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# Digital Game-Based Language Learning in 3D Immersive Environments: The GUINEVERE Project

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## Abstract

*GUINEVERE (Games Used IN Engaging Virtual Environments for Real-time language Education) is a two-year European Commission (EC) project that investigates the potential of digital game-based learning in 3D immersive environments focusing on foreign language learning (2017-2019). The project responds to the latest "Recommendation from the European Commission on Languages" (2018) in that it explores how game-based learning and virtual learning environments may be used as digital tools to develop collaborative and creative learning environments. As the project approaches the interim period, this paper provides an overview of its activities and planned Intellectual Outputs (IOs). OpenSim is one of three platforms used in the project, alongside Minecraft and Second Life to provide a variety of games for students in the different languages of the project partners (English, German, Italian, Turkish). All of the virtual world islands provide playgrounds for young learners where they can explore a variety of collaborative and individual games. The project provides a critical overview of the key research literature in the field and explores some of its objectives (to identify guidelines for teachers on how to use immersive tools with their students; a needs analysis addressed to teachers and students from the partner countries; field tests on immersive games; and the creation of a new mobile application for playing immersive games for language learning). The final Intellectual Output of the project will be a teacher training course aimed at providing technical and pedagogical support for teachers to develop immersive worlds and games for language learning.*

**Keywords**: *Language learning, virtual worlds, game-based learning, immersive worlds, virtual learning environments, games*

## 1. Introduction

Although the use of digital games has been explored by numerous research projects it is still not clear how best to integrate them in effective learning environments [6]. Indeed, according to the World Health Organisation (WHO), the increasing use of such games may often be tantamount to an unhealthy form of addiction. Educators who argue that games may in fact have many positive factors, namely, increased levels of motivation, creativity, agency and enjoyment during learning, require more research to examine how best to achieve favourable outcomes while mitigating the physical and psychological risks. This paper reports on a two-year European Commission funded project called GUINEVERE (Games Used IN Engaging Virtual Environments for Real-time language Education), currently approaching the interim stage, which investigates the Erasmus+ challenge of promoting the importance of language learning in addition to learners' mother tongue by harnessing the potential of digital technologies to develop play, creativity and dialogical thinking to learn new languages and to generate understanding of new cultures [2]. The project examines digital play in authentic immersive environments across three different online platforms, Second Life (SL), OpenSim (OS) and Minecraft (MC), in primary and secondary schools. Through the GUINEVERE project language teachers and learners will be trained to create their own digital games by transferring them to immersive environments in virtual worlds, augmented and virtual reality game platforms, and casual games for mobile devices. The skills which teachers need to master are building, coding, adding sound, texture and scripts, recycling 3D objects and designing games, role-plays, simulations and scenarios. Moreover, by creating a teacher training course using an e-learning platform the project aims to develop a MOOC (massive open online course) that can be used, adapted and re-used by teachers and teacher trainers at no extra cost.

## 2. Background

Immersive game-play is a social phenomenon involving millions of users around the world on a daily basis. Using the affordances of virtual and online teaching environments GUINEVERE aims to draw on well-known face-to-face games, transferring them to the virtual world to create highly engaging and immersive simulations for learners to participate in problem- and project-based learning approaches at a distance [1] [7] [9]. Having trained teachers to create the games, the project will use machinima (recorded in-world videos) to demonstrate how to use and interact with them in a learning context. In this respect, GUINEVERE builds on and develops from a series of previous EU Lifelong Learning Programme projects (e.g., LANCELOT, NIFLAR, AVALON, EUROVERSITY and CAMELOT). These projects share a number of characteristics such as how to use virtual classroom/video conferencing technology for language teaching, and to create authentic and interactive contexts for foreign language learners using task-based language teaching (TBLT) [4]. GUINEVERE further develops these past projects with respect to digital games and the second part of this paper provides a status report on GUINEVERE's first five intellectual outputs (IO1-5) at its interim point.

## 3. Integrating Games in 3D Worlds

### 3.1 Theory of Games Design and Design of Global Simulations

The first part of the project aimed to construct a sound overview about how and why to make use of games in 2D and 3D virtual environments for language learning in order to apply relevant theories of game design [3]. Based on the needs analysis and the triangulated data, an authoritative review of the research literature on the theory of game design was undertaken. A needs analysis was also undertaken to collect data through questionnaires, e-mail correspondence and interviews to evaluate the potential for the implementation of foreign language learning activities and games in 3D VWs and the data were used to develop a framework for the use of gamification in the field. Questionnaires collected data from teachers and teacher-trainers, and from students, specifically related to feedback on the implementation of gamification. The needs analysis provided a framework for foreign language instruction, foreign language learning, and participant interaction in 3D VWs and clarified the linguistic contexts that could be used to create games for classroom use. The analysis also provided a rationale for including the sociolinguistic and pragmatic aspects of language in gamification and foreign language instruction.

### 3.2 Summary of Practitioner Experience of Games in Virtual Worlds

GUINEVERE's methodological approach triangulates findings based on a thorough understanding of the research on virtual worlds and practitioner perspectives arising from a summary of their experience of gaming environments. Data for the latter have been taken from several workshops with language educators and primary and secondary school teachers that have taken place since 2016 with the aim of exploring the creation of games in the virtual world of Second Life and OpenSim. EVO ViLLAGE is one of approximately 15 EVO sessions, which is an initiative of the TESOL CALL-IS (Computer Assisted Language Learning Interest Section) and takes place annually over a period of 5 weeks with approximately 3,000 English teachers. Up to 15 sessions are offered by volunteers who conduct free of charge workshops in various virtual learning environments. ViLLAGE stands for Virtual Language Learning and Gaming Environment and was conducted with approximately 40 participants, mostly English teachers in many parts of the world. Some of these participants did not have any previous virtual worlds experience. They were brought up to date using the training videos developed in the CAMELOT project in order to develop their technical and pedagogical knowledge. The goal of EVO ViLLAGE, which was run by a group of volunteer moderators in the virtual world of Second Life, was to train the participants to create their own games. These language learning activity games ranged from board games to global simulations. Participants were shown how to build and script from scratch and developed a wide array of games, maizes, treasure hunts, quiz games, role playing games, board games, objects which emit sounds when touched and accompanying machinima (digital training videos to explain games rules). While identifying the implications of this activity, the project also reports on some of the challenges that arose from using the complex technology involved, and the need for more familiarity with game design to understand effective game development.

### 3.3 Categorizing of Games

Arising from a solid understanding of the research base the next part of the project aimed to help teachers and trainees to systemize the use of games and encourage them to create and use these

teaching tools in their didactical work. The goal of this work was to analyse and categorise selected games for language learning and identify their suitability and adaptability for the use in 3D virtual language learning. One way of classifying games was to specify linguistic contexts to support teachers with regard to their usability and adaptability in their teaching curricula. This included investigating the selected games with regard to their goals, teaching objectives, the skills they required, and elements of language to be prasticed, as defined in the CEFR (Common European Framework of Reference) at levels A1-C2: listening/understanding, spoken interaction/speaking with other people, spoken production/making announcements and speeches, reading and writing. Further classifications of games emerged during this phase and included: gap filler, warm up, competitive, skill-based, discussion-based, recounting something, guessing activities, question and answers, mix and match, carrying out instructions, spelling activities, grammar and phonetics. Finally, the games were analysed with regard to complexity, availability of comprehensive rules, time needed for the game, information about minimal and maximum number of players (individuals, groups), information on proficiency level, procedure and suitability, preparation time, re-usability, and adaptability [5] [6].

### 3.4 Guidelines for Language Teachers

The final part of year 1 of the project focused on producing an online document that provides guidelines and recommendations for educators and administrators who are considering and willing to use games in learning events or conduct language learning with games on 3D environments. It draws on information from the needs analysis and other best practices in the field of foreign language learning and provides guidelines for foreign language instruction, foreign language learning, and participant interaction in games and 3D virtual learning environments. It clarifies and frames the linguistic contexts which could be used in designing the games for classroom application and also provides a rationale for including the sociolinguistic and pragmatic aspects of language learning in immersive games and foreign language instruction.

## 4. Conclusion

Since coming to prominence over the last decade immersive learning has gone through several iterations of popularity but has often been marginalised in educational environments due to the cost and expertise required, as well as the mismatch between the speed at which technological innovations develop and the slow speed of curriculum change [5]. A related focus of the GUINEVERE project in this respect is investigating healthy and productive forms of digital play and to present teachers and learners with the opportunity to explore important forms of digital and collaborative literacy. The GUINEVERE project is a timely exploration of the affordances and challenges of digital game-based language learning in the new context of immersive environments and all of its deliverables will be made freely available to teachers and learners via its website (http://guinevereproject.eu/). Its concerns have been shaped to date by the critical digital pedagogy perspective [8] in that it aims to consider mainstream learners' use of games as well as include participants from groups who are typically disengaged by traditional forms of education and to explore themes related to disadvantaged learners to connect the themes of learning, creativity, health, well-being and inclusivity in education.

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