Collaborative learning and foreign language acquisition through 3-D game-like applications

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Abstract
This paper explores the benefits of using virtual worlds and 3-D game-like applications in order to reinforce foreign language acquisition through collaborative learning tasks. The target group of the current pilot study is made up of 18 students who have been previously enrolled in a six month German as a Foreign Language course at the University of Cadiz. Our interest in the current study focuses on exploring those e-learning tools which increase students’ interaction with other learners and thus reinforce students’ communicative competence in the target language. In order to analyse students’ interaction when collaborating in performing the same task we designed a 3-D game-like application called Who buys the most? By lodging the game in a virtual platform, called VirtUAM (Virtual Worlds at the Universidad Autonoma de Madrid) [1] we are able to store and analyse a huge amount of data related to students’ behaviour and inworld interactions while they are playing the game. Additionally, by employing one Experimental Group (ExpG) and two different Control Groups (CG1 and CG2) we aim to analyse the impact on students’ interaction and output production (use of the target language) when they are playing with native speakers and compare the results with those obtained when playing with one or more non-native speakers.

1. Introduction
The current pilot study aims to explore the benefits of using virtual game-like environments in order to reinforce language acquisition at the A1 level (CEFR) through collaborative learning tasks. A review of the literature has shown that in recent years there has been an increasing use of different e-learning environments and tools such as virtual worlds (VWs), video-web communication (VWC), Wikis, Webquests, Social Network Sites (SNS) to enhance students’ oral and/or writing skills through collaborative learning [2], [3], [4], [5], [7], [9]. Nevertheless, almost all of these are usually only employed from intermediate up to higher language levels, as they normally require at least intermediate foreign language skills. Less research has been done in order to explore their effectiveness in enhancing collaborative learning at the A1 level. The current pilot study therefore aims to explore at least one of the aforementioned e-learning environments (VWs) in order to reinforce A1 students’ communicative competence through collaborative learning tasks. The starting point of our study was the fact that our students are usually enrolled in very large sized language courses with an extremely low percentage of face-to-face teaching (40%) and a very high percentage of autonomous learning (60%). This makes it extremely difficult to provide students with the necessary language input as well as opportunities to produce enough language output during face-to-face teaching. Consequently it is generally very difficult to guarantee that the foreign language proficiency which students are expected to have at the end of the term, will be achieved. Teachers and academic institutions are therefore increasingly expected to facilitate students study with additional e-learning tools in order to help them to widen and reinforce their language skills during the autonomous learning process. Taking into consideration the fact that our students are at the A1 level, we are particularly concerned about designing e-learning environments which could easily be controlled by our students and which would, at the same time, encourage them to interact and communicate with other students in the target language and thus reinforce their communicative competence. We therefore designed a virtual game-like application called Who buys the most? which was lodged in a virtual learning platform, called VirtUAM [1]. The game-like application which was designed aimed first to provide students with meaningful language input and then with the opportunity to practise the input previously obtained, through the production of output [8]. To enhance students’ output production as much as possible they are asked to perform a role-play by collaborating on a shopping task in an electrical-shop, in teams. In addition, in order to guarantee a successful language acquisition the game-like application was designed on the theoretical background of the main-principles of foreign language acquisition [1], [4], [8]. These can be summarized as follows:
- provide learners with comprehensible language input
- provide learners with meaningful content
- provide learners with clear tasks and goals
- provide learners with regular feedback on their task performance
- enhance interaction and negotiation of meaning
- facilitate and stimulate foreign language output production to enhance fluency and make learners aware of their weaknesses in the target language

2. Game-design and collaborative learning

The game-like application we designed for the current pilot study is based on 4 different levels. Levels 1 to 3 are preparation-stages that aim to prepare students for the final game at level 4. Levels 1 to 3 provide students with rich language input ranging from vocabulary, grammar, listening, reading, writing to communication strategies. Additionally, all skills are introduced and practiced through different activities (fitness-centre) and games (quiz-show and amusement-arcade) which are played by each player individually but through competition with other players. Unlike level 1 to 3, level 4 is based on a role-play and requires students to collaborate on a shopping-task in an electrical-shop. Therefore each player gets a different role and task: Whilst player A is asked to take the role of the customer and gets several shopping lists that are randomly displayed on his/her personal monitor, player B is asked to take the role of the (shop) assistant who gets a shopping trolley. In order to perform their shopping task successfully students are asked to communicate with each other by using the text chat and applying the language skills previously practiced in levels 1 to 3. Throughout the game the players receive regular feedback from the platform which identifies the correct and incorrect answers as well as awarding or subtracting points from the corresponding game-scores [6]. Additionally, each inworld action is automatically stored by the VirtUAM database [1] which allows us—amongst others—to trace back students’ use of the text chat and thus analyze their interaction with other players. When considering this last aspect, the following questions are of particular interest to our research: Firstly, what is the impact on students’ output production and use of the target language when playing with a native speaker and what is the impact when playing with one or more non-native speakers? Secondly, how does interaction with one or more native/non-native players affect collaborative learning?

3. Empirical evaluation

3.1. Experimental setup

The current pilot study was carried out with 18 students from the same German as a Foreign Language course and 3 German native speakers. All students were at the A1 level (CEFR) and studying on the same language course at the University of Cadiz. Moreover, all of them were used to being exposed solely to the target language and to using this as the only vehicle for communication within the foreign language classroom. Each game-session took between 25 and 30 minutes depending on students’ game performance. In addition to this, each student was required to repeat the role-play three times, over a period of one week. By repeating the role-play several times, we aimed to give students the opportunity to reinforce their language skills throughout the interaction and collaboration with other players. In order to analyze students’ behavior when interacting with one or more speakers of the target language we employed three different groups and 3 native speakers. The first group was named “Experimental Group” (ExpG) and consisted of 6 different players, each one of whom performed the role-play with one of the three participating native speakers. The second group was named “Control Group One” (CG1) and consisted equally of 6 non-native players. Each participant changed his/her partner three times within the same group. The third group was named “Control Group Two” (CG2) and consisted of 6 non-native speakers. In this group each participant played with the same partner within his/her group three times.

3.2. Data analysis and game-evaluation

The analysis of the data stored on our database during the different game sessions has shown that students’ interaction and output production increases much more when performing the same role-play with different speakers than if they perform the same role-play with only one non-native speaker. The analysis of the inworld chat has furthermore underlined that students’ output production and use of the target language depend very much on the game-partner, his/her language proficiency and his/her ability to paraphrase those expressions and concepts s/he is not able to express in the target language. Even though all the student participants were used to communicating solely in the target language by employing different communication strategies (raising a query, paraphrasing, using
expressions in another foreign language, etc.) from the beginning of their German language course, only 10 of the 18 participants (5 from the ExpG, 4 from CG1 and 1 from CG2) were consistent in not using their mother tongue in order to resolve communication problems while playing the game. Nevertheless, the analysis of the text-chat has shown that those students who perform the role-play with different native or non-native speakers tend to focus much more on their language output when playing the game several times, than when playing it only once. This might be explained by the fact that game-repetition permits students to become more familiar with the game-vocabulary as well as the game-dynamic. Once students became familiar with the game they started paying more attention to several linguistic aspects. This is shown by the fact that at least 11 of the 18 participant students used the target language much more accurately in the third game-session than in the first and second game-session. Furthermore they tended to interact much more with their game-partner by producing more language output and using more complex sentence structures. This ability was very much increased when players provided each other with meaningful language input as well as corrective feedback as, for instance, all of the 3 native-speakers did with their game-partners. Furthermore, the previous data were confirmed by the results from the anonymous survey we designed in order to get some additional feedback relating to students’ learning experience during the role-play. The survey was filled in by all 18 Spanish participants once they had finished playing the third game-session.

<table>
<thead>
<tr>
<th>The role-play and interaction with other players</th>
<th>YES</th>
<th>N0</th>
<th>N.A.</th>
</tr>
</thead>
<tbody>
<tr>
<td>helps me to use grammar more accurately</td>
<td>ExpG</td>
<td>CG1</td>
<td>CG2</td>
</tr>
<tr>
<td></td>
<td>4</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>helps me to consolidate my vocabulary</td>
<td>6</td>
<td>6</td>
<td>5</td>
</tr>
<tr>
<td>encourages me to use communication strategies to make myself understand by other game-players</td>
<td>5</td>
<td>5</td>
<td>4</td>
</tr>
<tr>
<td>helps me to learn new expressions</td>
<td>6</td>
<td>5</td>
<td>3</td>
</tr>
<tr>
<td>helps me to become aware of my weaknesses in the target language</td>
<td>6</td>
<td>5</td>
<td>6</td>
</tr>
<tr>
<td>helps me to become more confident with writing in the target language</td>
<td>5</td>
<td>4</td>
<td>2</td>
</tr>
<tr>
<td>provides me with corrective feedback from other game-players</td>
<td>6</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>frequently requires me to use words in English, French or Spanish in order to make myself understand and to proceed with the game</td>
<td>1</td>
<td>3</td>
<td>4</td>
</tr>
</tbody>
</table>

Table 1. Questions from the survey

The results from the survey can be summarized as follows: More than 90% of the participant Spanish students (ExpG, CG1 and CG2) consider that the game helped them “to consolidate their vocabulary” and at the same time “to become aware of their weaknesses in the target language”. Between 60% and 78% of all participants underline that the role-play encourages them “to use communication strategies” in order to communicate with their game-partners solely in the target language. Additionally, they confirm that the role-play helps them to “learn new expressions” and “to become more confident with writing in the target language”. Nevertheless, it is noticeable that the average marks of the ExpG (native game-player with non-native game-player) are higher with regard to all answers than those observed in CG1 (several non-native speakers) and the average marks of
the CG1 are higher than those obtained by the CG2 (with the same non-native speaker). In addition to this, 50% of the participants consider that the interaction and collaboration with other players “helps them to use grammar more accurately”, “provides them with corrective feedback” and, last but not least, helps them to use all kinds of communication strategies, thus avoiding the use of language other than the target language. Once more the aforementioned results have underlined once more the impact on students’ foreign language acquisition and communicative competence when exposed to versatile interaction, either with a native or several non-native speakers.

4. Conclusions
It is acknowledged that the proposed study still presents several limitations. In particular there is a need for further studies to be carried out with a much larger sample size and over a much longer period. Nevertheless, the results from the current pilot study have shed some light on the potential of virtual game-like applications in order to reinforce foreign language acquisition through collaborative learning tasks, even at the A1 level.

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References