


***Hololingo!* - A Game-Based Social Virtual Reality Application for Foreign Language Tandem Learning**

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Abstract: *Hololingo!* is a Social Virtual Reality tandem app for real-time immersive distance learning of German as a Foreign Language (GFL). The acquisition of discursive oral language skills for applied authentic contexts is challenging for group-based classroom settings and is often outsourced to autonomous analogue tandem learning. We operationalise a Digital Game-Based Language Learning (DGBLL) approach for distance-learning which also relieves tandems from overstraining autonomy and self-guidance. *Hololingo!* supports tandems in their learning activities by providing entertaining communicative, collaborative, and didactically designed team tasks. These are embedded in a narrative adventure, target linguistic phenomena, and support the holistic acquisition of oral-discourse competencies and fluency. The combination of the tandem principle, immersive Social VR gamification, barrier-free access to a global pool of expert/native speakers, and a curricular connection through task selection facilitates language learning and provides transcultural contacts. App development follows a Design-Based-Research cycle of conception, implementation, and evaluation.

Keywords: Social Virtual Reality, Language Tandem, Digital Game-Based Language Learning

1 Introduction: The *Hololingo!*⁵ Project

In a mobile, global world, effective foreign and second language learning plays a key role in migration societies to foster participation and integration. Arrivers need language skills for access, participation, and integration regarding communities, companies, and societies, which in turn need to access skills and knowledge of newcomers. However, learning a new language is not trivial and often takes years to master. Therefore, easy access to learning material and swift integration of learning opportunities into everyday activities is crucial for rapid success. Especially opportunities of learning the language in authentic contexts with expert/native speakers of the target language are rare. This is especially the case when the target language is learnt in a foreign country, where it is not established. An international survey among learners of German as Foreign Language (GFL) showed that

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their biggest goal, speaking the target language fluently, was at the same time by far their weakest competence [Ah20]: On average, GFL-learners rated their productive oral-discursive language skills one competence level⁶ lower than their receptive skills and their speaking skills a half competence level lower than their writing skills [ibid.]. Of course, the spontaneous speaking of a language in authentic applied contexts with expert/native speakers is a challenging task environment, that requires fast lexical access and broad lexical knowledge, confident command of pronunciation, grammar, interactional and discursive-pragmatic competencies (making propositions, arguing, turn taking), planning of utterances while listening and interpretation of everyday language. However, the weakness of spoken language skills also results from too little practice. Oral-discursive competencies are hard to target by i) group-based teaching settings, where learners usually communicate among themselves, and ii) behaviorist text intense language learning apps (*Babbel*, *Duolingo*, *MondlyVR*). Immersive learning by language travel or exchange programs is considered highly effective, but can be expensive, time-consuming, and hard to integrate in everyday life. Therefore, language practice is often outsourced to private, autonomous tandem learning [Be10], where students exchange their expert/native languages in self-directed analogous settings, e.g. helping each other with homework or simply hanging out together. Nevertheless, the analogue tandem method has clear limits: a) a restricted number of suitable learning partners on-site (incongruous availability, language match, sympathy), b) an effort of coordinating and going to meetings), c) overstraining self-directed learning (choice of assignments, topics, methods) and d) a lack of tracking the learning progress [Bö17, Ah20]. As a result, analogue tandems are in comparison with courses and apps only little spread and often quickly abandoned. Currently, digital video tandem apps (e.g. *Hellotalk*, *Tandem*) are popular, as indicated by increasing download numbers. They provide easy access to a global pool of tandem partners through mostly already owned mobile devices (Smartphone, etc.). However, digital tandems [Fu17] neither substantially support self-directed learning nor help learners to keep track of their learning progress. Also, video tandems quickly generate the typical and boring ‘talking, to practice talking’ due to a lack of entertaining joint activities. Video tandems permanently need to come up with topics, questions, and assignments themselves. They must fully construct their learning process, which can be overstraining [Ah20].

Our Social Virtual Reality (SVR) approach masters these problems: Through the virtual tandem method, the application *Hololingo!* not only potentially enables location-independent, time-flexible language learning and low-threshold access to a global user pool. It also offers activating collaborative, didactically designed tandem tasks for Digital game-based language learning (DGBLL, [Hu18]) connected to a narrative, immersive SVR adventure. The task environment provides enabling opportunities for communicative, empathic, collaborative practice and learning of spoken language in an immersive 3D environment. The DGBLL-tasks target i) specific language phenomena – and thus deliver the possibility of curricular connection and integration – and ii) holistic oral-discourse practice in applied contexts with native/expert speakers in which tandem partners are aware of

⁶ A1, A2, B1, B2, C1, C2 according to the Common European Framework of Reference for Languages [Co20].

their respective roles. Learners shall get to lead conversations and make meaningful, comprehensive contributions while expert/native speakers are aware of the learners' needs and shape a supportive setting for them. Expert speakers are prepared to act as linguistic role models and to adjust their articulation and utterances to the learners' needs through awareness, patience, interest, and communicative grounding. They shape a supportive and scaffolded setting, in which they give learners space, time, help (e.g. vocabulary offers), feedback and encouragement to put their thoughts into complex language [La in prep.], but also acknowledge them as equal game partners (facilitated by collaborative tasks), despite the hierarchy in language competence. The immersive SVR-DGBLL task environment transfers imagined learning scenarios of classroom settings into experienced motor-stimulating empractic language scenarios, making applied language skills easier to learn and to transfer to analogue contexts [Ah19]. Yet, the success of VR apps is tied to the increasing use of mass-market hardware. The app-project is carried out by the interdisciplinary workgroup *Foreign Language Learning in VR* by the Universities of Potsdam, Hildesheim, and Marburg⁷ in a Design-Based-Research manner [Mc14] with iterative development cycles of (re-)conception, implementation, and evaluation.

2 Methods

Digital Game-Based Language Learning (DGBLL): “[A] learning game is defined as a playful activity that is structured by rules for the pursuit of quantifiable outcomes (e.g. win states and points), and incorporates educational objectives (e.g. knowledge acquisition) as its own end” [Hu18: 90]. DGBLL comprises educational language learning games for first and second/foreign language acquisition. It is considered a highly beneficial method, because of “immersive exposure to the language learning environment, lowered anxiety and other affective barriers to language learning, and increased use of the target language for interaction in gaming” [Hu18: 90]. The field of DGBLL has a particular research focus on language acquisition in digital multiplayer role-playing games like *Second Life* [Bi13] or *World of Warcraft* “where language learners interact and communicate for authentic purposes in 3D virtual worlds” [Hu18: 90]. A comprehensive review [Hu18] reports that DGBLL delivers better results than traditional language learning in many aspects: higher learning duration, motivation, experienced self-efficacy, the will to communicate in the target language, engagement in written communication outside the game (forums, private chats), pragmatic acquisition of appropriate language use (politeness, humour) and cultural learning.

Social Virtual Reality Tandem Learning: Like successful applications for vocational training [Ze19], *Hololingo!* uses Virtual Reality, which increases physical 3D immersion by providing i) an ego perspective, ii) senso-motoric coupling to an avatar, and iii) interactive worlds through stereoscopic head-mounted displays, motion, and hand controller tracking. While single-player VR language learning applications are limited to semi-authentic,

⁷ Website: <https://hololingo.blog.uni-hildesheim.de/> (28.06.2021).

scripted communication scenarios with chatbots (e.g. *Mondly VR*) or to vocabulary learning (*Word Saber*, [Ha20]). Multiplayer apps (e.g. *AltspacVR*, *VRChat*, *Rec Room*) provide public and private chat rooms with entertaining hangout activities (bowling, dancing, snowball fight). In these environments, some lecturers offer group-based language courses in classroom or field trip settings [La in prep.]. But Social VR apps can also be used for autonomous tandem learning, where two native speakers of different languages support each other in learning the other's language. Based on mutuality and autonomy, tandem learning benefits from direct contact with expert/native speakers to correct and consolidate foreign language skills in practice [Be10]. An analysis of 1:1 tandem communication in *AltspacVR* [Ah20] found e.g. complex multimodal interactions (e.g. learning the integrated use of deictics and manual pointers), indicating transferability to analogue contexts. However, virtual and analogue tandems exhibit potentially overburdening learning autonomy, which manifests itself in a lack of control over the learning process and is expressed in the desire for more feedback [La in prep.]. Feedback and reflection are also missing in conventional single-user smartphone apps [He16]. For our goal to relieve Hangout tandems of overwhelming self-direction and still evoke essentially free, entertaining, and learning-focused tandem discourse, *Hololingo!* combines the expert-novice tandem setting with cooperative, didactically designed DGBLL-tasks and a captivating storyline.

Design-based research (DBR): For app development we use a DBR approach [Mc14]. After conceptualising and implementing the first demonstrator, we initiated an iterative development process of analysis/exploration, design/construction, and evaluation/reflection. First, we carried out formative qualitative tests with German speakers to optimise usability. Then, we performed a first user test with a tandem. We recorded and linguistically analysed audio and video data (VR ego perspective, analogue scene) and examined the results for correspondences between task design and elicited communication to improve the theoretical understanding and optimise the demonstrator. We also collected oral and written user feedback of both tandem partners regarding the tandem experience and app usability, which we will use to develop and design a prototype.

3 Didactic Conception

Hololingo! is an app project in progress. Our overall goal is to develop a DGBLL-SVR app for tandem learning that users can access from all over the world. For matching with other users, learners will create profiles with languages, competence levels, and interests. Based on curricular proximity to their competence level according to the Common European Framework of Reference for Languages (CEFR) [Co20], respective learning scenarios will be offered for i) the development of holistic oral-discursive language competencies [Bo08] and ii) the practice of specific linguistic (lexical, grammatical, and pragmatic) phenomena. In future upgrades, learners shall keep track of their progression by tests, coupled to a badge system. For now, the demonstrator comprises a first holistic learning scenario *Myth of the Huckup*. A statue of Huckup, a mythical troll, is located in Hildesheim's city centre. As a metaphor for guilt, it jumps down from a tree in the necks of apple

thieves for punishment. We created a thematic adventure in which tandems learn about the myth and relive it through various DGBLL exit-game stations (fig. 1).

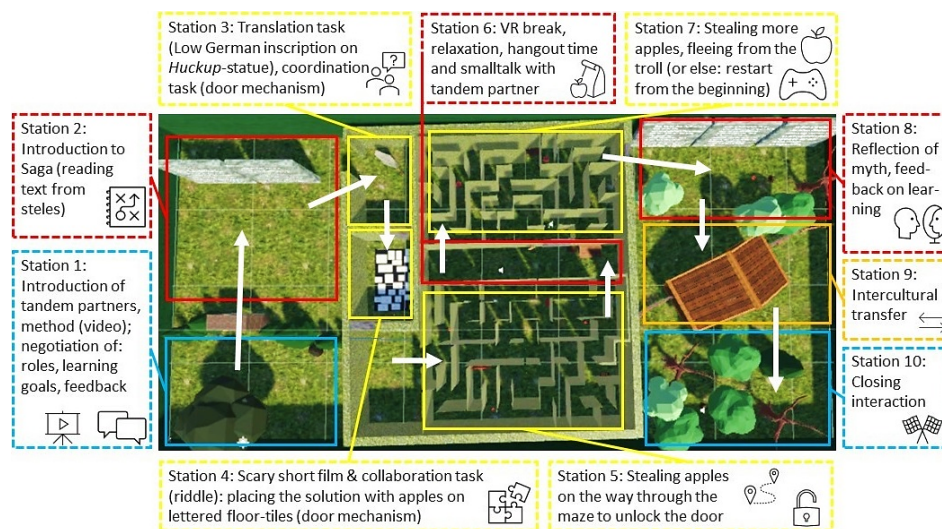


Fig. 1: Plan of the Unity-based *Hololingo!* adventure from an aerial perspective.

First, the tandem partners get to know each other, watch an explanatory video on tandem learning and negotiate their roles for the upcoming tandem work (station 1). They then learn about the myth by mutually reading an introduction from stone steles (st. 2). They further engage with the saga by translating the inscription of the Huckup statue from a Low German text into standard German - a task that can only be solved by collaborative linguistic reflection (st. 3). Afterwards, the exit-room game starts. Users must verbally coordinate two distant switches' flipping to open the door to the next room. Here, they further connect to the myth via a reflection task on a spooky short film. In a subsequent collaborative word puzzle, they relive the saga by stealing apples: First, they must place the keyword with apples on correct letter-tiles (st. 4). Then they must find their path through the maze and steal more apples on their way, which they need to put on a table in the break room to unlock the next door (st. 5). In the break room, tandem partners can relax – even take a VR break and put down their HMDs for a moment – or have some hangout and small talk time together (st. 6). In the second part of the maze, they must escape from the troll (if else, they are relocated to the beginning). They have to watch out, warn each other and navigate collaboratively through the maze (st. 7). After the escape, there is another opportunity for a short break before engaging in a reflection task: securing understanding of the myth, feedback on the language learning process (st. 8). In Huckup's cabin, it follows a spontaneous narration and exchange about a comparable myth from the learner's cultural sphere and a reflection on the joint tandem practice (st. 9). Finally, tandem partners may decide to stay in contact and say goodbye to each other (st. 10).

4 Implementation

We used *HTC VIVE* and *HTC VIVE Pro* head-mounted displays (HMDs) and recently also the Oculus Quest 2, a stand-alone HMD that does not require external tracking stations, like other mass-market and console-based solutions. VR devices allow users to immerse themselves in virtual environments through stereoscopy, motion, and hand tracking [Ze19]. We did not yet use further early-stage hardware additions, like body, finger, eye, or face tracking, which exist for the *VIVE*-platform but plan to integrate them eventually, as they might increase the immersive user experience and open up new possibilities for analysing behaviour. - In the beginning, Unity and VRChat served as the software basis for *Hololingo!*. The Unity Engine is a manufacturer-independent development platform. However, there are further options to develop virtual environments, based on Software Development Kits (SDKs) from HMD manufacturers. Recently, more cross-manufacturer platforms came up (*OpenVR*, *Unity XR Interaction Toolkit*). *VRChat* is a SVR platform that allows users to interact in virtual worlds and develop their own. It is necessary to use the *VRChat* SDK to upload content on their platform. We used the *VRChat* SDK because of a rich set of objects and features, visually appealing environments, and refined avatars. As of now (April 2021), the platform supports Steam (a manufacturer-independent distribution platform), *Oculus Quest/Rift*, and *HTC* HMDs.

Social VR apps gather spatially separated people in a joint virtual environment. Users are represented by avatars and experience the virtual surroundings from the ego-perspective. Although there are already some social VR platforms (e.g. *AltspaceVR*, *VRChat*, *Rec Room*), VR learning spaces that specifically evoke linguistic phenomena and boost holistic language learning for freely interacting tandem teams do not yet exist. With *Hololingo!* we created a first didactically designed DGBLL environment. Based on a user-centred design approach, all iterations of the *Hololingo!* world are developed using Unity, the *VRChat* SDK and the *HTC VIVE (Pro)* HMDs. As mentioned earlier, the educational design process is related to the Design-Based-Research method [Mc14] by iteratively analysing the problem domain, designing and evaluating a solution, formatively and summatively. The demonstrator was developed between May and July of 2019 and is a private world on *VRChat*. In our experience, developing a world with moderate interaction capabilities was straightforward, and no coding experience is required, but developers should be comfortable using Unity Engine. Cross-platform support, voice transmission, and body tracking are already implemented, which is crucial to support language learning. The SDK provides a range of triggers and actions to implement interaction. We added functions like pressing buttons and interacting with objects by grabbing or pulling on them. E.g. by using if-then relationships, we developed an exit-room coordination task in which users had to synchronise verbally on the simultaneous operation of two distant levers to unlock a door. We integrated videos to introduce the tandem method and as conversation starters. For complex interactions, like spelling a word by dropping apples on lettered floor tiles (fig. 2, left), we used animations and triggers from Unity and actions provided by *VRChat*. We also developed gaming elements like escaping from Huckup in a maze – a *Pacman* scenario in which users must verbally coordinate for navigation and warnings (fig. 2, right).



Fig. 2: Word puzzle (fig. 1, st. 4), L2 describing bell shape (st. 6), escape task with troll (st. 7).

The visual representation of texts was little satisfactory. Also, the SDK does not support the implementation of complex interaction capabilities well. This led to various issues, like animations getting stuck at different conditions and not executing properly. This impacted the experience of test users negatively for some tasks. Other downsides of using the SDK were overhead cost, an elaborate installation, and the dependence on the *VRChat* platform. Even though the SDK use resulted in an appealing learning world, it was not (yet) possible to publish the demonstrator as a public world on *VRChat* or to publish the software in an open-access format to make it available to other researchers for subsequent use or development. Due to these limitations, we are currently migrating the demonstrator to a self-developed, cost-effective solution. We implemented *Photon Unity Networking 2* as a free asset to establish networking functionality and *Photon Unity Voice 2* to add voice transmission. We are currently improving the app's usability.

5 Evaluation

By the following research questions, we examined core design elements of the current *Hololingo!* demonstrator: Does the design i) enhance L2 learners' discourse participation, ii) contribute to the performance of different tandem roles?⁸, iii) create opportunities for intense conversation, iv) entertain and generate fun? We compared hangout to DGBLL tandems and conducted a qualitative communication analysis.

5.1 Hangout vs. DGBLL Tandem Communication

In a previous study, we evaluated 3h 55 min. of audio and video data from 13 self-directed hangout tandem conversations in *AltspaceVR*, recorded with exchange students in 2019 at the University of Hildesheim. We also analysed 1h 27 min. of DGBLL tandem data, reflecting the latest version of the *Hololingo!* app [La in prep.]⁹. Each tandem consisted of a L1 expert and a L2 learner of German communicating from different lab rooms via *HTC VIVE Pro* devices. In both settings, participants were informed about the tandem method

⁸ We will implement DGBLL tasks for elicitation of *specific* language phenomena in a later demo, as they had been proven successful in other contexts [St12, Ah18]. Our focus is on *holistic* tasks for the current version.

⁹ We thank all participants, all students of the seminars *Interkulturelle Kommunikation/Fremdsprachenlernen in SVR*, and M. Goecht, A. Schwanke, K. Köller, F. Breker for their contribution and support.

and got a short VR training before meeting their tandem partners in VR. In the didactic DGBLL-Setting, tandem partners also watched a short educational video on tandem learning in VR together and got the task to reflect on it (fig. 1, st. 1). In a quantitative analysis, the word count for L1 experts and L2 learners was identified for both data sets, including discourse particles (e.g. *ähm, mh*). The results showed a similar word/minute ratio for hangout vs. DGBLL tandems but a significant difference for discourse participation [ibid.]. In the self-directed hangout data of *AltspaceVR*, L2 learners accounted for only 32 % of the words, while for 46 % in the *Hololingo!* data. The didactic design seems to enhance learner participation [ibid.]. However, a more controlled follow-up study with more participants than the examined one DGBLL tandem needs to test the results' validity.

5.2 Qualitative Analysis of DGBLL Tandem Discourse

We examined the DGBLL *Hololingo!* data of a Chinese exchange student learning German (L2; level B2) and a German native speaker (L1), who had not met before. We transcribed selected parts of the 87 min recording in the HIAT format and carried out a multimodal functional-pragmatic communication analysis [Eh07]. A previous analysis of the translation and reflection tasks (fig. 1, st. 1 and 6) shows high degrees of joint communicative interaction (e.g. co-constructions to ground mutual understanding, multimodal use of gestures and emojis) [La in prep.]. Now, we focus on i) tandem role typic behaviour for expert and learner, ii) elicitation of communication by task design, and iii) the affective learning experience and indications of fun.

Tandem Roles: The tandem setting was only briefly explained to the participants before the recording. After greeting each other in VR, they were informed about the tandem method by a video and a reflection task (fig. 1, st. 1). We observed largely role-specific behaviour for the L1 expert and the L2 learner. – L1 adjusts in speed, volume, and clarity of pronunciation to L2's needs by communicative grounding. L1 takes control of the interaction in critical phases and guides L2 (L1: *Bevor wir das Video abspielen, steht da [...], dass wir uns einander vorstellen müssen* [Before we play the video, it says (...) that we must introduce ourselves to each other]). L1 also uses various strategies to give L2 the turn and opportunities to speak: Pauses show that L1 patiently waits for answers, reactions, or initiatives from L2 after own contributions (*Wir müssen uns erst vorstellen!* [10 sec.] *Hallo?* [We must introduce ourselves first! (10 sec.) Hello?]). L1 lets L2 go first several times (L2: *Also, ich fange an, oder?* L1: *Ja.* [L2: Well, I will start, shall I? L1: Yes]). L1 encourages L2 to make contributions by asking her direct questions (*Warum hattest du gelacht, als, als der eine ...* [Why did you laugh when, when the one...?]). L1 also hands the turn back by follow-up questions to invite L2 for further elaboration (L1: *Er hat gesagt, Chinesen singen gern Karaoke?* L2: *Jaa.* L1: *Okeh...?* [L1: He said Chinese people like to sing karaoke? L2: Yes. L1: Okay...?]). L1 rarely leaves out conversation opportunities, e.g. by rushing to the next task (L2 answers L1's question. L1: *Ok, also. Die dritte Aufgabe – durchs Tor gehen* [L1: Ok, so. The third task: go through the gate]). Instead, L1 sometimes follows up on L2 persistently to make sure that L2 has understood the content: L1 uses *teacher questions*, to which she already knows the answer, to get L2 to verbalise her

thoughts (L1: *Was haben wir gelernt?* [What have we learnt?]). When L2 asks about content, L1 answers and states her own understanding. Overall, L1 acts as an attentive, helpful partner who invites L2 to speak a lot and gives helpful feedback (L2: *Wie heißt das? Er stiehlt? Stiehlt?* L1: *Stiehlt!* [L2: What is the form? He steal? Steals? L1: Steals!]). She gives necessary feedback also when it is not requested (L2: *Er stahl den Glocke.* L1: *DIE Glocke* [L2: He stole the bell (wrong gender). L1: THE bell (correct form)]). – L2 also performs her role as a learner well. When she does not know the vocabulary, she gives verbal and gestural explanations until L1 names the word (L2: *Wie heißt das? Äh, ein RING oder so? [...] so wie DAS* (Outlines a bell shape with her hands [cf. fig. 2, centre]) *und es klingt, klingelt* (repeatedly strikes the previously drawn bell with one hand) [What is it called? Uh, a RING or something? (...) So yeah, like THAT. And it sounds, rings]). L2 explicitly requests feedback on grammatical forms, when she is not confident (L2: *Wenn es in Vergangenheit, also er STAHL?* L1: *Jaaa* [L2: When in the past tense, so he STOLE? L1: Yes.]). She sometimes offers varying forms until L1 confirms or states the correct form (L2: *Äh, die - DER böse Wicht?* L1: *Mmh!* [L2: Uh, the (incorrect), THE (correct form) evil troll? L1: Mmh!]; L2: *... auf dem Rücke? Auf dem rück?* L1: *RückEN?* [L2: ... on his back? (2x with wrong inflection) L1: Back? (correct form)]). L2 eventually takes more initiative by reading out assignments and suggesting solutions first (Both approaching station 3). L2: (reads out loud the hint) *Ihr kommt nicht weiter, wenn ihr nicht zusammen arbeitet.* L1: *Ok.* L2: *Und, ich glaube es hat mit diesem Steintür zu tun, oder?* [L2: You will not get anywhere if you do not work together. L1: Ok. L2: And, I think it has to do with this stone door, hasn't it?]). L2 effectively uses opportunities that are provided to her by L1 for practice and learning. She seems to appreciate L1's support by uttering interest in talking to L1 after the game (L2: *Ich kann dir erzählen, vielleicht später?* [L2: Maybe I can tell you later about it?]).

Elicitation of Communication Through Task Design: For *Hololingo!* it is essential to design DGBLL tasks that reliably elicit appropriate communication for language practice and learning. Unlike topic-based conversation and reflection tasks (st. 2, 6, 8, 9), we also aimed for a) collaborative tasks of sharing problem understanding and constructing solutions that address interactional competencies with frequent turn taking, and b) coordinating tasks to verbally fine-tune joint actions. Such a coordination task is the exit room mechanism (st. 3, part 2), for which two distant levers must be operated simultaneously. The transcript shows alternating verbal suggestions and enquiries to coordinate actions (L1: *Ok, wollen wir... Was steht da? Ziehen?* L2: *Ziehen?* L1: *Mhm.* L2: *Mhm* (activates lever). L1: *Ich weiß nicht genau* (activates lever). L2: *Ja, funktioniert das bei dir?* L1: *Äh, ich weiß nicht genau, ob ich richtig gezogen hab. Also es bewegt sich, bewegt es sich bei dir?* L2: *Nein. Oder sollen wir gleichzeitig das machen, oder?* L1: *Ja? Ich glaub schon.¹⁰*). Ultimately, simultaneous action execution is achieved by verbal synchronisation of the activity: L2: *Eins, zwei, drei* (both pull levers simultaneously) [L2: One, two, three]. – An

¹⁰ [L1: Ok, let's... What does it say? Pull? L2: Pull? L1: Mhm. L2: Mhm. (pulls lever) L1: I don't know exactly (pulls lever). L2: Yes, does that work for you? L1: Uh, I'm not sure if I pulled it right. So, it moves, does it move at your end? L2: No. Or should we do it at the same time, don't you think? L1: Yes? I think so.]

example for a task that primarily elicits communication on collaborative problem understanding and solution construction, is the word puzzle (st. 4; fig. 2). The solution has to be placed with apples on lettered stone slabs. (L1: *Wollen wir erstmal gucken, was die Tafel sagt?* L2: *Sollen wir ein Wort buchstabieren, oder so?* L1: *Mhm! Mit dem Boden meinst du?* L2: *Es gibt, ja vielleicht, es gibt insgesamt fünf Äpfel. Stimmt?* [...] L1: *Ok. Wir müssen was buchstabieren.* L2: *Ja.* L1 (reads the hint aloud): *Der Apfel ist die Lösung.* L2: *Ja.* L1: *Wie verstehst du das?* L2: *Keine Ahnung* (laughing). L1: *Ok.* L2: *Aber, wenn es ein Lösung ist, so ein... ist das ganz direkt? Also der Apfel ist die Lösung?* L1: *Ja.* L2: *Also sollen wir APFEL buchstabieren, oder?* L1: *Ja, lass es ausprobieren.*¹¹) – The design of the collaboration and coordination tasks seems to be responsible for eliciting the intended respective verbal behaviour¹².

Affective Dimension (Fun): Finally, we want to examine the app's fun factor. The very fact that the tandems did not want to take a break within the first hour despite the recording directors' offers, shows that the learning was entertaining. In addition to frequent emotional expressions throughout the recording, especially a lot of laughter, we observed that particularly time-sensitive gaming tasks – like stealing apples and fleeing from the troll through the maze – elicited many affective expressions (L1: *Welche ähm welche Richtung möchtest du gehen?* L2: *Ähm. Du kannst mal entscheiden.* L1: *Ok, dann gehen wir dahin, wo er grad nicht war.* (laughing) *Ehhh! Ogottogott. Ogottogottogottogott! Häh! Warum kann ich nicht weg? Warumkannichnichtweg? Warumkannnichtweg?* L2: *Eeeecht?*¹³). In another example L1 expresses excitement by uttering fear, which, after both manage to escape, gets dissolved with L2's cry of victory (L2: *Also, sollen wir gehen?* L1: *Warte, wenn er sich umdreht, oder?* L2: *Ok ja.* L1: *Also wenn er jetzt weggeht.* L2: *Jetzt?* L1: *Weiß ich nicht, also wenn er den Rücken zu mir. Ogottogottogott, ich hab Angst. Nein. oh o ä äh. Ok.* (manages to escape) *Bist du da?* L2 (also manages to escape): *Jahoiiii!*¹⁴).

5.3 Discussion

The task design and narrative DGBLL realisation of the *Hololingo!* demonstrator showed the desired effects. Compared to self-directed hangout tandem data in *AltSpaceVR*, the discourse participation of L2 was increased from 32 % to 46 %. The qualitative multimodal communication analysis showed rich communicative [La in prep.] and tandem-role adequate behaviour for L1 (adjusting pronunciation, empowering L2 to speak, providing

¹¹ [L1: Shall we see what the board says first? L2: Should we spell a word or something? L1: Mhm! With the floor, you mean? L2: There are, yes maybe, there are five apples in total. Right? [...] L1: Ok We must spell something L2: Yes. L1: (reads out the clue): The apple is the solution. L2: Yes. L1: How do you understand that? L2: I don't know (laughs). L1: Ok. L2: But, if it is a solution, such a... is that literal? So the apple is the solution? L1: Yes. L2: So we're supposed to spell APPLE, right? L1: Yes, let's try it out.]

¹² For epistemological reasons, the connection between cause and effect of course can never be shown.

¹³ [L1: Which uhm which direction do you want to go? L2: Uhm. You can decide. L1: Ok, then we'll go where he wasn't just now. (laughs) Uhhh! Dear God! (3x) Huh! Why can't I escape? (3x) L2: For real?]

¹⁴ [L2: Well, shall we go? L1: Wait when he turns around, right? L2: Ok yes. L1: So, if he walks away now. L2: Now? L1: I don't know, so when his back is directed towards me. Dear god! I'm scared. No. oh oh uh uh. (L1 manages to escape) Ok. Are you there? L2 (also manages to escape): Yahaaaay!]

guidance and feedback) and for L2 (taking the opportunity to speak, increasingly taking the lead, asking for feedback). The analysed coordination and collaboration tasks elicited the respective intended verbal behaviour and are therefore suitable for practising interactional skills. By engaging in gaming and problem solving they also relieved learners from topic construction. The analysis of affective expressions shows that the app provides a positive, entertaining atmosphere with excitement and fun in dynamic game sections. In another paper, we also evaluate user feedback [La in prep.]: L1 called the experience exceptional, enjoyable, and rich in variety. She also stated that working and solving tasks together helped getting to know each other. L2 claimed to have learned L1's way of thinking more directly through the setting and to have mentally anchored new words more deeply by speaking and acting simultaneously. However, L2 had expected more classical types of tasks such as cloze texts and formal assessments of her learning progress, so we may need to i) communicate the learning objectives more clearly, ii) support the habituation of the self-regulated autonomous method more strongly in the future, e.g. through a more detailed tutorial and improved progression tracking (note function, tests, badges). As the results reflect still an early stage of the app in the development process (demonstrator) and as they are based on a qualitative analysis of one DGBLL-tandem recording, they are limited regarding impact and replicability. More advanced versions of the app will be evaluated with larger participant samples and complementary pre/post-tests.

6 Summary and Outlook

We presented the latest version of the *Hololingo!* demonstrator, a Social VR app for foreign language tandem learning. We i) argued for a didactic DGBLL approach to support the learning and training of verbal interactional communication competencies, ii) outlined the conception of different task types that we embedded in a narrative scenario, iii) described the DBR-based development and implementation process, and iv) carried out a linguistic evaluation: We examined a) the elicited discourse data for adequate tandem-role behaviour, b) effects of coordinative and collaborative task design and c) affective expressions as an indicator for excitement and fun. To reduce dependencies on VRChat, we will implement future app versions in Photon. In addition to the demonstrated core design, we subsequently want to integrate additional scaffolding elements (notes, a dictionary, phrase suggestions), create tasks to elicit specific language phenomena [St12; Ah18], strengthen curricular connection to the CEFR, and add matching functions (user profiles, competence tests, badge system). In future studies, the linguistic evaluation will be supplemented by a larger sample of participants for reasons of validity, by eye tracking to analyse (joint) attention processes and by pre/post-tests to measure learning effects.

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