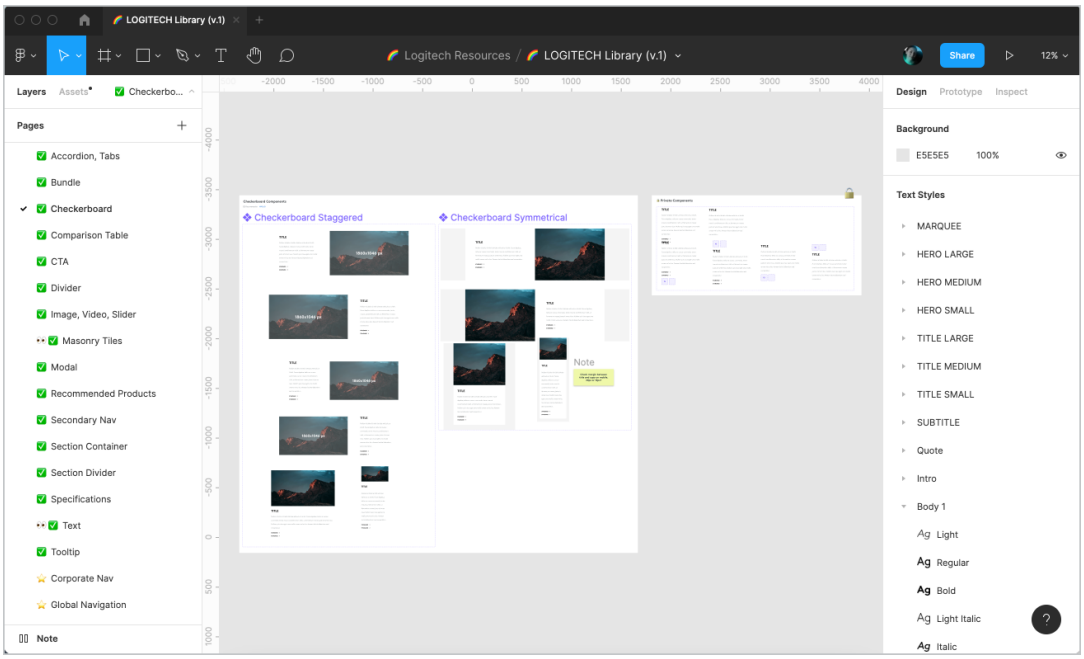

Figure A.6 – Logitech's core library contains all web components. Each component is shown in its variants, states, styles (e.g., how it appears on a tablet).

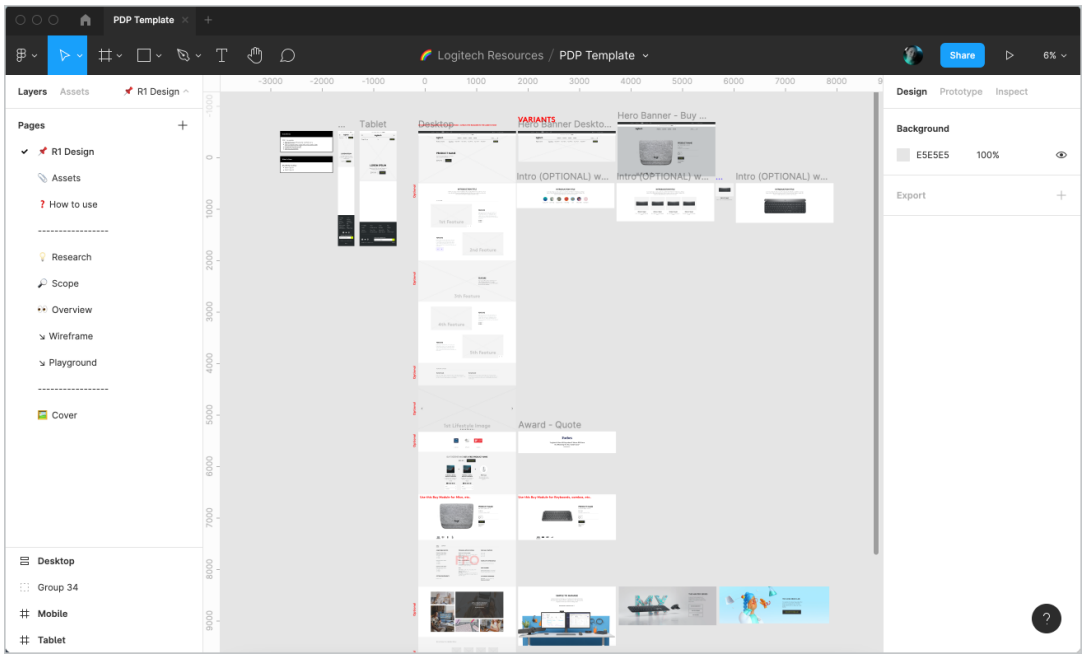

Figure A.7 – Templates are available on Figma. Designers can use them as a starting file to create a template that better matches their needs (e.g., a PDP template for B2B products). Each template offers different options for each component type (e.g., you can see how the first module can be customized to have a hero banner with a lifestyle background or a buy module component). Moreover, attempts to automate some tasks better (e.g., exporting images for hand-offs) have been made.

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