Culture Locator
A Concept To Support Tandem Language Learning In New Digital Realities

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ABSTRACT
Learning languages in the form of a tandem program offers learners numerous advantages over individual learning. In order to develop a concept that supports the cooperative work of tandem partners, a qualitative study was conducted using the Design Case Study as a framework for research. The results show the positive impact of cultural exchange and the importance of hearing in language learning. As a result, a concept was developed that promotes cultural exchange and also focuses on hearing. Thus, this paper offers the idea of a technology that assists language learning by listening to the target language from native speakers during a treasure hunt game. Above all, the focus is on cooperation, as riddles have to be solved together by the tandem team.

CCS CONCEPTS
• Human-centered computing • Collaborative and social computing • Collaborative and social computing systems and tools

KEYWORDS
CSCW, Cooperation, Language learning, Tandem, Audio bubble, New Digital Realities, Culture Exchange

1 Introduction
Language is considered one of the pillars of communication. Humans have been always aiming to consolidate a shared language in order to expand benevolence and create a closer culture [19]. However, there are more than 6,500 spoken languages in the world [2].

Tandem Partner Programs support two native speakers to exchange knowledge about different languages [17]. It is considered an efficient technique that supports learning languages due to its many advantages. Tandem learning gives both learners a comfortable atmosphere to speak and correct each other’s language. Also, it supports intercultural communication. As well as, it has always been known to be a cheap way of learning [17].

The current form of tandem partner programs has some challenges that were explored through interviews with tandem partners. For instance, the imbalanced benefits between the tandems. Interviews have confirmed that one partner has benefited more than the other. Likewise, the existence of native language in the surrounding environment empowers this result. This paper discusses a new possibility to support tandem partner programs using new digital realities.

Photos, videos, movies, music and voice records are media that tandem partners are currently using to exchange language learning. Audio Bubble is the technology that will be introduced in this research paper as a focus in the field of new digital reality.

Our technology assists language learning by hearing the targeted language from native speakers in their everyday life through a treasure hunt game. This process will also aid learning the culture of the targeted language.

The concept of Culture Locator targets collocated tandem partners. On one hand, one of the partners will be learning the language of the present native surrounding. On the other hand, the second partner will learn the language of an absent environment. The audio broadcast in each audio bubble station of the treasure hunt (details in Chapter 3 Concept) will include hints in the language of the absent environment. An effective cooperation between partners is needed in order to understand the hints and discover the next station. For example, the target languages of the tandem partners are German, and Arabic and they are in Germany. The
audio in the station is in Arabic will lead to some places in Germany.

Audio bubbles were chosen as a new digital reality because of the following reasons: First, the high importance of hearing for language learning. Second, the Culture Locator, which is the name of the user’s gadget, gives the opportunity to experience a foreign culture in real life. Moreover, it leaves the tandem curious to further investigate the visuals from the audio place. Lastly, the audio bubble supports direct human to human interaction using digital realities instead of separating them.

2 Background and Related Work
2.1 Tandem Principle
As mentioned in the introduction Tandem is a method and a way of learning languages based on two people working together in a pair. Each person has a different mother tongue. There are no additional teachers, predetermined goals or rules. The aim of the cooperation is to learn or improve the target language, which means the mother tongue of the other tandem partner. Further goals and driving forces are the personal and cultural exchange as well as the exchange of knowledge and experiences. Tandem is based on the three core principles of reciprocity, responsibility and autonomy [16].

Reciprocally, since the learners depend on the respective support of the tandem partner: The success of learning is based on mutual support. The partners are experts in their own mother tongue but are still learning the target language. Therefore, both are responsible for their own learning, but also for the learning of the other. Both partners strive for the same contribution of energy and effort to the exchange in order to support the other in his/her learning process. In the learning process itself, each learner has to recognize for him or herself what he or she wants to learn and actively shape tandem learning accordingly.

The principles of tandem learning show that tandem learning itself is based on cooperation. In addition to a common goal, this requires a division of labour [13]. The common goal of the tandem is to improve language skills. As described, the division of labour lies in the support of the partner and the responsibility for one’s own learning.

2.2 Importance of Tandem in Language Learning
The University of Bochum explains in more detail on its website that tandem learning is very important in language learning and has great potential. It is explained that a great advantage of tandem learning is to avoid a classical classroom atmosphere. Tandem is rather a one-to-one lesson with a personal learning partner who speaks the target language fluently. This leads to a significantly higher level of interaction and an improvement in oral expression. The tandem partners determine the topics of communication. In this way, topics can be discussed that are relevant for the partners and lead to interest and motivation. Since both partners are learners, the fear of making mistakes also decreases, which in turn leads to more free and open communication. Not only language skills are strengthened, but also intercultural competence [20].

Despite the many advantages of tandem learning, there is the risk that participants may not be able to participate in the program continuously. There are many possibilities but there are hardly any rules or guidelines that the partners could follow. Especially for first-time participants, it can be difficult to coordinate themselves and to know how to support the partner in learning a language. This requires knowledge and skills that may not be available at the beginning of the program. The concept presented in this paper offers the chance to subtly accompany and guide the learners in their process.

2.3 Importance of Hearing in Language Learning
The basic factor that makes these advantages possible in the first place is that the target language can be heard unlimitedly, spoken by a native speaker. Hearing is of primary importance for learning a language and a fundamental requirement for language acquisition [9]. This is also explained by A. Klinglmair, who herself refers to L. Barker. He measures the proportion of hearing in everyday language use at 42% and thus places it above speaking (32%), reading (15%) and writing (11%) [1]. Hearing a language helps to internalize typical elements such as its sound, emphasis or rhythm. “Listening helps the language learner to understand the beauty of the language”[7]. This shows the importance of listening in language acquisition and explains why the focus of this work is placed on experiencing through listening. At the same time, Klinglmair further explains that cultural background knowledge is another essential aspect in understanding a language. She refers to G. Solmecke, who sees a lack of knowledge about a culture, for example the way in which it deals with non-verbal gestures, conventions or simply existing contexts, as the cause of incomprehension or misunderstanding [6].

2.4 Culture Language and Gaming
This opinion is also shared by Kramsch, who calls culture and language a “single universe or domain of experience” [14]. Culture and language are thus closely interwoven. In order to learn a language, culture must also be included. In favor for experiencing a culture directly and personally, it must be experienced in real life. This means that one must actively participate in cultural life in order to generate a genuine and authentic picture of that culture. Therefore, the concept of this work is based on visiting places in a city where cultural life takes place through the playful method of a treasure hunt. This principle of treasure hunting has already been implemented in applications for mobile devices. Two examples are the games Geocaching by Groundspeak [10] and Pokémon Go by Niantic [23].

In Geocaching, the players find themselves in a treasure hunt and have the possibility to find physical objects in the real, not virtual, world. These were hidden by other players. The game is based on
The game Pokémon Go was developed by Niantic in 2016 and uses augmented reality technology. The so-called Pokémons are linked to real-life locations via GPS markers and can be discovered on a visual map. The aim of the game is to catch as many Pokémons as possible. This is done by the player in the real world going to the location specified by the GPS marker of the Pokémons. Once the location is reached, the Pokémon is optically integrated into the real environment with the help of the camera and is visible on the screen of the game device. By throwing Pokémon balls, the Pokémon can be captured [18].

Although in both games’ players move through the real world with the help of GPS, there is a difference in what can be found at the given mark. While Geocaching involves real objects, Pokémon Go is based on purely virtual objects, meaning Pokémons. What both games have in common is that the users of the game actively move through the real world.

On the one hand, this way of playing offers new possibilities compared to traditional computer games. In addition to the virtual world, also the real world is explored. At the same time, the games mentioned above lack a number of aspects and functions and open up problems. Both games build up a strong interaction between the user and their game device (smartphone). The interpersonal interaction is missing, because the players are mainly occupied with the game device view. Since in the case of Pokémon Go the objects to be found are virtual Pokémon, the game takes place more on the game device than in the real world. Although players move through the real world, they take little notice of it. So not only the interpersonal but also the interaction with the real world is missing in these games.

Furthermore, both games lack an acoustic world. As described, listening to a language is an important aspect of language learning. The focus of the two applications presented is on physical or virtual objects. The games are supported by, but not based on, audio elements which limits them to a visual experience.

In addition, the use of mobile gadgets such as the smartphone can be seen critically. The advantage of them is their availability. A disadvantage on the other hand is the distraction by the game gadget itself. It not only represents the game gadget, but also the connection to social contacts. In the case of language learning, this can lead to unwanted distractions such as incoming calls or messages.

Another feature of the presented games is that they can be played alone. This does not fit to the principle of tandem language learning, as it is based on cooperation as described above. This similarly leads to a loss of interaction between humans.

It can be stated that the presented work has similar technical features (use of GPS) to existing applications. However, these applications show several gaps and issues, which are addressed with the presented work.

### 2.5 Current Technologies

In order to integrate acoustic worlds into the real world, new technologies are needed. The main difficulty here is to generate individual acoustic areas that can only be heard within a certain radius.

A pioneering technology to be mentioned here is the Personal Sound Zones technology of the Fraunhofer Institute for Digital Media Technology (IDMT). It acoustically divides any room into several listening zones. In each zone there is an individual sound reproduction, without sounds from surrounding listening zones being able to enter. The technology is based on an array of miniature loudspeakers with which sound is only projected into certain listening zones. At the same time, quiet zones can be created in which hardly any noise is emitted. This means that sound can be consumed individually without wearing headphones. According to the institute’s internet presence, possible areas of application include public transport systems, for example trains or airplanes. But the technology could also be interesting for museums or trade fairs [8].

A similar technology is the Personal Sound Bubble technology from Silentium. It also uses mini loudspeakers to divide rooms into noise zones [21].

What both technologies have in common is that they are permanently installed technologies that generate noise zones through several loudspeakers. The disadvantage of this is that they are tied to a room or a fixed place. Thus, the currently available technologies are not flexibly applicable, which offers the possibility for new concepts in this area.

### 2.6 Development of Audio Technologies

As already mentioned, hearing and thus sound plays an important role in language learning. But hearing also provides vital functions for people. Not only does it help to intuitively evaluate rooms and their sizes, hearing is also active during sleep, while other sensory organs such as the eyes are inactive [3].

Despite these possibilities and variety of hearing and thus also the possibilities of sound, it is used only rarely as a design element, especially in the field of design.

*Yet, in design disciplines, sound has been a neglected medium, with designers rarely aware of the extend to which sound can change the overall user experience.* [15]
This observation was already made in 1992 by Schmandt and Hindus, who describe sound as a "forgotten technology in CSCW" [6].

In dealing with artefacts, the medium sound is primarily used as a functional, iconic element, for example to support and accompany screen-based applications. An example of this is the sound of paper being crumpled up when files are moved to the trash. For this reason, Franić et. al. describe the everyday encounter with sound as “limited” [15]. They see more possibilities in the medium of sound and describe it “as an active medium that can enable novel phenomenological and social experiences with and through interactive technology” [15].

This opinion is also shared by Volker and Milton, who see the use of sound as an opportunity to stand out in the visual world. They see sound as a powerful opportunity to create exceptional experiences that differ from the daily visual distractions. Furthermore, they name the human being a listener whose relationship to the sound is an ancient one [4].

These statements show and confirm that, compared to visual stimuli, audio has so far been used little in the design and development of new technologies. Therefore, we see a gap here, which we address in this paper. This work combines the importance of listening and cooperation in language learning with a new concept in technology to form a new digital reality in form of an audio reality.

3 Methodology

The concept has been developed using the basic approach of the Design Case Study. This provides a clear guideline and focuses on existing social practices, which in this case play an important role in supporting cooperative processes. The relationship between particular instances of social practices and the design space for the IT artefacts is important to be understood. For the design of the IT artefacts is substantive to consider the given social practices and the design space for the supporting cooperative processes. The relationship between existing social practices, which in this case play an important role in tandem learning. It was also a great opportunity to see the possibilities which can be improved by supporting the cooperative process with new digital realities.

In order to improve and deepen the first ideas which had arisen from the results of the pre-study, a design workshop was held during the design phase. The aim of the workshop was to elaborate the initial existing ideas and explore new possibilities offered by the participants. Two basic techniques were used in the design workshop: Brainstorming and the 6-3-5 method.

Brainstorming aims to create an open atmosphere for the participants to express their ideas [22]. For this reason, a brainstorming session was held in the design workshop. This way the participants could express themselves without filtering and simply say what came to their mind to generate a large number of innovative ideas.

The 6-3-5 method is a brainwriting technique whose purpose is to enable an exchange of ideas between the participants in order to obtain new ideas or possible combinations for an idea. Six persons each write three ideas, which are further developed by the five other persons [12]. This method was deliberately used, on the one hand, to quickly receive a large number of highly developed ideas or suggestions and, on the other hand, so that each participant could deal with the ideas of the others undisturbed and uninfluenced, so that the most varied views and approaches could be incorporated.

To recruit the participants for the interviews and the design workshop, the target group was defined as former and current participants of the tandem learning program. Since this program is offered at the university, the convenient sampling strategy was used to recruit participants for the interviews and the design workshop.
4 Concept

The concept includes a cooperation process that combines two important points: supporting the culture exchange and hearing a foreign language. In this way, the foreign culture is brought closer to the learners by suitable audio sequences as part of a joint treasure hunt through the city. At the same time, the participants can benefit from listening to the foreign language.

Each station of the treasure hunt is equipped with a new digital reality in the form of an audio bubble. The tandem couple gets a gadget which is called Culture Locator that supports and manages their treasure hunt.

The bubble shields the current ambient sounds and the learners actually hear the ambient sounds of a corresponding place of the other culture. This is triggered by pressing the gadget, which then builds the audio bubble that surrounds the learners.

If, for example, they are in a marketplace in Germany and the partner comes from Palestine, the sound of a Palestinian market can be heard in the audio bubble, including the conversations there.

However, this is only possible if the tandems are in the right place, which is detected by the Culture Locator-gadget via GPS. When the correct location is reached, the gadget signals by vibration that the audio bubble can now be started.

The sound content contains hidden hints to the next station, which result from the conversations in the foreign language. Both partners and their knowledge are needed to track down these clues. In the above example, one partner speaks the language heard in the audio bubble, here Arabic, and the other often knows the current area better, so together they can track the clues and hints that lead to the next station. If both combine their knowledge, they can solve the riddle of the current treasure hunt station. An example to illustrate this: The station takes place on a market and in the audio bubble a customer is offered a fish while the vendor is speaking Arabic. In addition, a boy asks his mother if she has some water for him, because he is thirsty. The Arabic-speaking partner recognizes the words and if the partner does not know these words yet, he/she must either translate them or explain them. Both languages can then be practiced and used. The German-speaking partner then notices that the combination of fish and water could match to a river. So, the next station could possibly be at the river that flows through the city.

By pressing the gadget again, the audio bubble disappears, and the actual current ambient sounds are audible again.

5 Design and Development

Semi-structured interviews initially served as the basis for the design process. In order to evaluate the interviews and produce meaning across the data set, a thematic analysis was carried out. Also, a design workshop was held to generate different ideas with the participants. Subsequently, a concept was developed which was visualized in a video prototype.

Interviews and Thematic Analysis

The interviews were conducted with five participants. Of these, four were participants of a language tandem program and one participant is part of the organizational team of that tandem program. It was important to gain a general insight into the tandem program and to get a deeper understanding of the practices. Also, strengths, weaknesses, as well as, suggestions for improvement should be identified. Through the interviews, a wide range of insights have been gained, and many parallels between the individual participants became apparent.

Of the four participants in the tandem program, three learn Arabic and one French. At the beginning of the tandem program, each was assigned to one person who speaks the language they were learning. The further the tandem program consisted of self-organized meetings during the semester, in which the participants should deal with both languages. They were free to choose what they did in their meetings, for example helping each other with grammar questions, practicing the pronunciation or exchanging ideas about current topics or differences in their home countries. Some participants pointed out that a relaxed atmosphere was important to them in the meetings and that they therefore liked to meet for coffee or a meal together. The participants were also given the opportunity to participate in organized movie nights in which films are shown in different languages with subtitles.

From the interviews it emerged that the cultural exchange in the tandem program was seen as one of the most valuable experiences, an interviewee said about the culture exchange:
The participants said that culture and language belong together for them, as one participant explained:

"I think that was the best part for me about the project, because I learned a lot about the culture."

The participants were also asked to what extent they used technologies in their meetings or outside of them. These included digital translators and sending voice messages so that correct pronunciation could be practiced. Also, the participants sent each other some videos or audios, which could be interesting for the other one. One participant reported that he had analyzed lyrics with his partner and had written out words he did not know.

As negative points, it was listed that more support could be helpful in the organization of the meetings, but generally the participants reported very positively about the tandem program and clearly emphasized the added value in the cooperation of learning and exchange.

In the thematic analysis different codes were generated, which helped to identify any broad topics and issues which then led to the following themes:

1. **The support of native surrounding in language learning**: This theme deals with the impact of being surrounded by the native environment -the country where the language is spoken. This enforces an easier access by hearing the language constantly. The language learners are confronted with situations that you cannot escape from and that force you to use language. Questions may arise that you would not have had in mind before. This was mentioned by all participants. One interviewee explained:

   "I think it was definitely easier to learn the language in the country [...] because you had so much access. People were talking all day. You had situations that were challenging, you were forced to talk in this language you couldn’t switch to German whenever you want. So, it was easier to learn when you hear it."

2. **Having fun/experiences together**: Having fun together was also an important part of the tandem program. Friendships were developed and it became clear, that discovering things together with your tandem partner makes more fun than experience things alone. Also, it was mentioned that learning together with another human has benefits compared to learning only with a technology as one interviewee mentioned:

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3. **Ways to learn a language**: This theme covers the ways and techniques participants use to learn languages. The participants used translators, dictionaries, voice messages, music and movies to support the learning.

4. **Challenges of learning a language**: In the interviews also challenges were discovered that make learning and using a language difficult. Some participants mentioned the fear of making errors, the switching back to a language they know, the different dialects of a language, which makes the understanding more difficult. It became also clear that for some participants it is difficult in the beginning, since they are not familiar with the other tandem partner yet. Thus, finding conversation topics can be problematic.

5. **Reasons to learn a language**: In the interviews it was also discovered which individual reasons the participants had to learn a language. Some participants had a personal connection to the language because a parent originally comes from a country where that language is spoken. Others were just interested in the language but mentioned the culture also as an important factor.

6. **Diversity interests**: This theme focuses on the exchange and the comparison of the different cultures and personal experiences. Many participants said this exchange was very interesting and important for them, so they exchange pictures and stories. One interviewee mentioned:

   "I wanted to know more about his culture and especially about the political situation."

7. **Imbalanced benefits between language partners**: Interesting was also the frequent comment of the imbalanced benefits between language partners which this theme is about. The benefit imbalance was not necessarily considered negative. It was especially noted that the person learning German in Germany benefits more from the Tandem Program due to the surrounding German environment. It was revealed that the cultural exchange of the second, more distant country is receding into the background, although this is one of the main reasons for participating in the tandem learning program.

**Design Workshop**

Based on the knowledge gained in the pre-study phase, initial concept ideas of a treasure hunt game and a moderation gadget for the meetings were developed. In the course of a design workshop, ideas were discussed, and new ideas created together with the participants. Therefore, a three-hour design workshop was organized with three participants, with whom the interviews have already been conducted. At first the participants were brought up to date on the current status of the project and the aim of the workshop was explained. Digital realities were also discussed in order to navigate through the wide range of possibilities that can be later considered in the participants ideas.
In the next step, positive and negative experiences in connection with the tandem program were collected in individual work and then clustered together. Thus, the participants could be guided back into the topic and an introduction to the design workshop could be created. Here the participants mentioned as a negative aspect that it is often difficult to find time for meetings. Many positive points were mentioned, especially the cultural exchange, getting to know new people and linking theory and practice were mentioned. It was also said that it is very helpful to have a native speaker as a learning partner who is available to answer questions when learning a language.

In a large brainstorming session two topics were discussed with the participants: Culture Exchange and Challenges While Meeting. At that stage, ideas, problems, possibilities and experiences of the participants were collected in group work. Here the reference to digital reality was created. It was discussed at which points digital realities make sense and can effectively support the tandem partners.

Since the concept of the Culture Locator is based on the results of the brainstorming on Culture Exchange, these will be explained in more detail below. It was discussed how the cultural exchange currently takes place in the tandem groups. Mainly photos were mentioned, especially personal photos. These are for example pictures of the house in the homeland. Also, in the tandem groups the participants often talked about different worldviews, sense of humour and misunderstandings. The participants emphasized in this brainstorming that the environment gives impulses to topics which are then discussed. But the problem is that you are only in one country and therefore only inspiration from one country can be found.

The participants thought it would be exciting to experience the culture of the other country, to explore a city together and to ask questions. As possible solution ideas like social rooms, digital rooms were named. But also, Pokémon Go and the idea of a treasure hunt came up. VR and having headphones at the station was suggested for supporting this. One participant said:

It would be nice if you have a virtual reality or you check Google Maps and check the places together. So, you see signs [...] and you talk about the culture, the food and whatever you experience.

After the brainstorming the 6-3-5 method described in Chapter 3 Methodology was used. Here our previous ideas of a treasure hunt were discussed with the participants. Then the participants should consider a scenario how to support cultural exchange and the imbalanced factor with digital realities. This method turned out to be very productive and offered many suggestions for the project. The participants developed, for example, an idea of a treasure hunt in which one can dive into the city of the other country and must solve riddles together with the tandem partner. In addition, the idea of a digital room was developed, in which different environments can be represented.

Based on the ideas collected from the design workshop and the background research, the concept for supporting the culture exchange during the tandem program and thus a better language learning was developed as presented in the previous chapter.

6 Discussion

The Culture Locator tries to bridge the gap of audio usage in new digital reality system that was addressed in the Background section. In addition, it meets the expectations of the participants in terms of digital realities in learning languages, as the following quote describes, "I think it's also an opportunity to see the language in life not on the paper or from the books".

The Culture Locator concept is built on a solid realization of the fact that practicing listening is a central method when it comes to learning languages. Thus, the Culture Locator only supplies audios in native tongues. There are many justifications for this decision. First, hearing native language is different than hearing the language used in classrooms, not to forget, it is important to practice hearing real life language, which is also one of the main aims of tandem program. Moreover, the alone occurrence of audio cues forces the listener to focus more in order understand it, especially when there is no access to any other human senses. On the other hand, the tandems can later check the visuals of that audio, if they wish.

The Culture Locator reinforce the human to human interaction using technology. Respectively, it is highly encouraged to experience the system together as tandem partners. The approach is attentive that it is significant not to lose human social interaction for technology, especially that it is essential to hear the target language from native speakers to better master it. On top of that, being together always offers an open opportunity to chat about the relevant cultures, traditions, values and beliefs.

The Culture Locator also satisfies the needs of the tandem program participant. First, it provides wide access to distant cultures. Understanding cultures is part of learning languages. An interviewee said:

The best part was definitely the [...] conversations about international stuff and getting to know different cultures and other mentalities than our German ones.

The audios in the audio bubble stations represent a different language as well as a different culture. For example, a shopping street in Germany is quiet, while a shopping street elsewhere is full of noises, screams, speakers and music.

Second, the Culture Locator balances the benefit between the partners. As previously mentioned, tandem partners experience uneven gain of knowledge in the current tandem program. Even though, it was not reported as a negative fact, it was an open gap to fill. The Culture Locator concept focuses on the fact that one partner can encounter the targeted language in the native surroundings while the other partner does not attain this advantage. The proposed solution, for this specific factor that causes imbalanced benefit, is to offer an audio adventure for the partner who miss that feature.
Furthermore, the principles of tandem learning are based on cooperation. Each is responsible to bring their own native language closer to their partner. The cooperation model of the Culture Locator suggests audio riddles that can only be solved if the two tandems collaborate. The audio riddles are made in the opponent language of the native surroundings (the country the tandems are in), the hints will lead to the next station.

There are couple of current challenges that the Culture Locator is facing. For instance, there must be an institute that adopts the system and take responsibility to install it, an ideal case would be that a language center fosters it and sets the station up with the help of the city municipality. This is for the sake of data protection; each institute can upload extra audios. Also, the institute is responsible to guide the tandems in case they were not able to solve the riddles.

Second, the stations of Culture Locator must be installed in public places that are accessed by everyone, which might cause interruption for the tandem partners while experiencing the audios and for the other walkers in the city. The fact that the technology is canceling the noises around the users and generates an audio bubble as a new reality can also contribute to the last-mentioned challenge. The gadget will generate the audio within a certain radius, although further studies must be made to exactly calculate the perfect radius. An extra big radius may annoy other outsiders or attach them to the supposedly private trail that the tandems should be having. Either ways, this will affect the privacy of the tandems and the outsiders.

7 Conclusion and Future Work

This research focuses on finding new possibilities to support learning new languages with a tandem partner using new digital realities. The concept of Culture Locator insures a balanced learning experience and culture learning. The model is designed to encourage collaboration between partners in order to maximize their learning experience while having fun.

New digital realities can be shaped in many forms. Audio is capable to simulate a new reality and support new experiences. The central variation between the treasure hunt presented in this paper and the other electronic treasure hunts is the major participation of audio as a shell that hides hints about next stations. Furthermore, cooperation between the learners is essential to solve the riddles and understand the hints meaning.

As mentioned in the Background chapter, a further development of the Silent Zone Technology can be used in a larger scale to build the system. It will be used to cancel the real environment sound and encapsulate the audio sound inside a bubble zone.

Future work would be to design a smarter model that allows tandem partners to interact with.

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