

Leona Balscheit & Milan Elsen  
*Another App?* supervised by Richard Jungkunz  
KISD Mid Term Project  
17.10. – 15.12.2023

# ZeichenMeister

## Project Documentation



Learn German Sign Language  
in a magically simple way!

# ***Outline***

1. Abstract	3
2. Goal	3
2.1.Tasks	3
2.2.Guiding principles	4
3. Production Plan	4
4. Product Definition	5
4.1.Defining The Problem	5
4.2.Research	5
4.2.a.Market Research	5
4.2.b.Technological Research	5
4.3.Concept	6
4.3.a.Didactical Concept	6
4.3.b.Differentiating Features	6
4.4.MVP Featureset	7
5. Design	7
5.1.Defining the typical User	8
5.2.User Flow / Information Architecture	8
5.3.Design System	9
5.4.Database	10
6. Prototype	11
7. Tests	11
8. Presentation	11
8.1.Marketing Assets	11
8.2.Reception & Feedback	12
9. Reflection & Future Steps	12
9.1.Possible Improvements	12
9.2.Steps ahead to launch a product	13
9.3.Reflection	13

## *1. Abstract*

In this document, we present the design process of a mobile app that we developed as a mid term project for the Interface and UX Design course, supervised by Richard Jungkunz. The course aimed to teach us the principles and methods of Interface- and User Experience design, as well as the tools and techniques for prototyping and testing mobile apps. The project was an opportunity for us to apply what we learned in the course to a realistic scenario of creating a mobile app from scratch.

Mobile apps are ubiquitous in the modern world, offering various functions and services to users across different platforms and devices. However, designing a mobile app is not a trivial task, as it requires careful consideration of the user's needs, preferences, and expectations, as well as the technical constraints and opportunities of the mobile operating systems. Moreover, the mobile app market is highly competitive and saturated, making it challenging to create an app that stands out and attracts users. Therefore the main objective of the project was not to come up with a novel or innovative app idea, but rather to follow a holistic and rigorous design process that covered all the stages from idea generation to prototype testing. We wanted to simulate the realistic creation of an app as closely as possible, without skipping or rushing any step. Therefore, we focused on the feasibility and usability of the app concept, rather than the originality or uniqueness of the app idea.

The document is structured as follows: We describe the idea and the concept of the app that we chose to develop, as well as the market research and the technical research that we conducted to validate and refine our idea. Continuing, we present the production plan that we created to organise and manage our work, as well as the drafting and the prototyping phases that we went through to design and implement the app interface. Furthermore we report the results of the testing that we performed to evaluate the app prototype, as well as the feedback and the suggestions that we received from our testers. Finally we conclude with an outlook on the possible future steps to bring a final product to market.

## *2. Goal*

The main goal of the project was to create a realistic concept for a mobile app design, following a holistic design process from idea generation to creating a prototype.

### *2.1. Tasks*

The specific tasks of the project were:

- To generate an app idea that was feasible, usable, and relevant for the target users and the market context

- To conduct market research and technical research to validate and refine the app idea, as well as to identify the user needs, preferences, and expectations, and the technical constraints and opportunities of the target platforms
- To create a production plan that organised and managed the work, as well as defined the scope, the timeline & the roles of the project
- To design and implement the app interface and functionality, using drafting and prototyping tools and techniques, as well as following the principles and methods of interface and user experience design
- To evaluate the app prototype, using testing tools and techniques, as well as collecting and analysing the feedback and the suggestions from the users and the supervisor.

## *2.2. Guiding principles*

The project work was guided by the principle of emulating a real app development workflow, as closely as possible, to simulate the realistic creation of an app. To achieve this, we divided the work within our project group into two main roles: conception and implementation. Leona was responsible for the conception, which involved generating, validating, and refining the app idea, as well as creating the production plan and drafts of the User Flow and Individual Screens in the prototyping tool Figma. Milan was responsible for the implementation, which involved developing and testing a native iOS app prototype, using the programming language Swift and the user interface framework SwiftUI. Both of us collaborated and communicated closely throughout the project, reviewing and iterating on ideas and the final design together, as well as collecting and analysing feedback and suggestions from the testers and our supervisor.

## *3. Production Plan*

In the second week we created a rough production plan for the following weeks. We dedicated two entire weeks to research and product definition, three weeks for design and implementation, another week for testing and feedback and finally the last four days for preparing the presentation. After the research stage we refined the plan and created a detailed schedule for the design and implementation block, that included the stages of:

- defining the user
- creating user flows and navigation
- creating a design system
- drafts of individual screens
- native implementation in code

Finally the largest part was dedicated to several rounds of iteration and refinement.

## *4. Product Definition*

### *4.1. Defining The Problem*

The idea was inspired by a confrontation with people that speak the German sign language. We realised how useful it can be to communicate without using the voice. It is not only a fundamental part of inclusive communication, but also a way to enrich your expression and broaden your communication skills. Even as a hearing person it can help you, in situations where spoken language is not suitable e.g. at a noisy event. Though, we realised how hard it is to learn sign language from scratch, especially, if you usually never come in contact with sign language users. Thinking about apps like Duolingo or Babbel, that help to learn spoken languages, we wondered why there was no such app that simplifies the learning process for sign language, so we decided to create it.

### *4.2. Research*

#### *4.2.a. Market Research*

Before developing our app idea, we conducted a market research to assess the demand, the competition, and the potential of our app. We searched for existing apps that offer sign language learning or communication, and compared their features, ratings, and reviews. We also surveyed potential users, including hearing-impaired people and sign language learners, to understand their needs, preferences, and expectations.

Researching existing sign language teaching methods, we found that there are some good books available, some very outdated websites and even an app called *yoDGS*, that seems to be up to date and well maintained.

With this overview over the market, we did some further research on apps for learning spoken languages to figure out if we could provide any value that isn't offered yet by the existing mediums of learning sign language.

We figured, that the existing *yoDGS*-app already has the basic feature set implemented really well. It allows the user to learn new *Gebärden* (gestures in the german sign language), tests the user on them with a couple of different types of exercises, including translation to written German and multiple choice translation tasks from sign language to German as well as German to sign language. There is also some grammar in german sign language, which the app conveys reasonably well. We quickly figured that the existing solutions were definitely not perfect, but would still already satisfy large parts of the market, so we needed some unique feature or design choice to strongly differentiate our product.

#### *4.2.b. Technological Research*

After an introduction to different prototyping tools by our supervisor, we quickly decided to do our sketches and rough drafts in Figma, the industry standard prototyping tool. While Figma offers a bunch of advanced features for creating

prototypes, like testing on a real device and even generating interface code, we decided to mostly not use those features. Since we wanted to emulate a real app design workflow, we instead decided to create a native iOS prototype and skipped creating the Figma prototype simply for time constraints.

For the native iOS app we decided to use the Swift, since it is primary iOS programming language officially supported by Apple. The interface was completely programmed in the relatively new SwiftUI framework. While it does not have all of the features of the traditional UIKit framework, it needs a lot less boilerplate code, and therefore allows for very rapid iteration, and an overall much faster workflow. It is clear that it will become the standard way to program interfaces on Apple platforms over the following years.

### *4.3. Concept*

#### *4.3.a. Didactical Concept*

With the results of our market research we identified some gaps and opportunities for improvement. For the basis we needed a strong didactical concept. We found that almost all of the existing language learning tools and apps and also the exiting sign language learning resources are at least in some way based on the popular card index learning system for learning vocabulary.

According to the traditional system, vocabulary has to be repeatedly learned five times to end up in long term memory. While this is highly controversial and in no way scientifically proven, it is clear that continuous learning and repetition over progressively longer timespans are essential to learning vocabulary. But of course the key to learning any language, including sign language is actually using it. This is why we decided to base one half of our didactical concept on repetition and encouraging the user to learn continuously for maximum efficiency in learning new *Gebärden* (German Sign Language gestures). The other half is dedicated encouraging users to use sign language in real life with other sing language speakers or other learners of sign language.

Additionally we researched into possibilities to make the learning process as engaging as possible. Key to this is providing highly interactive learning tasks and gamifying the process, even using “dark design patterns” that are morally questionable (since they are usually used by social media platforms, gambling apps, and games to drive addiction), but for the rather good cause of our app.

#### *4.3.b. Differentiating Features*

We also found that we need a strong set of differentiating features to stand a chance in the market. We came up with:

- Sign language detection via the camera to train *Gebärden*
- A wider variety of training exercises compared to the competitors

- An algorithmic feed mixed of new gestures, training exercises and video detection training. The timeline is based on the proven "index card system"
- A community platform to meet other people speaking or learning sign language
- An event Calendar for sign language events

#### *4.4. MVP Featureset*

For our minimum viable product prototype we decided to put aside any features that would require a backend and continuous moderation and maintenance work, since this would be way beyond the scope of this project. This means that we only designed dummy screens for all of the community and event features.

All of the features that would work on device we decided to actually implement. This includes the basic features for learning new *Gebärden* and various different exercises. We had planned to offer a bunch of different exercise types to differentiate our product from the competitors, but in the end time has only allowed us to implement three of them: Multiple Choice, translation in both directions and a word quiz.

We also decided to include an algorithmic feed that mixes up all of the features mentioned above based on the learning progress. This is supposed to guide the user through the different exercises in a very low friction and intuitive way.

For this we created a scrolling interface inspired by social media platforms. We didn't actually write the algorithm, again because of the time constraints.

### *5. Design*

Our app aims to provide a user-friendly and engaging platform for learning and practicing sign language. Sign language is a visual and spatial language, so conveying it via videos of a real human is the most obvious choice. Compared to other options like text instructions or animations it is the only option that can fully convey the nuance of each individual *Gebärde*, especially since many are quite similar but have totally different meanings.

We make accessibility a key focus in our design, since sign language itself is an important accessibility tool. This means that we support many of the accessibility features provided by the operating system, such as dynamic type size, interface scaling, contrast settings, and more. There are some accessibility features that are not supported, simply because they do not make sense in our context. For example the screen readers, because a certain level of vision is required to use sign language at all.

We also focus on standard and familiar interactions for easy accessibility, so we include many standard iOS design paradigms. However, we also want to create a unique visual style. Our interface is *colourful & lively to surprise & delight* the user, while not being distracting. Overall it makes learning a very joyful process. In line

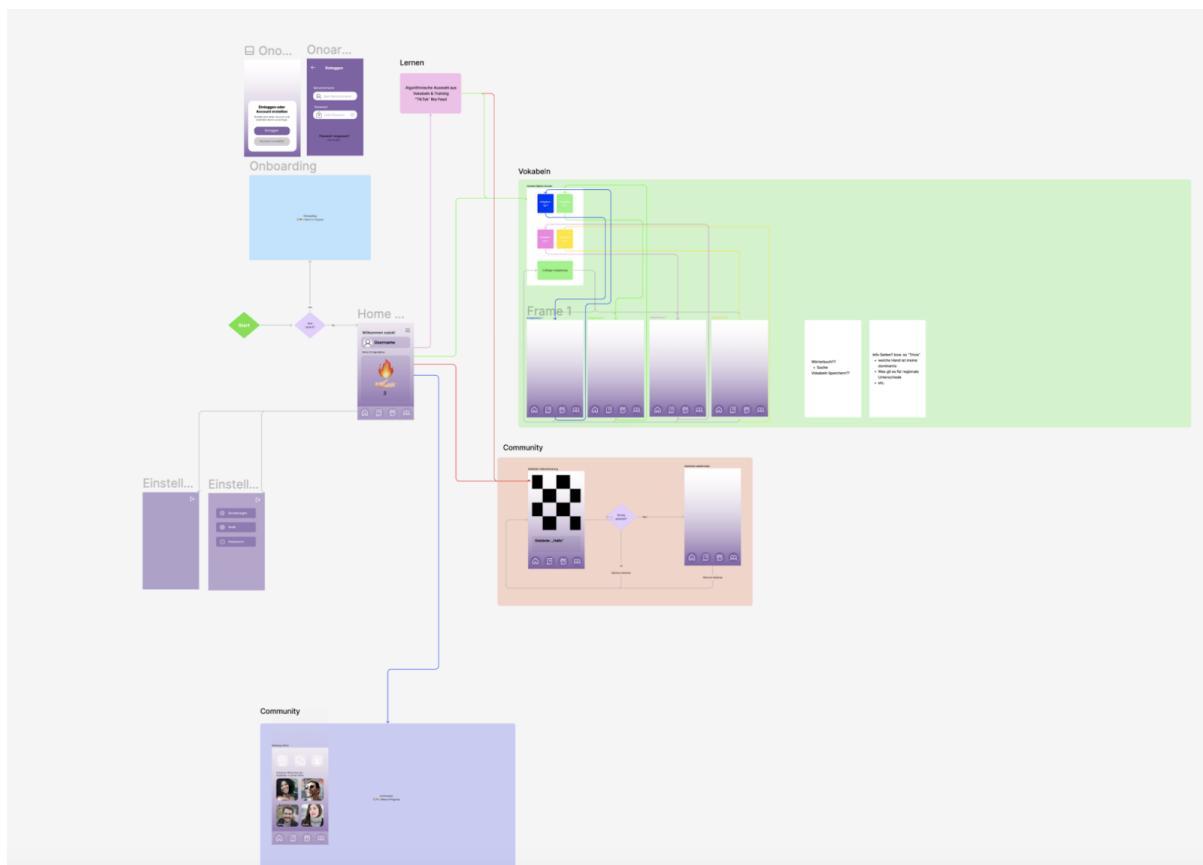
with these principles we also designed a mascot: a wizard holding a flame that grows and burns more intensively with each day the user continues to learn .

## 5.1. Defining the typical User

The typical user for our app is someone who is interested in learning sign language for personal or professional reasons, but does not have frequent or direct contact with people who use sign language. They are motivated by curiosity, empathy, or inclusivity, and want to acquire a new skill that can enrich their communication and understanding of others. They are comfortable with using a smartphone and have access to the internet. They are not necessarily elderly, as they are familiar with the latest technology and trends. They are looking for an app that can lower the bar to learn sign language, by providing fun and engaging lessons, feedback, and practice opportunities. They are also likely to actively look for such an app, since sign language is not yet widely taught or used in mainstream society.

## 5.2. User Flow / Information Architecture

We started with drafting the navigation flow as a diagram and over time adding first drafts of the individual screen into the diagram. Connecting the screens with arrows reveals that there are quite a lot of possible navigation paths, a lot more than we had anticipated.



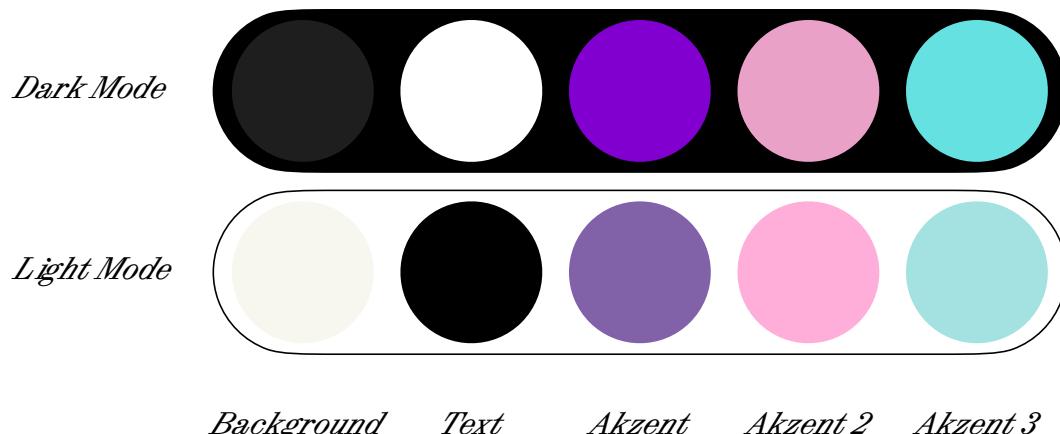
User Flow diagram in Figma with first sketches of individual screens

After finalising the information architecture logically, we started designing the interface elements for navigation. We use a navigation interface that is familiar to any iOS user. Our app is divided into three main areas: Learning, Training and Community. These areas and the home screen are accessible at all times via a permanently visible tab bar at the bottom of the screen. Additional modal views, e.g. the settings screen, are shown in a sheet overlay, another very common iOS interface element.

### 5.3. Design System

#### Colours

The app design aims to create a fun and delightful user experience, and one of the key aspects of achieving this goal is the choice of colours. The app color scheme consists of three main colours: purple, pink, and a light teal blue. These colors were chosen for their color harmony, contrast ratios, and psychological effects. The colours vary slightly across dark and light mode, for one since the human colour perception is not consistent depending on the background the colour is shown on and also to keep the contrast between the color and the background pleasant to the eye.



#### Font

We decided to use the iOS system font San Francisco, simply for practicality reasons. It is quite similar to Helvetica, they are almost indistinguishable at first sight, but San Francisco is better optimised for screens and small type sizes and therefore highly readable and accessible. The similarity to Helvetica means that it is super neutral and familiar to any user and we believe that it is a great baseline for any app design.

It supports all of the system accessibility features like dynamic type size, interface scaling and other visual accommodations with very little work, since it is preinstalled. While all of this is also possible with a custom font, it requires a lot more work and we decided to focus our efforts on other aspects of the design for now.

## *Buttons*

Buttons are large and have a text label as well as an icon. We use either a pill shape or a circle filled with our light blue accent colour and slight transparency.

Together with a subtle drop shadow, and the button tap animation, the solid colour border around the buttons gives them a very three dimensional and haptic feel

## *Animations*

We implement several different animations. Among others a subtle animation on scrolling views, graceful transitions when navigating to a different screen and playful feedback after completing an exercise. Also of course the flame animation to visualise the users learning streak, which is rendered live using a particle animation framework. All of these animations convey the navigation architecture, make the interface fluid and lively.

## *5.4.Database*

For the basic learning and training features we recorded a small sample set of videos of 16 more or less randomly chosen *Gebärden*. Since we ourselves do not speak German sign language yet, we got some help from a special education student of the Universität zu Köln. We shot the clips in a studio and decided that a pure white background seemed, while very neutral, also too dull and clinical, so we shot them on a more friendly light blue background, since we figured that would fit harmonically with our pink and purple color scheme.



*Filming of the videos*

## *6. Prototype*

We ended up with a fully working prototype running natively on the phone, which was almost fully featured. The video detection was the only feature we couldn't get to work in time. The prototype is written in Swift and SwiftUI and all of the code could be used in a final production app. The layout is responsive and runs on all different iPhone screen sizes. In the future it could also be adapted for tablets and desktops. The lightweight nature SwiftUI allows the bundle to be quite compact. For the 25 different views and all of the navigation logic about 3000 lines of code are needed.

## *7. Tests*

We tested the app with three different groups of people. Deaf people who already use sign language, sign language learners who can also hear and people who had never come into contact with sign language. Interestingly the sign language speakers could not provide a lot of useful feedback, since they already use it and have no use case for such an app. The other two groups provided us a lot of helpful feedback and observing them using the app also revealed some issues with our design. After testing we decided to label some buttons more explicitly, add a feedback animation after completing a task and add an onboarding screen.

## *8. Presentation*

In addition to our prototype we created some marketing material for the presentation. After a short beamer presentation, introducing all project groups. Each project group presented their work at their own booth, similar to a small booth at a trade fair.

### *8.1. Marketing Assets*

We prepared all of the assets necessary for publishing an app on the app store: the app icon in high resolution, a banner image, screenshots of the app, a slogan and a short description text. These assets were used in the intro presentation.

For the booth we designed posters in A2 format in portrait and landscape, but ended up using only one of them for visual consistency with the other stands. Our prototype was running on a phone at the booth for anyone in the audience to try. Since the video detection was not ready in time we also made a short video demonstrating the feature, which we played in loop on a tablet at the booth. As a fun extra, we also printed icons of the German sign language alphabet onto some T-Shirts which we wore at the presentation.



## 8.2. Reception & Feedback

The presentation was very well received and the feedback was encouraging, many people especially enjoyed the playful design approach. There was also some constructive criticism, mostly about the bugs remaining in the prototype. The app crashed once during the demo and there were a couple

## 9. Reflection & Future Steps

### 9.1. Possible Improvements

Some interface elements are not rich enough in contrast and therefore not super readable. Some of the animations are not rendering very smoothly yet. While some people liked the playful design approach a lot, one person also found it overwhelming and distracting. With more time at hand the design could also be customised further and have a stronger brand identity. The most obvious step for that would of course be a custom font.

## *9.2. Steps ahead to launch a product*

The native prototype is basically complete as far as the interface goes, after some bug fixing and performance optimisations it would be ready for production. To ship a final product we would of course still need to take care of some technical aspects:

- o Record videos of all existing *Gebärden* (there are a lot)
- o sort and categorise them
- o Implement a database of the videos and perhaps a way to load them from a remote server, since it would be a large amount of data
- o Implement the algorithmic feed
- o Find a way to monetise the app or finding a sponsor

## *9.3. Reflection*

Looking back, we are very satisfied with the outcome. Our prototype is almost fully featured and while technically still a bit unstable and buggy, design-wise it is very polished.

Although our execution and especially our time management could have been much better. We ended up spending a lot of time on the basic features and polishing the experience. I feel like we could have made some concessions there and spent more time on the innovative features that differentiate our product from competitors in the market. In hindsight we could have spent more time on the machine learning technologies, which could possibly have offered more learnings to both of us, since neither of us have ever worked with ML technology.  
In the beginning we had some ambitions to create a fully functional product and maybe even bring it to market. We didn't achieve that, but of course it was a completely unrealistic ambition to begin with for a two person team, especially in this short time frame.

Nevertheless we managed to produce an almost fully featured and quite polished prototype, plus a lot of marketing and promotional material. That was quite a lot for the time frame.