

Abstract

Computer-assisted language learning tools are designed to increase external motivation or benefit from the memory-building methods. However, inspired by the Experience Design approach (Hassenzahl, 2010), when the focus is shifted towards enabling positive experience for learners, designers have discovered new opportunities.

This study turns initial strategies to enable a positive experience for language learners into a high-fidelity clickable prototype. It evaluates the experience that is also created with the prototype's usability through testing with participants. Then the study reports those findings also with the discussion of further possible iterations.

The study concludes with a particular solution that can become an actual product or inspire similar approaches in product design that try to reach the exact purpose of enabling positive experiences. This solution shows potential for enabling positive experiences and feelings of relating to a group or feeling competent. However, the study also points out that collaborative and mission-based strategies used in this solution can also be expanded or replaced by new strategies in future work.

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1. Introduction

1.1 Motivation

Computer-assisted language learning tools are part of our lives in different ways. The current most popular CALL tools in the market seem to use effective techniques that ignite external motivation with gamification and benefit from the memory-building methods. However, in an earlier study, it has been discovered that usage of a wiki, which is a collaborative platform, has various positive effects on learners; therefore, authors have suggested that future researchers may consider the usage of diversified use of wikis in collaborative language learning (Fan Su & Di Zou, 2020).

Also, the work that has been conducted in the capstone project before this study using Hassenzahl's Experience Design approach (Hassenzahl, 2010) showed that there are hedonic opportunities to enable positive experiences by using technology as a mediator. Thereby, learners can address and, in the best case, fulfill psychological needs (Sheldon et al., 2001).

These studies demonstrate that with the focus on learning experience and psychological needs, there is room for improvement in designing more positive experiences for people without just evaluating the effectiveness of current tools and bettering them. Therefore, this study aims to turn a specific strategy for enabling positive language learning experiences into a concept, understand the results with people's interaction, and report its findings for possible future improvements.

1.2 Study Objectives

This study aims to outline the process of designing a digital prototype and evaluation of it to see whether the strategies that the prototype uses help

enable positive language learning experiences for users. The study consists of four steps that all serve as checkpoints to reach the primary aim.

The first step is creating an experience story that can enable positive experiences for language learners; this goal was reached during the initial capstone project by analyzing real-life experiences. The second step in this study is turning that experience story into an interactive prototype that potential users can test. The third step evaluates the prototype using Experience Design (Hassenzahl, 2010) and Usability Testing (Kruger, 2006) approaches in interviews with users and reporting the results. The fourth and final step is to discuss those results and see if the prototype is aligned on primary purpose with a picture of possible future iterations.

1.3 Structure of the Thesis

This study consists of six chapters, including this introduction part as the first one. The second chapter points out the fundamental literature work that this study uses methodologically with related work that inspires collaborative solutions for a positive experience. Chapter three clarifies the process behind and presents the design work conducted for the study. Then the fourth chapter shows planning and a direct report of the evaluation. In chapter five, results are discussed compared with the initial research objectives, and limitations with future research possibilities are introduced. Chapter six, the final chapter, introduces a conclusion as a summary of the study.

2. Literature

In this chapter, there will be an introduction to the Experience Design approach as defined by Hassenzahl (2010). It also explains why it was the primary approach used in designing an evaluation of this project. Then the usability approach will be presented, which has been used later in the

prototyping process to evaluate the usability aspects of the high fidelity clickable prototype using usability testing (Kruger, 2006, p.133). In the final part of the chapter, there are references to the earlier research conducted in related fields that have influenced this thesis to move into collaborative solutions to create positive experiences.

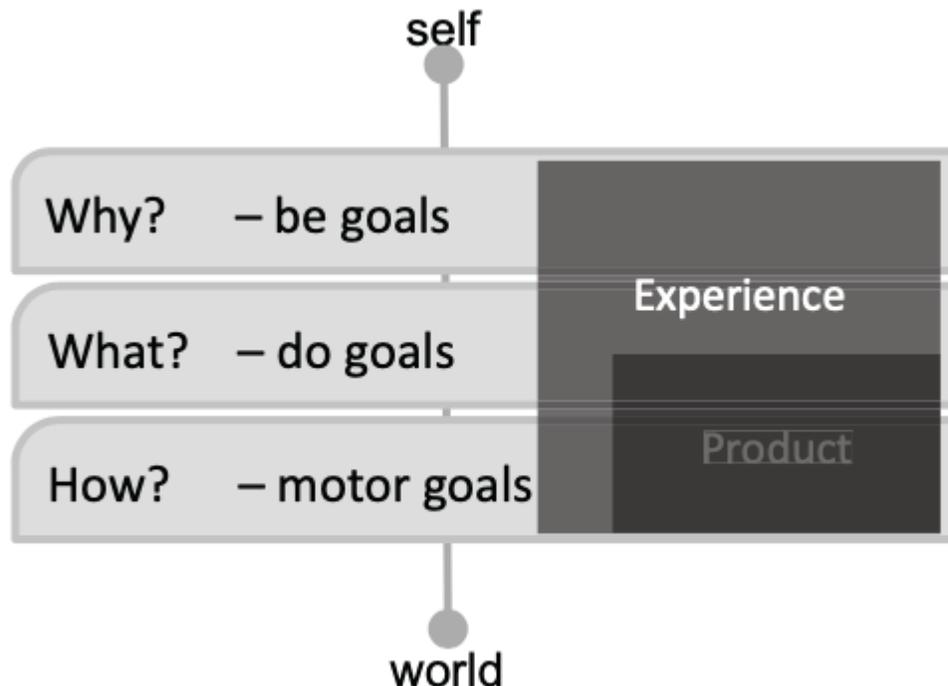
2.1 Experience Design Approach

The Experience Design approach by Hassenzahl (2010) puts the human experience in the center of the design. Therefore, the core elements of experiences have to be analyzed. He further states that perception, action, motivation, emotion, and cognition in dialogue with the world would be examples of those elements (Hassenzahl, 2010, p.4). Thereby, those elements will be the building blocks for the creation of concepts through technology later on.

The experiential approach to HCI must go beyond the do goals and to the underlying reasons for the actions as Hassenzahl and Tractinsky state (2006, p.92). It aims to create experiences for people focused on 'Why' or, in other terms, 'Be' goals of people (Hassenzahl, 2010), as shown in Figure 2.1 (Hassenzahl, 2010, p.12). Also, in a study, Knobel explains this approach briefly as telling meaningful stories through an interactive system and placing those stories at the heart of all design efforts (Knobel et al., 2013).

Figure 2.1

A three-level hierarchy of goals



Note. Adapted from *Experience Design: Technology for All the Right Reasons*, by Hassenzahl, M., 2010, p. 12. Copyright 2010 by Morgan & Claypool.

In his book *Experience Design*, Hassenzahl exemplifies 'Be' goal-focused design by discussing an imaginary kitchen mixer product designed with experience in mind. The function is compromised to enable safety for creating a positive father-child experience (Hassenzahl, 2010, p. 64). As an example of this approach, this study also focuses on people being related members of the learning group or feeling competent to each other in a tribe (see appendix I.I) instead of optimizing the system's functionality for learning the maximum amount of information retention.

The creation of a positive experience is complex (Pine & Gilmore, 2011), but positive emotions play a role in it (Hassenzahl, 2010). According to the 'self-determination theory,' those positive emotions will result from addressing and fulfilling psychological needs (relatedness, competence, and autonomy) (Ryan & Deci, 2000). Sheldon and colleagues build up a more detailed set of

psychological needs (Sheldon et al., 2001) based on the determination theory. This detailed set of needs help designers as an additional tool to analyze and design experiences (Hassenzahl, 2010), and a more detailed version of those needs can be seen in Table 2.1.

Table 2.1

List of Psychological Needs

Need	Description
Autonomy-Independence	Feeling like you are the cause of your own actions rather than feeling that external forces or pressure are the cause of your action
Competence-effectance	Feeling that you are very capable and effective in your actions rather than feeling incompetent or ineffective
Relatedness-belongingness	Feeling that you have regular intimate contact with people who care about you rather than feeling lonely and uncared of
Self Actualizing-meaning	Feeling that you are developing your best potentials and making life meaningful rather than feeling stagnant and that life does not have much meaning
Security-control	Feeling safe and in control of your life rather than feeling uncertain and threatened by your circumstances
Money-luxury	Feeling that you have plenty of money to buy most of what you want rather than feeling like a poor person who has no nice possessions
Influence-popularity	Feeling that you are liked, respected, and have influence over others rather than feeling like a person whose advice or opinion nobody is interested in
Physical thriving-bodily	Feeling that your body is healthy and well-taken care of rather than feeling out of shape and unhealthy
Self-esteem-self-respect	Feeling that you are a worthy person who is as good as anyone else rather than feeling like a "loser"

Pleasure-stimulation	Feeling that you get plenty of enjoyment and pleasure rather than feeling bored and understimulated by life
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Note. Adapted from *Experience Design: Technology for All the Right Reasons*, by Hassenzahl, M., 2010, p. 46. Copyright 2010 by Morgan & Claypool.

As defined by March Hassenzahl (Hassenzahl, 2010), the Experience Design approach puts humans at the center of the design process. It helps to evaluate the end product further than just usability aspects by also analyzing how the resulting experiences affect users' emotions and needs. This particular aspect of the approach aligns with the initial motivation, enabling positive collaborative experiences for language learners using technology as a tool and helps to evaluate the result by looking more profound than the just surface product.

2.2 Usability Approach

This study mainly focuses on the Experience Design approach and evaluation of the product; therefore tries to capture if the user can meet their psychological needs through the experiences enabled by the product. Still, since the prototyping context is a web application and consists of collaborative elements that have tasks to be done by the user, the usability approach comes into point to evaluate if users can fulfill those tasks successfully and understand the pages that the prototype presents. The official ISO definition for usability is: “Extent to which a system, product or service can be used by specified users to achieve specific goals with effectiveness, efficiency and satisfaction in a specified context of use” (ISO 9241-210:2019).

In order to evaluate the parts of the prototype, which requires user interactions like wiki creation parts, there was usability testing (Kruger, 2006, p.133) questions and tasks in the interviews conducted. In the Evaluation

chapter, there are details of the usability testing setup, as also shown in the interview guidelines (see appendix II.II.).

2.3 Related Work

When explaining how Experience Design can find patterns that enable similar experiences which can act as a blueprint to aim for designers, Hassenzahl argues that besides first-hand real-life empirical observations like the interviews conducted in the course of this study, designers should also exploit accumulated knowledge around a topic (Hassenzahl, 2010, p.76). He further adds that designers should focus on the effects of their designs on people instead of re-doing the conceptual work already provided by other disciplines such as psychology (Hassenzahl, 2010, p.76). Following this approach, this study combines the patterns it found during interviews with the existing literature and integrates those findings into the ideation process.

Earlier studies in the field show some promising results for collaborative approaches, for example, according to King, Wikipedia-writing for the participants and how this computer-mediated socialization experience can “ignite the vision” (Dörnyei, 2009, p. 33) of an ideal English writing self in the future. (King, B. W. 2015)’. Also, in a recent study, it has been discovered that usage of a wiki, which is a collaborative platform, has various positive effects on learners; therefore, authors suggested that future researchers may consider the usage of diversified use of wikis in collaborative language learning (Fan Su & Di Zou, 2020).

Furthermore, in earlier studies, there are more hints for details of creating a positive experience, such as collaborative technology was effective in promoting so-called low achiever and shy students engagement in the collaboration process, as they could access learning resources freely by also learning on their own pace (Wang & Liao, 2017) and when learners could

choose their preferred approaches for participation in group projects, and discussions resulted in higher engagement with others which turned out as a positive result for satisfactory learning achievements (Wang & Chen, 2012) as reported by Fan Su & Di Zou (Fan Su & Di Zou, 2020, p.22).

While those studies were shaping the collaborative aspects of the designed experience, there were further hints for design in other earlier studies, for example, according to Hanson & Brown, a future direction for study strategy interventions in second language learning is testing spaced-repetition studying that is actively engaging for learners using games or mnemonics (Hanson & Brown, 2019, pg. 18).

All of the findings mentioned above have influenced the strategies being used in the design process, together with the interview findings, in pursuit of enabling positive learning experiences for learners.

3. Design

This chapter shows all the design work the study has conducted. First, it gives an overview of the whole process and its basis. Then the chapter introduces outcomes from all three steps of the whole process, starting from the analysis, then ideation, and finally, the prototyping phase that leads to an interactive prototype to evaluate.

3.1 Overview of the Process

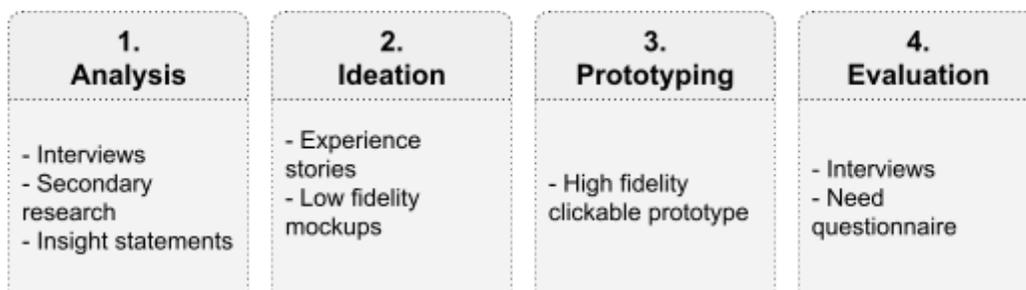
As introduced in the Literature part (Chapter 2) this study mainly focuses on the enabled experience of learners through introduction with the created prototype; therefore, to analyze this experience enabled by the prototype Experience Design approach (Hassenzahl, 2010) was in the center with the tools it provides throughout the study. According to Knobel, to have an aligned

process with the universal abstract activity circle (Hartson & Pyla, 2012), which includes analyzing, designing, prototyping, and evaluation, there have to be consecutive design steps in a study (Knobel, 2013, pg 25).

Furthermore, Knobel looks at the fundamentals of user-centered design and sees alignments in structuring a process. However, he adds that the focus has to be on experiences in every step to enable positive experiences here (Knobel, 2013, pg 25). Then Knobel says that a study can achieve this by analyzing existing experiences as the first step, then the creation of an experience and representing it as a story as the second step, which is learned by Hassenzahl's Experience Design approach (Hassenzahl, 2010), then keeping this experience focus in the third step of creating a prototype as well as the last step of evaluation (Knobel, 2013, pg 25). He finally adds that tools from other fields like psychology help analyze experiences and focus on the design process (Knobel, 2013).

Figure 3.1

Design Process



Note. Four steps of the experience focused design process timeline that is created for this study

In the light of all those references and the project planning that happened with the academic supervisors in an ongoing discussion, this study uses a

four-step design process outlined in figure 3.1. There is an analysis of existing experiences and creating insights for writing a new experience in the first step. The second step introduces the ideation of a positive experience as a story and supportive low fidelity mock-ups. The third step of prototyping consists of creating a high-fidelity clickable prototype that users can test, and the study can evaluate both from experience and usability perspectives. The fourth and final step of the design process is evaluating this prototype and the report of findings.

3.2 Analysis

Analysis of the existing experiences was done by the initial capstone project preceding this study by analyzing real-life experiences through interviews and secondary research. As explained in the earlier Literature part (Chapter 2), this study uses both of the findings as an inspiration for creating an aimed positive experience story in the ideation process. According to Knobel, efforts in this part of the process focus on gathering human experiences and holistically analyzing those experiences for the related part of the technology to be built (Knobel, 2013, pg. 26).

In the light of the Experience Design approach seven interviews have been conducted with language learning students. Those interviews were rather friendly conversations to gather true feelings of the moments. Also, there was a questionnaire for each unique experience to understand which psychological needs (Sheldon et al., 2001) they fulfilled to be reported as a positive or meaningful experience.

As a secondary tool, the capstone project also conducted online discussions by asking questions on language learning forums and analyzing secondary research in the field. Then the capstone project provided patterns and insight statements that shed light on the ideation part where the

experience story is created. All of the insight statements have a basis on different input points like interviews, discussions, or secondary research.

3.2.1 Insight Statements

1. Moments when people surprisingly understood the target language are memorable. People want to become someone who understands the target language naturally; when this happens without expecting it, it results in meaningful moments.
2. Practicing collectively with others creates meaningful moments & increases motivation. When people practice the language with others, and mostly it is reported as similar to others who are learning stuff like them, it increases motivation, and corrective feedback makes tangible language progress. Also, when it is with a close person, it can create related experiences they remember for a long time.
3. Moments when native speakers surprisingly understand people are memorable. People struggle with expressing themselves or being fully understood in the target language they are learning, but in rare occurrences when they are being understood more than they expected to so, these moments result in meaningful positive experiences.
4. It is hard but when learners push through it, speaking the target language improves well. Some people can neglect this while learning a language, but when someone pushes through the fear of failure and speaks the language, they can get rapid feedback (if they have the right environment) and improve.
5. Motivation boosters for learners in language learning are general curiosity, relatedness with others in the classroom or someone closer, beneficial-technical learnings for life goals, and feedback on the progress.

3.3 Ideation

After having all the insights in the initial capstone project, the next step is creating experience stories. Hassenzahl states that the fundamental claim of Experience Design is putting the experience before the products. To reach that, it urges designers to set the story straight before creating products to enable those stories (Hassenzahl, 2010, p.76). Therefore, this study uses ideation stories that clarify the main motivations of learners by explaining how they can fulfill them through interacting with a system before starting to ideate a product.

The initial capstone project provided two stories looking at different groups of insights. While one story has a primary focus on surprise elements that led to positive experiences, the other focuses on collaborative experiences. Since the secondary research provided more insights on the collaborative experiences, this study selected the story of 'Emmy's Online Tribe Finding and Language Learning Experience' (see appendix I.I) for prototyping and evaluating.

In the story, Emmy, the main character, needs new experiences in language learning and goes online and interacts with a system to fulfill that need through several different interactions with the system and others in it. This study prototyped Emmy's story and created a clickable prototype that testers can use during the interviews.

3.4 Prototyping

In this chapter, the study presents the prototype from the experience story of our main character Emmy (see appendix I.I). In the first part, there are

evaluation considerations that the study requires to evaluate the prototype both from experience and usability aspects. Then the second part of the chapter introduces the clickable prototype that this study created using a commonly known software Figma, a prototyping-focused design tool available free for students.

3.4.1 Evaluation Considerations and Planning

As explained earlier, the main focus of this study is evaluating enabled experiences. However, still, the intended experience includes a web application to be used by the main character. Therefore there was a need to include usability aspects to see if the users can fulfill essential tasks that would enable the experience.

In order to achieve this goal, this study presented a hybrid approach for a clickable prototyping plan, which includes different parts of experience and usability focuses on different steps to be created. The prototyping plan had some fundamental interactions that let users complete some tasks on the clickable prototype and think them out loud on the interface elements with guided questions for usability evaluation. Also, the plan had the overall experience of finding a tribe and getting new connections to learn collaboratively, like in Emmy's Experience Story (see appendix I.I), by letting participants imagine they are the hero in the story while using the prototype. According to the plan, participants answer open-ended questions to understand their experiences in real-life situations. Even though not fully functional, some interactions in the prototype will need to simulate those collective experiences, like seeing other's cursors and feedback in collective wiki pages.

After a high-level plan of the prototype was ready, as stated in the earlier paragraph, the plan was discussed by the student and supervisor professors

to be sure that the prototype was helpful for both evaluating the experience and usability for the testers. Then the study had a sound basis for starting to create a clickable prototype.

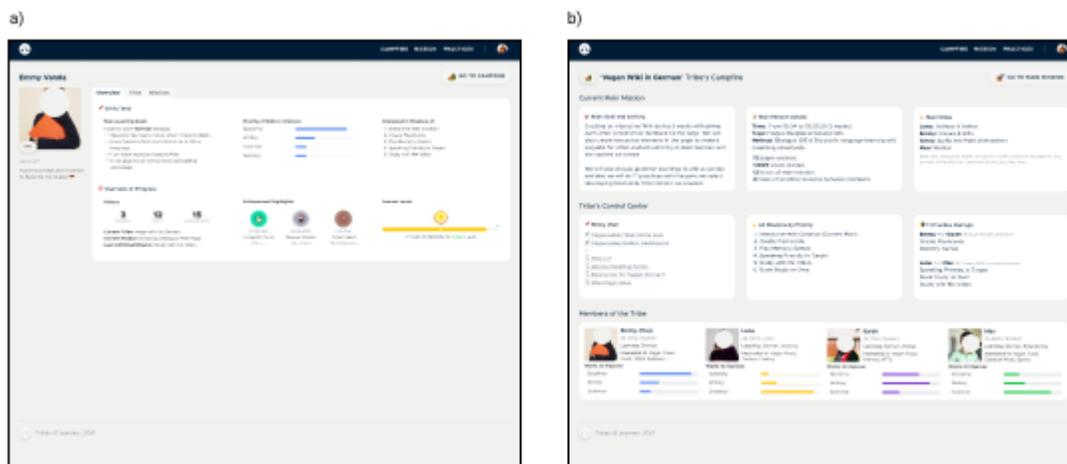
3.4.2 Creating a High Fidelity Clickable Prototype

After having a higher level plan of what to evaluate, the study moved on to creating a clickable prototype that would serve both experience and usability evaluation purposes in different steps.

The first screens of the prototype are the onboarding experience for the learners (see figure 3.2). The focus here is to tell Emmy's story and understand how participants would experience it in real life if they were the main character instead of Emmy in the experience story. Therefore, the screens focused on the content rather than having so many interactive elements. Hence, the content here was to make the tester understand what is going on and understand how they would experience it.

Figure 3.2

User Profile and Tribe Campfire Screens from the Clickable Prototype

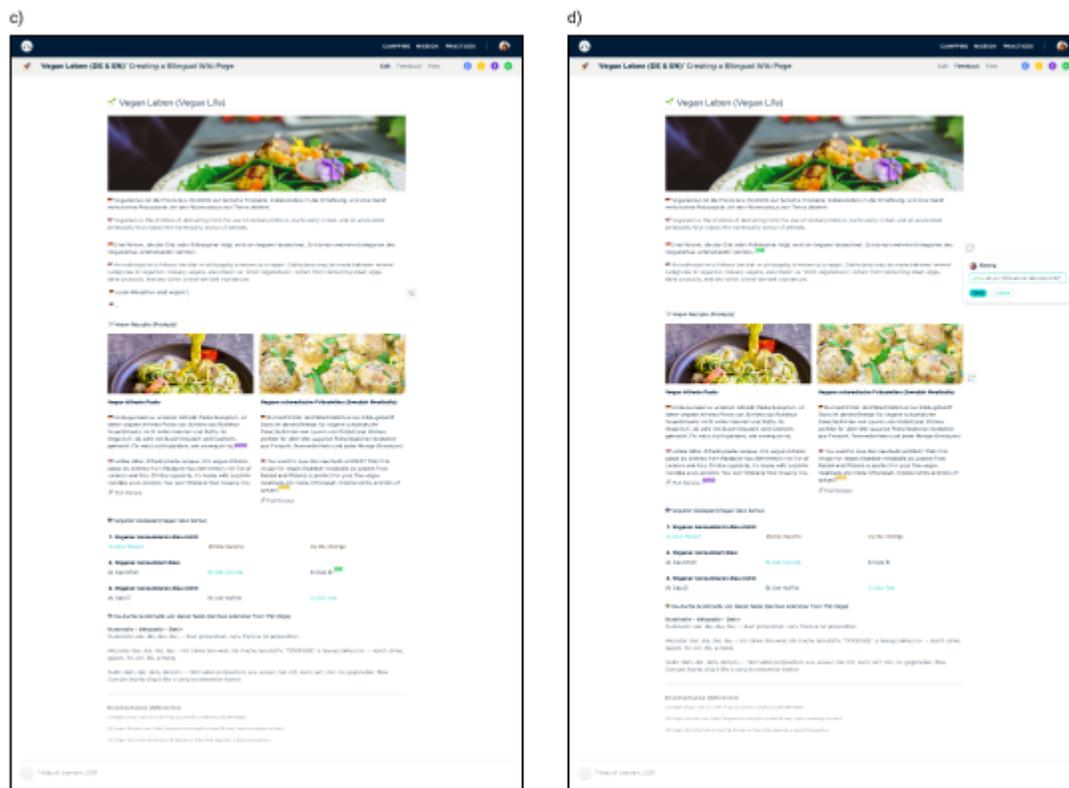


Note. These screens are Emmy's first steps into joining an online tribe to do learning missions

The middle part of the prototype introduces the mission of creating a bilingual wiki page with others in the tribe for learning a language. Here beside the co-creation and giving feedback experiences, the aim was to test if users could successfully fulfill tasks required in the page using the clickable prototype. Hence there were 15 different states of wiki creation screens (see figure 3.3) were used in the clickable prototype to simulate the actual editing and feedback giving experience. Also, the pages used realistic contents and indicators of other tribe members editing the pages simultaneously as Emmy to highlight the critical aspects of the experience. Furthermore, the study used these wiki creation and feedback giving parts of the clickable prototype to evaluate the experience and the usability.

Figure 3.3

Wiki creation and feedback giving screens from the Clickable Prototype

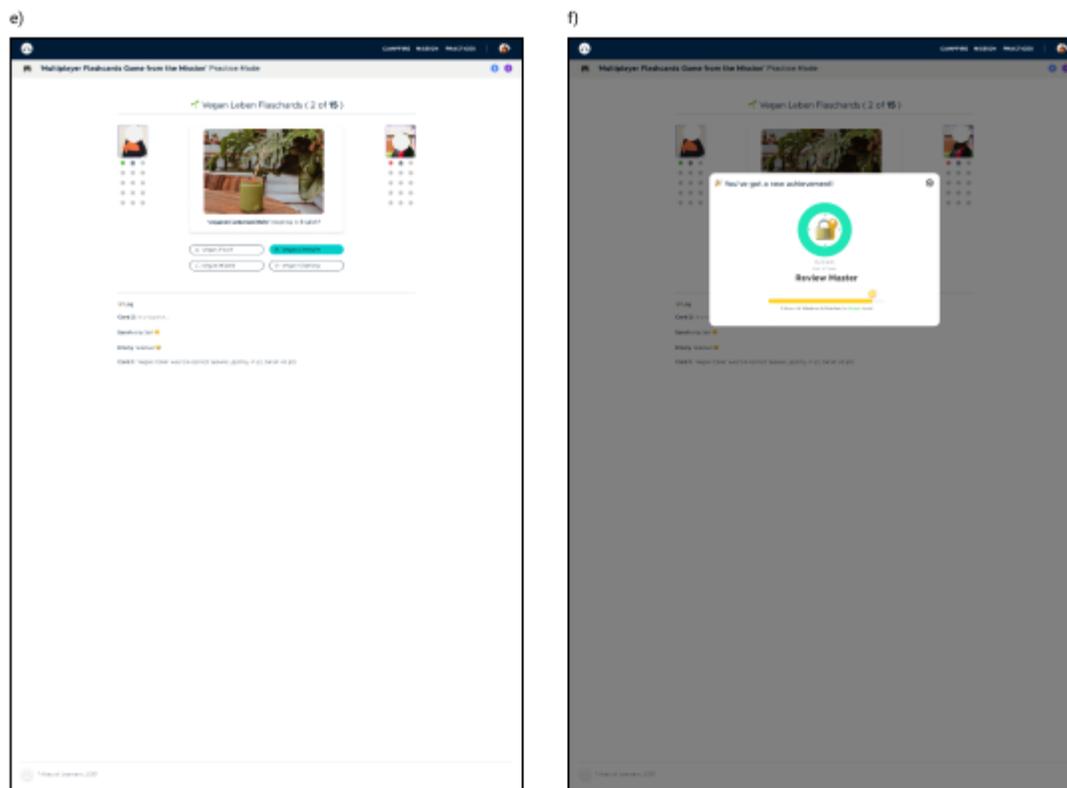


Note. These screens and interactions were part of Emmy's main mission in the online tribe for learning German together with other members.

In the last part of the clickable prototype, the study used screens of playing a flashcard learning game with someone close from the tribe and getting a medal for achievement (see figure 3.4). Those screens were again from Emmy's story where she becomes friends with Sarah from the tribe and starts playing practice games together and then getting a medal for her achievement (see appendix I.I). Here the main focus was the experience and making testers feel like they were the main characters in Emmy's story playing this practice game.

Figure 3.4

Flashcard Practice and Getting a Medal screen from the Clickable Prototype



Note. These are from the final part of Emmy's story where she practices with

Sarah and gets a medal.

In the last part of the clickable prototype, the study used screens of playing a flashcard learning game with someone close from the tribe and getting a medal for achievement (see figure 3.4). After all, these individual screens and states in Figma the study had a clickable prototype which consisted of four main parts to be evaluated through interviews with different questions according to the evaluation criteria. Here is a summary of the steps in the order testers went through.

They are joining a tribe, which is introduced to the testers with the story of Emmy and has parts of both seeing their profile and a tribe campfire page where they can see the primary mission and other tribe members.

They were creating a bilingual wiki with other members, where the tester saw the editing mode of a bilingual wiki page that includes content about the tribe's main common interest in vegan foods. There were different types of interactive content on the page, and testers also saw other members' cursors around the page moving to simulate a co-creation experience. The clickable prototype enabled the simulation to write a new paragraph in two languages and delete it.

Giving feedback to other learners in the tribe, in this part, the prototype could switch to editing mode for the tester; then the testers could give feedback on a pop-up that comes after clicking a part of the text.

Seeing a practice game and getting a medal, in this final part prototype showed a flashcard game with another member, and the tester was able to see a pop-up of getting a medal after clicking on the correct answer.

After all four steps of the experience were in the prototype, the study evaluated it with testers during the interviews.

4. Evaluation

After the prototyping was done, evaluation was necessary to reach the primary research objective, which was to outline designing a digital prototype process and evaluating the prototype to see whether the strategies that the prototype uses helps to enable positive language learning experiences. In order to see if the experiences are being enabled and the people can successfully fulfill the tasks using the prototypes, both are used in the interviews with testers. This chapter is split into two parts and presents this evaluation effort. In the first part, there is an outline of how the evaluations were structured to use different methods simultaneously and point out the guidelines that the interview uses. The second part reports the results of the evaluation results by also analyzing the transcripts of interviews.

4.1 Structure and Planning

In this part of the evaluation chapter, there are explanations on how the interviews with testers are structured. The first part shows the experience design considerations, and the second part shows the usability considerations being added to the interview guidelines. Finally, the third part gives the overall structure of evaluation with all the methods included.

4.1.1 Experience Design Considerations

The main goal of this study is to enable positive learning experiences for language learners. Therefore, since the ideation part (See chapter 3.3) main focus was on the experiences. This study converted the intended experience story, which came from the insights from initial interviews of the capstone project, into a testable prototype. According to Knobel, after the experimental prototype is implemented and tested, the evaluation should analyze how the

participants live the experience by interaction with the system (Knobel, 2013, pg. 135). Further, he states that the interviews aim to gather the experience as lived by the participants in detail to be compared with the intended experience (Knobel, 2013, pg. 136).

Since this study has limited functionality in the prototyping part using a clickable prototype instead of a real-life functional environment, the story behind the screens was explained to the participants during the interviews (see appendix II.II.). They asked to imagine the real-life environment while interacting with the prototype. After those interactions, there were qualitative questions during these semi-structured narrative interviews to understand the participants' experience, similar to interviews that happened before the ideation phase.

Also, at the end of their experiences with the prototype, there was a need questionnaire conducted with the participants, which is introduced by Hassenzahl (2010) and adapted from Sheldon et al. (2001) to understand if the experience happened during the interview fulfills similar psychological needs (see Chapter 2.1) that the study intended during ideation phase (see appendix I.I.).

For example, during the first part of the prototype, a campfire screen shows the first Emmys' profile and then the tribe she is in (see figure 3.2). Before participants were asked to click to proceed and think out loud, they were introduced to Emmy's story by also saying that imagine you are the main character instead of Emmy; this was relatively realistic since all the participants were also remote language learners in college ages like the Emmy from the story. To give a more concrete example, here is an excerpt from the story in the interview guidelines that are being told to participants (see appendix II.II.): *'You were in a classroom having a good learning time with your best friend, then after class went remote. Now you miss the*

memories in the classroom when you attend not engaging online classes. Then you have discovered this place, registered with giving your interests, values... After they interacted with the prototype and finished that part of the experience prototype there were questions to understand the lived experience by the participants like: *'During the testing of this prototype did you experience a unique or meaningful situation or maybe imagined a possible situation that did not happen now but would happen in a real-life context?'*

4.1.2 Usability Considerations

In order to see if participants were able to use the prototype efficiently, usability approach was also included in the evaluation process. While the interviews were recorded both visually and verbally in a remote call setup, there were usability testing questions included in the interview guidelines (see appendix II.II.).

In a usability test, explained by Kruger, the observer shows a page and asks users to clarify what it is or try doing some typical tasks (Kruger, 2006, p.133). Since the study produced a clickable prototype in the design process, this enabled to do both 'Get it is testing (Kruger, 2006, p.144) which is showing a page and understanding if the user gets the purpose, value propositions with organization and function of its elements and the Key task testing (Kruger, 2006, p.144) which is done by asking users to fulfill a task and observing how well are they doing it. As an additional observation method, thinking aloud (Nielsen, 2012) is also asked from the participants, which Nielsen defines as asking participants to use the system while thinking loud, in other words simply verbalizing their thoughts as they move through the interface (Nielsen, 2012).

In sum, the prototype and the interview sessions included parts where users had a page where they could observe what is going on at first glance

while thinking out loud, and they were asked to fulfill some tasks; these usability aspects were recorded and transcribed to later analyze or in other terms do triage as Kruger names it (Kruger, 2006, p.156). Furthermore, Kruger states that triage is simply reviewing the problems participants faced and deciding which ones need to be fixed (Kruger, 2006, p.156). Those problems are reported later in the Results section, and fundamental problems are stated in the discussion section for future iterations of the prototype.

More concrete examples of this setup can be found in the interview guidelines (see appendix II.II.), for example, when participants face the wiki creation part of the prototype. First, they were asked for their first impressions of the page, then they were given a task and observed while being asked to think out loud. Therefore these kinds of parts of the interview had all three aspects of usability testing tools mentioned earlier.

4.1.3 Overall Interview Structure

After having both Experience Design (Hassenzahl, 2010) and Usability Testing (Kruger, 2006), objectives are clear; interviews are conducted in the order of the clickable prototype with different parts having different goals. In order to report those results in a more structured way, related parts of the interview were named as follows, which can also be seen in interview guidelines (see appendix II.II.).

Joining a tribe, interviews started with joining a tribe part. At the same time, participants were introduced to the experience story and asked both their expectations and observations before and after seeing the screens and hearing the story.

Creating a bilingual wiki with others and giving feedback, in the middle parts of the prototype, they fulfilled both tasks of creating a bilingual wiki and giving feedback to other learners in the tribe. At the same time, there were

concrete usability tasks here. It was also for making participants engage with the prototype in a real-life setting; the prototype had multiplayer cursors and changing elements to replicate the multiplayer environment.

A practice flashcard game and getting a medal, then there was the experience of playing a flashcard practice game with other tribe members and getting a medal.

Overall Experience Evaluation, in the end of the interview participants were introduced overall experience evaluation questions and a need questionnaire.

Interviews conducted for this study had five participants referred to as 'Tx' where x is equal to the participants' interview happening chronologically. All five participants were either college students or young professionals just out of university and had learning experiences, especially in the remote environment before; this selection was based on the basis that they can relate to Emmy's story.

The interview setup was a remote call where participants had the clickable prototype open in their browser and had their screen shared with the observer. In order to transcribe and better analyze the actions of testers, both their faces, voices, and interactions with the prototype are recorded within their consent. All of these findings are reported in the following results chapter.

4.2 Results

All interviews are also transcribed with noting down testers' interaction with the prototype on a visual level, and from those transcriptions, results are presented in this chapter in related order. First, this chapter presents all the experience related findings, including need questionnaire results then it represents all the usability findings both in the order of testing, which was

going through the prototype as Emmy's story (see appendix II.I.) and in the end also evaluation of the whole experience (see appendix II.II.).

4.2.1 Experience Design Results

In this section, all the qualitative data from the interviews regarding participants' experience is being presented. Data is categorized in the order of the interviews where at first participants share expectations, then they interact and do missions, and in the end, their overall experiences are evaluated with open-ended questions. Also, there is quantitative data presented from answers to need questionnaires to discuss later if the prototype could fulfill intended needs from the story.

Expectations before interacting with the prototype:

Participants report what they would expect from an online collaborative learning experience before being introduced to the story or all the details of the prototype. Here the main expectation reported from the participants was they would work with another natural person in the system; T5 said: *"Another person would make a difference between an online recorded course and reading a book because of having the active learning thing with someone else."* also in a similar note T1 said: *"Maybe dialog, create a dialog and talk with them about a certain topic."* The secondary expectations reported were around organizational aspects where participants can put their tasks together or no expectations since they said it would feel like a new area for them.

Autonomy and Security through organized tasks with personal goals:

Seeing their profile page and personal values with specific learning goals made participants report positive impressions regarding the connection of reasons to learn and daily activities; T5 reported: *"...why she wants to learn german what is important for her in terms of skills, which is a very cool feature because it is taking to account what we want to improve and why we need to*

improve it" also T2 said: *"It is also nice writing is a separate skill because it is the hardest part not just being judged by the hardest is nice... see how much I spent learning and it makes me wanna spend more..."*. However, some participants also reported this is not so important, and they would also skip doing missions usually.

Relatedness through interacting with others:

Tribe members with mission details on the campfire page created interest in participants. T4 said: *"It is good to see their personal interests also. If I am also interested, we can also have another practice pairing."* but in an exciting detail, T2 said, *"I would prefer if I knew them because it makes me want to interact with them. I think that was what I was missing when I was doing stuff with Duolingo. They wanted me to meet strangers, but I just really... it just does not attract me."* So assuming those are people they know, campfire created a relatedness feeling, T2 further added: *"(looking at profiles at the bottom) oh it is cool that you can learn german but also other stuff like Lena drawing. That is cool. So you know a little bit about who they are concerning german."* Overall, participants felt connected to others in doing the mission and showed interest in other people's skills and goals.

Competence and Stimulation through contributing and practicing:

About contributing to the wiki with others, there were positive reports but also criticism from some participants because they thought if there is no teacher, other learners can affect them negatively in terms of learning something wrong for example, T1 said: *"I would write it down, and my teacher may be, for example, can give feedback."* When it comes to the competence feeling that comes from competing with a friend on the quiz game page, there were positive reports from all participants; interestingly, two of them mentioned Duolingo and said competing with another person instead of a robot created a positive feeling about this T2 said: *"Even it pretends to be a person, still feels*

that it is just a robot" and T5 said *"It is nice because it reminds me of the competition which is missing like in Duolingo"* and they gave similar answers without any prompt, the only question was how they were feeling about the quiz. Also, some participants mentioned that motivation from the game could replace teacher grading me, and one of them said seeing the log of answers was positive in terms of learning opportunities.

Overall evaluation and reported quantitative need results:

Before understanding participants' overall experience with asking open-ended questions about the whole experience, there was a question to detach them from the prototype and listen to what their ideal version of positive learning experiences enabling the platform would be, and this gave the study additional results beside the only ones about the created prototype. For example, T1 said an ideal experience would be a platform where they consume a native language content like a newspaper or a funny short video and try to understand it together with the group, which would lead to understanding naturally spoken language instead of course materials, they also reported that creating a wiki together was not so attractive. T2 said an ideal platform would have more than one mission type to pick either if they want to study with others or do specific missions to work on specific skills alone, for example choosing to study vocabulary and grammar on different days either alone or with the tribe. T3 said they needed more audio and video content. Also, this would allow people with learning disabilities to benefit from such a platform, not like T1, T3 liked the idea of collaborating to create but required more visual and audio cues. T4 had more direct calls with other members and a teacher in their excellent platform idea. At the same time, also T5 said I would like someone professional checking my work and giving feedback, maybe also with some speaking exercises.

When they finished describing their ideal platform, they were asked what

they would include from the prototype presented to their ideal platform. Clearly, people wanted to keep competence elements such as playing a game and seeing progress immediately. Also, they said they would have standard missions and the dashboard from the beginning where they can have an overview of their learning progress and activities.

After that, they are asked a final question to report any feeling of positivity or meaningful situations during the interview while interacting with the actual prototype, and the first critical report was the friends. Tribe members' feature was improving relatedness; T2 gave an example to this feeling: "*... Before starting german courses at university, I did not feel like there were people I could comfortably talk to.*" Also, T3 reported that having a group and all these missions can lead to internal communication, creating relatedness. They said: "*Giving feedback and being more connected, having some insider jokes would be meaningful from my side.* ".

On the other hand, overall positive reports were also heavily coming from autonomy, Security, and competence feelings. T4 said: "*when you focus on learning, you miss the overview sometimes,*" so seeing these individual skills and effort logged in the prototype so visibly was positive for them. In a supporting tone, T5 also said: "*...different things like how much you learned, and it motivates you maybe also a ranking within the tribe or something maybe community ranking or something, and you have the motivation to beat them.*" which pointed out all the related feelings altogether.

At the end of the overview of their experience being asked, they also filled out a need questionnaire, which was always shown in different order to have data quality, and most reported needs fulfilled was in this order: Competence, relatedness, and autonomy.

4.2.2 Usability Results

In this section, usability testing results are presented and pointed with related parts of the prototype to discuss later. According to the interview guidelines, where the main focus was on usability in some parts, this section presents three categories of results: first, creating a bilingual wiki, giving feedback to other learners, and overall usability results.

Creating a bilingual wiki, 4 out of 5 testers did not experience any significant problems while creating a new paragraph in German and English and then deleting it. One tester, T5, misunderstood the functionality as if it was creating the English part as automatic translation instead of using writing the English sentence for learning. Also, another minor problem reported in this flow of tasks was that one of the participants did not understand that deleting something comes after clicking the quick action button and suggested instead they can see a trash icon directly on clicking a block. Overall, elements in the page were understood when participants described what they see or think out loud. T2 said they wished they could hide the translations since it discourages them from reading the German parts.

Giving feedback to other learners, overall, this task was also completed by 4 out of 5 users without any significant problems. One tester reported very similar to the existing tools they use with different aspects to do this in real life easily. T1 was confused about whom the feedback was coming from; this was also a bit of a clickable prototype problem since it was out of the flow to see the earlier feedback' creator. Also, the numbers in the bubbles of feedback points indicated the order of feedback chronologically, and the color of the numbers indicated who started that feedback chain; this was only noticed by one of the participants, so if this becomes an important functionality it can be improved in terms of findability.

Overall usability, besides giving tasks to users, they were asked to think out loud and tell what they see on other screens as well where the main focus

was on experience; these hybrid approaches to questions also gave qualitative usability data to present for the overall concept as well.

First of all, the profile screen testers seemed to get what is going on quickly, 5 out of 5. They did easily notice parts like their interests, why they are learning the language in the profile, and reported positive feelings about but 2 out of 5 testers did not get that progress bars which was communicating in the design how much they want to improve each skill for a language (speaking, writing, etc.) but instead they understood it as a progress of learning. This seems like a significant usability issue to be fixed.

The Campfire screen created different effects on testers; while some found it clean and organized, some reported it was too crowded and could not see it as a whole but just pieces. Since this page was designed with experience in mind to communicate content from Emmy's story, it probably needs a rework to fix usability issues. For example, people seem to get the tribe goals and over what is going on on the screen, but T5 reported that: "I don't understand if this is an activity they come up with or visit given by the platform they choose" talking about the primary mission. Hence, the page was unclear if it was automatically created or edited as a tribe together. Also, like in the profile page, progress bars are misunderstood as to their skill levels for the language instead of what they want to improve; this was clear in the UX copy, but testers just directly understood the progress bar as a level, so this problem was also visible here. About the tribe member profiles at the bottom, some testers said it was a bit irrelevant information, but some of them liked it; T5 said: "At the same time it is also nice to know their interests. If I am interested, we can also have another practice pairing where we mention all this stuff.". Overall all the testers understood the actual content on the page about the mission and where they can navigate for the next task. For example, T2 reported a positive understanding of the page by saying: "...It was on purpose they were

separate, so it was really easy to look at. Really easy for my brain to decide what was important for me at the time and what wasn't so I don't have to look at all the pages all at once. "

Besides the tasks that have been reported in the wiki pages, the overall page design and content in the pages seemed clear while users explained what they understood from pages. T5 said: "I understood the quick action button easily, so it is the same page with different modes, one edit, here you can edit feedback but cannot edit and in view, you see real-life version and cannot edit or feedback." so the overall function of the page for switching modes was clear to all testers. Also, the content in the page was explicit; T5 said: "This is a wiki page about veganism which seems to be the interest all of this tribe has in common." while also, for example, T3 said: This is like a bilingual wiki page. The first sentence in the German English one, and same for this one, you are practicing in this way, we can I think we are four persons working on this page, we can give feedback comments, and we can add new paragraph new sentence also same practice there are replied there is a text here it is clear. ". They also seemed to understand they could create quizzes and grammar excerpts at the bottom of the page altogether.

After the testers were done on the wiki page, they saw a notification to join a flashcard game with Sarah. This created positive reactions and seemed clear to 5 out of 5, T1 for example, said: "Okay, maybe she wants to work for the vocabulary, I guess, Accept." and T5 said: "If I accept if it is going to a different page with a flashcard game." so also the navigation was clear as an expectation. In the flashcard game, the question, dots giving the correct guesses of each user and logs at the bottom all of them were clear for example, T4 said: "...circles says okay enemy was correct we are on two we are on the second one and yeah." while T5 said: "We are two people it is like in a game kind of, if it is a game if we are playing against or together. I think it

is against each other. ". Then testers saw a screen where they got an achievement after the correct answer and their overall learner level; this also seemed clear. T3 said: "it is kind of gamified you can unlock achievements, I am a review master for two more hours of the mission, and you can reach green level." explaining all the elements in the pop-up at once.

5. Discussion and Limitations

5.1 Discussion

During this study, a strategy discovered in the initial capstone project turned into a prototype and was evaluated with testers using both Experience Design (Hassenzahl, 2010), and Usability Testing (Kruger, 2006) approaches. This evaluation aimed to see if the prototype can enable those positive experiences and if it was usable. This section discusses the results from earlier chapters with initial goals and reports possible future iterations with stating the current limitations.

Experiences enabled during the use of high-fidelity clickable prototypes made participants understand the initial story behind the product and almost made them live it in a natural life setting. Overall results of this study indicate that using this particular design approach, it is possible to use strategies discovered from people's real-life experiences or reports from other study fields and turn them into a product that enables similar experiences. More specifically, the prototype was successful in terms of creating feelings of autonomy by organizing the work according to the personal values of learners and creating competent feeling by letting them make contributions in purposefully perceived missions or playing games with other members however it seems like creating a relatedness feeling is not that easy since

some testers reported that they would either feel it with someone they already know or someone they can become closer over a long period during missions. Still, there were obvious positive feelings reported in interacting with other humans that were way better than just being with a recorded video or playing games with a random app's robot. Another noticeable thing noticed was that there was a consensus around seeing their progress immediately and having records of efforts give increasing motivation feelings to all participants.

Usability-wise, the prototype did not have any significant problems that made the primary purposes of screens out of order. However, in the details, there were significant problems noticed that must be fixed on further iterations; for example, using progress bars for what users want to improve did not work; people usually skip the text and assume this is their current level. It was also noticed that while some users had no problems at all using the block style editing in wiki pages or giving feedback by switching modes, a few of them had difficulty at first understanding it. This seems like not a significant problem, but rather a few of the participants were demographically far away from the new widely adapted collaborative tools. Other details can be fixed in future iterations, such as feedback bubbles indicating each user's color or feedback's chronological order. Also, on a different side, A/B testing can be applied to test different flows for deleting or moving blocks since some testers reported difficulty finding them in the interface.

5.2 Limitations

This study also had some limitations; first of all, due to the current Covid-19 situation, all tests are being conducted remotely, and it may affect the understanding of people's experiences. In an ideal setup, testers can use such a prototype in a real-life setting to simulate other members of the tribe through role-play-like methods or a more functional prototype can be developed with a

team of engineers to make the prototype more in-situ. Another limitation in terms of tester group and different goals of Experience Design (Hassenzahl, 2010) and Usability Testing (Kruger, 2006) approaches. While for usability testing, the participant number of five seemed enough to iterate the prototype for one next level for a better experience evaluating instead groups of people, let us assume in three, can use the tribe prototype together, and evaluations can be gathered separately with groups and then be compared. Even though this is not a must, it seems like it can provide richer results looking at similar studies in the field.

5.3 Future Work

Future research in the field can also use different strategies to enable these positive language learning experiences; for example, in order to focus on a single prototype, the surprise factor was not fully integrated into the current study. However, a different approach can test missions focused on real-life adventures instead of collective experiences. Also, in the current direction, a new prototype can focus on not just collective missions but can test different single missions or can include teachers in the feedback loops since these were reported as missing elements by participants, some required a knowledgeable third party in the missions, and some wanted to be able to do single-player missions. As a final note, separating the usability evaluation and technical implementation of a prototype can be considered in later stages of the actual product creation life cycle to gather more focused results in usability.

6. Conclusion

The experience design approach shows positive results in understanding opportunities in a field that can fulfill people's needs through the design of products. This study had the aim of outlining the design of a digital prototype that uses a specific strategy to enable positive experiences for language learners and evaluate whether the prototype was reaching this aim and also if it was usable by participants

In this study, an initial strategy discovered in the initial capstone project turned into an experience story to be enabled by a digital prototype; this process was outlined through section three. Later in the evaluation part, which was in section four, the first related considerations in terms of experience and usability were detected. Then they are evaluated with real-life testers, and results are reported. In the discussion section, which was number 5.1, those results are discussed and compared with the initial aim of the study to see whether the prototype reached the goal of enabling a positive experience. Also, in the discussion part, limitations of this study reported with iteration ideas for the prototype and suggestions for future research.

This study showed that using the experience design approach, it was possible to design a product that can enable positive experiences for language learners and evaluate its effectiveness using the usability approach. Qualitative reports in the evaluation showed that such a product could fulfill needs and create positive feelings for its users. However, future research in the field can discover different strategies to enable such positive experiences and improve the implementation of prototypes to conduct tests more effectively. Also, the usability approach has enabled us to detect future

improvements for the prototype at hand. However, again, future research can also consider more focused usability studies separated from the experience evaluation.

Overall it was evident in this study that with the focus on people's experiences, there are opportunities in this field to enable more positive situations through technology usage. It seems valuable to discover more strategies for learners, especially in current remote digital environments where more psychological needs are being created with the lack of real-life human interaction and test the designed prototypes as close to natural experiences as possible with potential user groups.

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II. Appendices

II.I. Experience Story

Emmy's Online Tribe Finding and Language Learning Experience

Emmy is a high school student in Ohio taking German classes because she plans to study in Germany after high school. She used to enjoy and benefit a lot from practicing collectively in class and with her friends before. However, recently she does not talk to one of her best friends in the class, and therefore she hesitates to engage with others. (need for the experience)

She enjoys typically using the target language and getting corrective feedback from a close friend. She got that idea from Netflix's culture book, which she listened to on Audible. She learned the trick there that negative feedback when it comes to a constructive purpose improves one's performance. Since then, she tries to apply this principle with her close friend in the class. (Inspiration)

Now that they do not talk anymore and Emmy misses this honest feedback

that she cannot get from others, also Emmy finds familiar language exchange places, so generic and dull. She feels like she cannot relate to others there, and just getting feedback on her texts from other learners does not create any excitement or motivate her to push through. She misses the practice with her friend.

However, recently she discovered this place where people get together and form tribes and go on 'learning' journeys together (relatedness, group belonging, and security). While registering there, she entered all of her personal goals and why she wants to learn German (linking personal values – motivation) in her profile. Besides that, she pointed out exciting areas to find like-minded people.

Then magically, she got matched (surprise element) with similar people with whom she can eventually become friends. They had similar interests and became similar in the target language as a goal with similar reasons. At the first challenge of the journey, they picked up collaboratively creating wiki pages (collaborative practice) which later would contribute to existing wiki projects at some point.

They let everyone in the group contribute to the creation in the way they like; some did translations, some recorded audios, some created pictures (everyone participated in their way.) Also, they had the chance of a public discussion page like a real wiki where they could give feedback to work being created to improve the work and learn from each other.

While contributing to create those pages, Emmy discovered much valuable content in Germany, which can also support her design career when she moves there in the future. She started translating those exciting articles and taking notes of language learning pieces which she can practice later and also if she wants, share publicly attached to the created page. When she gets stuck or curious about if there is a better way to form a sentence in German, in that

kind of situation, she could leave comments open to others so they can fill in what she missed and give the feedback she wanted at the beginning (a concept idea?). During group calls, she also becomes close friends with Sarah, another participant; now Emmy thinks that she is like her close friend from the classroom. They started talking outside of group challenges and just practicing with each other. Also, they did practice sessions like guessing flashcards and watching a study with me video together (Relatedness).

Finally, depending on the types of challenges, they all got little badges from those challenges which they can look at and remember the journey. These are also like achievements which would make them feel competent.

II.II. Interview Guidelines

Introduction - 5 Minutes

- Thank you for your participation.
- Introducing yourself briefly with the context of the project.
- Making them in a friendly setting, making us remember our first interview and memory activation.
- There is no wrong or right answer, there will be a concept tested by you and here we are testing the concept not you, feel free to think out loud, ask any questions, and make suggestions. I will be explaining also on the go.
- Declaration: If it's ok I want to start and also record to interview for transcribing later for the thesis.

Joining a Tribe (10 Minutes)

<p>[Screens: 1.0 , 2.0]</p> <p>Story:</p> <p><i>You were in a classroom having a good learning time with your best friend, then after class went remote. Now you miss the memories in the classroom when you attend not engaging online classes. Then you've discovered this place,</i></p>	<p>The question, after they finish the task of going through two pages and thinking out loud about what they see:</p> <ul style="list-style-type: none"> ● Imagine you are joining a tribe now really, what kind of things would you expect from it? <ul style="list-style-type: none"> ○ Why would you join such a group?
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<p><i>registered with giving your interests, values, personal goals of why you want to learn the thing and also interesting missions that you would like to do with others. Imagine this is your profile now and then you will go to your tribe's campfire...</i></p> <p>Task: <i>Analyze the profile page, go to the campfire, and then analyze the Campfire of the tribe page.</i></p> <p><i>Please think aloud on each step and feel free to ask questions and make suggestions on things you don't feel right or don't understand as the user.</i></p>	<ul style="list-style-type: none"> ○ What would you like to practice? ○ Do you think you would have value from such a thing in your learning journey? ○ How would it work in your imagination?
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Creating Bilingual Wiki with Others (5 minutes)

<p>[Screens: 3.0 to 3.6]</p> <p>Task:</p> <ul style="list-style-type: none"> -Please add a new Paragraph in the first part of the page where you already do an edit now, -Type in German 'Coole menschen sind vegan!!' -Type in English 'Cool people are vegan!' -Click on 'Quick Actions' -Delete the block you just created. -Then there will be questions before moving on to the next task. <p><i>Please think aloud on each step and feel free to ask questions and make suggestions on things you don't feel right or don't understand as the user.</i></p>	<p>Questions:</p> <ul style="list-style-type: none"> ● What are your first impressions of editing a collective wiki to learn together? Do they know how to start? <ul style="list-style-type: none"> ○ What went well in the task? ○ Where did they stumble? ○ What was confusing/misunderstood ? ○ Do they understand that all the edits are directly saved by the system?
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Giving Feedback to Other Learners in the Tribe (5 minutes)

<p>[Screens: 4.0 to 4.4]</p> <p>Task: <i>Please switch to the Feedback mode, - See where does 'Max' makes an edit now, - Click on him to give feedback, - Click on typing area to write down quick feedback, -Send your feedback Then please tell us what do you think will happen for Max?</i></p> <p><i>Please think aloud on each step and feel free to ask questions and make suggestions on things you don't feel right or don't understand as the user.</i></p>	<p>Questions:</p> <ul style="list-style-type: none"> ● What are your first impressions of giving feedback to other tribe member's creations? <ul style="list-style-type: none"> ○ What went well in the task? ○ Where did they stumble? ○ What was confusing/misunderstood ? ○ Do they understand that all the edits are directly saved by the system?
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Seeing an Example Practice Game & Getting a Medal (5 Minutes)

<p>[Screens: 5.0 to 5.2]</p> <p>Task: <i>Please Accept Sarah's offer to practice a flashcard game, Choose the correct answer to the flashcard question, have a look at your achievement, and please think loudly during the process.</i></p>	<p>Questions:</p> <ul style="list-style-type: none"> ● How did you feel about practicing the things from the collective page in the 1:1 game with Sarah from your tribe? <ul style="list-style-type: none"> ○ Why did you feel that way? ○ What else would you like to practice with a person you feel friendly with from your larger tribe?
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Overall Experience Evaluation (15 Minutes)

<p>Story: <i>Tester imagines the overall experience being adopted to their values, goals, and current problems, then asking questions.</i></p>	<p>Questions Afterwards:</p> <ul style="list-style-type: none">● Let's imagine you have all the resources and money to build your ideal collaborative language learning tool, how would it look? Describe me.<ul style="list-style-type: none">○ Then let's get back to what we tested now, which parts of you would put in your ideal tool and which parts you won't?● During the testing of this prototype did you experience a unique or meaningful situation or maybe imagined a possible situation that didn't happen now but would happen in a real-life context?<ul style="list-style-type: none">○ Can you describe it in more detail?○ Can you share your thoughts and feelings? <p>+Conduct a need questionnaire for the positive moment they recall in the experience.</p>
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