Designing Interactive and Collaborative Learning Tasks in a 3-D Virtual Environment

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Abstract. The aim of our study is to explore several possibilities to use virtual worlds (VWs) and game-applications with learners of the A1 level (CEFR) of German as a foreign language. Our interest focuses especially on designing those learning tools which increase firstly, learner motivation towards online-learning and secondly, enhance autonomous learning through a highly interactive environment. Interaction is here seen as a multidirectional process, in which learners are asked to interact with different virtual environments as well as other learners in order to resolve a variety of tasks successfully. By interacting and collaborating in different tasks' performance, students are encouraged to learn from each other, in order to foster and widen their individual knowledge. For our research study we have designed a VW-platform, called VirtUAM (Virtual Worlds at Universidad Autónoma de Madrid). This platform permits us to store and record a huge amount of data related to users' behaviour and in world interactions. Furthermore the platform has been employed to build several virtual spaces, which implement different game levels. The virtual spaces themselves are used to give students basic training in different language skills (listening, reading and writing) related to German as a foreign language. In order to obtain data regarding the game's impact on student learning, we designed a general questionnaire, which was only filled out after the game and which aimed at getting personal feedback from the participants.

Keywords: OpenSim, virtual game-like applications, task-based learning, motivation, foreign language acquisition, collaborative learning.

1. Introduction

The following paper aims at analysing the possibilities and benefits of integrating new technologies such as virtual worlds and game-like applications in the foreign

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language acquisition process. In this sense, our interests specifically focus on the use of VWs combined with videogame-like features, in order to motivate students towards autonomous learning through online tools (Berns, González-Pardo, & Camacho Fernández, 2011a).

In recent years, many universities have started integrating in their *blended teaching* the use of Virtual Learning Environments (VLEs) (Gannon-Leary & Turnock, 2007; Garrison & Kanuka, 2004), such as Moodle, WebCT, etc. or VWs such as Second Life, Active World or OpenSim, which all offer a broad range of possibilities that enhance autonomous learning. Nevertheless, based on our own teaching experience, we believe that neither traditional VLEs nor VWs are able to motivate our students towards autonomous learning. According to a recent survey we did with our students, we can outline that the most frequent demands, for a motivating and successful online learning environment, are referred to those which offer: diversity in assessment, course flexibility in terms of time and space, tasks which provide opportunities for real and versatile interaction (learner-learner, learner-instructor, learner-content) as well as constant feedback on individual task performance.

Taking into consideration the aforementioned aspects, the following research study mainly focuses on the exploration of those online tools which reinforce real interaction, encourage learners to participate actively in their learning process, provide students with regular feedback on their task performance and, last but not least, fulfil the necessary criteria to be integrated into a Learning Management System (LMS). It was at this point of reflection that we started analyzing the possibility of combining VWs and videogame-like applications. The reason why we were interested in combining both is that VWs are often very interesting tools from the teacher's point of view but they are not necessarily that interesting from the student's point of view. Unlike VWs, videogames usually offer great potential to increase students' motivation and learning (Chang & Chou, 2008; Gee, 2007; Lunce, 2006; Malone, 1981a, 1981b; Prensky, 2001). This enhanced motivation can be explained by the fact that videogames are highly entertaining because they are task-based, enhance collaboration and competition by focusing on the achievement of a set of goals, provide immediate feedback to players on failure or success, stimulate willingness to explore, experiment and take risks in problem solving, are challenging because they support different levels of difficulty, and are highly immersive because objects and environments are usually created in 3-D.

The above mentioned features are not only the main components of a booming videogame industry, but also support some of the key-principles of foreign language teaching (Berns, González-Pardo, & Camacho Fernández, 2011b; Dörnyei & Ushioda, 2011; Ellis, 2003; Krashen, 2003; Lightbown & Spada, 2006). Such principles include the need to: motivate learners through meaningful and learner-focused topics; provide learners with comprehensible input through context-based learning; provide learners with opportunities for real and meaningful interaction through task-based and goal-

oriented activities as well as cooperative learning; underline the role of failure in successful language acquisition; encourage learners to experiment and take risks while communicating in the target language.

2. Method

2.1. OpenSim and VirtUAM

As we have shown in previous work (Berns et al., 2011a, 2011b) there are however, still other aspects which sometimes make videogames less appropriate or even inadequate. Drawbacks may occur because videogames are usually not embedded in a LMS or online platform which both store data on players' actions and behaviour during the game. Consequently, it is extremely difficult for teachers to track learner development and task performance and it is almost impossible to give students the support they need in order to succeed in further learning (Torrente, Moreno-Ger, Martínez-Ortiz, & Fernandez-Manjo, 2009). In order to design a game-like application and to measure its impact on students' language acquisition and motivation, we designed our own virtual platform called VirtUAM (Rico, Martínez, Alamán, Camacho, & Pulido, 2011). The VirtUAM-platform permits us to build our own VLE with an almost unlimited number of objects to interact with. Furthermore, the platform can be accessed only by registered users, which avoids the access of external users who might interfere negatively in our students' task performance (Berns et al., 2011a, 2011b).

2.1.1. Game design and structure

Taking into consideration students' motivation when involved in highly interactive tasks, we selected one of the key-topics from the curriculum planned within the A1 level (CEFR). This topic was related to different shopping tasks to be performed in a virtual city. The game we designed for this purpose was called *The city-game* and aims at the training of specific shopping products, some basic communication strategies as well as some selected grammar structures. In part all had been practised previously in face-to-face teaching and were now being fostered and widened through *The city-game*.

The following table provides a brief overview of the main game structure and its different levels. As Table 1 shows, the game is based on seven rooms (also called levels) which, apart from room one (level 0), all aim to train the learners' listening, reading or writing skills. During the game students have to move through different rooms with their avatar (students' 3-D virtual representation). In each room they face a new language task. The game itself is built on the bottom-up principle, focusing firstly on providing students with the necessary language input (levels 1, 2 and 3), secondly on the opportunity to train newly introduced learning contents (levels 4 and 5) and thirdly, on the performance of the final task (level 6). The final task is based on a collaborative task (or role-play), which requires students to do shopping in an electrical store. Whilst one student takes the part of a customer, another is encharged to perform

a shop assistant. Additionally, each player gets a different tool: the client gets several shopping lists, which are displayed on his personal monitor, the shop assistant gets a shopping trolley and the task to gather the shopping products the client asks him to buy. With the additional integration of a score-system and a time-limit we aimed not only to give students real-time feedback on their performance while playing the game, but also to increase their motivation (Berns et al., 2011a, 2011b).

Table 1.   Description of *The city-game* structure and levels

Sessions	Rooms	Skills	Goal	Dynamic	Time
1,2	Level 0 Meeting point	reading & writing	attend to students questions	student-instructor	5-8 min.
	Level 1 Training-room	listening	activate & widen previous knowledge	individual training	20-30 min.
3,4	Level 2 Quiz-room	writing	practise writing	small groups/ competition	20-25 min.
	Level 3 Amusement-Arcade	listening, reading, & grammar	practise grammar structures & foster vocabulary	individual/ competiton	20- 25 min.
6,7	Level 4 Cafeteria	reading & writing	practise communication strategies	interaction with different bots	20-30 min.
	Level 5 Clothes-Shop	reading & writing	practise communication strategies	interaction with one bot	20-30 min.
8	Level 6 Electrical Store	reading & writing	check/ consolidate reading & writing	collaborative task (role-play)	25-35 min.

3. Discussion

3.1. Empirical evaluation

During the present case study one language instructor was on hand to answer queries from the players. Furthermore one external observer analysed the data registered by the VirtUAM-platform. The target group consisted of about 30 Spanish university students learning German as a foreign language (A 1). During the different sessions students were connected from home and invited to use the text chat by communicating solely in the target language.

To measure *The city-game's* impact on student language acquisition and motivation we designed a general questionnaire, which had to be completed by the players at the end of the game. The results from the survey can be summarized as follows: 92% of the enrolled students comment that their motivation towards autonomous learning through VLEs increases significantly when learning contents are embedded in a game-based environment. In addition to this 95% of the students confirm that language

acquisition becomes easier, when learning is task-based and enhances interaction with others; 88% emphasize that learning becomes even more entertaining than in other VLEs. Moreover, 91% of the students stress their remarkable improvements in terms of vocabulary, 76% with regard to their grammar and 86% with regard to their writing skills. According to the questionnaire, as well as the information retrieved from the database, many learners practised their writing not solely during the explicit writing activities within the game (levels 2, 4, 5 and 6) but also by using the text-chat to make small talk with other players. The analysis of the questionnaire shows that the game environment reduces, in most of the learners, the feeling of anxiety: 38% of the learners feel more relaxed than in a face-to-face teaching scenario, while 68% feel more comfortable than in other VLEs. In our opinion this can be explained by the fact that students do not feel the same anxiety, in terms of evaluation, as they might do in face-to-face teaching or traditional VLEs. Unlike the former, games are perceived by students as activities related to fun and entertainment rather than to evaluation by the teacher (Berns et al., 2011b).

4. Conclusion

In view of the aforementioned results from the questionnaire, the pre- and posttests as well as the data retrieved from our VirtUAM-database, some final conclusions can be drawn: virtual game-like applications increase students' motivation towards autonomous learning, as they provide real-time feedback and help players succeed in the different game activities and in turn enhance the language skills which are targeted. Game features such as competition and collaboration with others motivate students to be more active and encourage them to challenge themselves in order to outperform other players. Virtual game-like applications offer a lot of possibilities to create immersive environments providing numerous opportunities for versatile interaction and thus for practising the target language with other learners. In this sense we believe that virtual-gamelike applications can be considered a very useful online tool to increase learner autonomy. The latter is seen here not only as an individual but as a social process in which a group of learners will collectively take responsibility for and control of their learning (Blin, 2004).

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