

# Comparing Two Teacher Training Courses for 3D Game-based Learning: Feedback from Trainee Teachers

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## ABSTRACT

*This chapter explores data from two online language teacher training courses aimed at providing participants with the skills to create and use games in 3D immersive environments. Arising from a two-year project which explored how game-based learning and virtual learning environments can be used as digital tools to develop collaborative and creative learning environments, two training courses were developed to support teachers to use three immersive environments (OpenSim, Minecraft and Second Life). The first course was self-directed and the second was moderated by facilitators. Both courses provided a variety of games and resources for students and teachers in different languages (English, German, Italian and Turkish). This chapter explores feedback from the teacher participants on both courses arising from a questionnaire and interviews with teachers and provides recommendations about the technical and pedagogical support required to develop immersive worlds and games for language learning.*

Keywords: CLIL, Game-based Learning, Immersive Worlds, Language Learning, Minecraft, Moodle, OpenSim, Second Life, Teacher Training

## INTRODUCTION

This chapter investigates the main features of an online teacher training course on language learning and teaching in immersive worlds. The course was part of a two-year project which aimed to examine the pedagogical potential of digital game-based learning in 3D immersive environments. In particular the chapter critically explored the potential of immersive training for language and CLIL (Content and Integrated Language Learning) teachers in the two different formats, a self-study course and a teacher-led training course, based on quantitative and qualitative data. The main difference between the courses was that the self-study course provided a theoretical framework for games design without the need to actually build games. In the teacher-led course the participants' goal was to design and create a game in a virtual world. The two courses were addressed to teachers from different European countries (Italy, the UK, Germany and Turkey). The chapter briefly summarizes relevant research literature before describing the rationale, aims and scenarios that informed the planning and implementation of the two courses as examples of continuing professional development (CPD) in immersive worlds. The research was guided by the following two research questions:

1. How beneficial and effective is CPD on game-based learning and immersive worlds for foreign language teachers?
2. What are foreign language teachers' perceptions of being trained in a Community of Practice (CoP) in an immersive world?

## BACKGROUND

The use of digital games in different contexts has become increasingly popular in the last few years. Industry and educational professionals are regularly using digital games to foster users' motivation and engagement, as confirmed by Johnson et. al (2013), who argued that "game play has traversed the realm of recreation and has infiltrated the worlds of commerce, productivity, and education, proving to be a useful training and motivation tool" (p. 21). Research has shown that games play a crucial role when it comes to education but it is important to reiterate that several categories and concepts have overlapping boundaries and they are not always clearly defined. Several authors, for example, use the terms gamification and game-based learning to describe the same concept (Callaghan, McCusker, Losada, Harkin & Wilson 2013; Epper, Derbyberry & Jackson, 2012).

### Theoretical Framework

Research suggests that integrating game mechanics into classrooms may increase students' intrinsic motivation to learn as well as improve their engagement and learning outcomes (Clark et al., 2011; Hanus & Fox, 2015; McGonigal, 2011). A gamified curriculum also offers students the possibility of obtaining a visual display of their progress while having the freedom to explore multiple identities and experiences and to fail without the fear of penalty (Kapp, 2012; Klopfer, Osterweil & Salen 2009; Lee & Hamer, 2011). However, some barriers have been identified when integrating games into education such as lack of support for teachers, the logistics of game-school integration (Osterweil & Salen 2009) and, as Lee and Hammer (2011) pointed out, the challenge of a gamified curriculum that "might absorb resources, or teach students that they should learn only when provided with external rewards" (p. 4). It is therefore crucial to understand the foundations of game design in order to integrate them effectively and appropriately into educational programmes.

Research suggests that the use of games and game elements have been applied across all levels of education with more emphasis on primary and secondary education (Dib & Adamo-Villani, 2014; Lim & Ong, 2012; Su & Cheng 2015; Wiggins, 2016) and that educators are supporting and increasingly adopting games in their practices as the NMCHorizon Report (2014, p. 78) confirms: "the Gamification of education is gaining support among educators who recognize that effectively designed games can stimulate large gains in productivity and creativity among learners".

Teacher training courses and continuing professional development (CPD) opportunities for teachers are often hosted by a variety of elearning platforms. Moodle is one of the most popular and user-friendly open source platforms which has been increasingly used in all sectors of public and private education in recent decades, particularly as a result of its alignment with the principles of social learning. Moodle is based on a Learning Content Management System (LCMS), which includes:

- an 'author' tool that allows teachers to create and re-use learning objects;
- a dynamic interface;
- an administrative interface that allows teachers to manage and track the activities of users.

The virtual environment created by Moodle is inspired by the following pedagogical principles and frameworks (Huang & Liang, 2018):

- *constructivism*, according to which students actively build new knowledge by interacting with the environment in which it is integrated;
- *constructionism*, which is aimed at highlighting how learning is particularly effective when engaged in building knowledge and skills intended for use by other users;

- *social constructivism*, which aims to extend the ideas previously illustrated within a social group engaged in constructing educational materials in a collaborative way for each other, thus creating a cooperative culture of shared products with shared meanings;
- *connected behaviour* or *related behaviour*, as opposed to *dissociated behaviour*, refers to a more empathetic approach that promotes a variety of perspectives in a constant attempt to listen, ask questions and try to understand as far as possible the point of view of others (Boon, 2007).

Based on these affiliations, Moodle has strong theoretical links with *cooperative learning* (Kaye, 1994), which aims to foster group work for educational purposes, so that students can collaborate with each other to maximize their learning potential. Specific research has shown that cooperation, compared to competitive and individualistic efforts, generates the following results in most cases:

- greater productivity and effectiveness in the development of the training path;
- greater self-esteem, social competence and satisfactory results from a psychological point of view;
- more committed, attentive and collaborative interpersonal relationships.

In fact, teachers can be considered as special lifelong learners as they have to be able to innovate and adapt to different students and contexts throughout their careers. Constant learning is therefore a priority for them, because they are reflective practitioners, whose practice involves a willingness to participate actively in a continuous growing process, requiring ongoing critical reflection on both classroom practices and core beliefs (Larrivee, 2008). If, on the one hand, learning is a never-ending process, there are some phases that are more critical and strategic than others. In this context, it is worth mentioning Mezirow's (1991) research on how adults learn by giving meaning to their experiences through perspective transformation and the work of Schön (1983) on the teacher as a reflective practitioner, which is a key dimension of personal and professional growth. Reflecting 'on' and 'in' action is an essential aspect of learning, as it helps teachers understand the strengths and weaknesses in their teaching style, in order to improve it constantly. This was among the aims of both training courses. As a transversal task in both courses, the digital portfolio was specifically designed to fulfill this aim. Moreover, forum interaction was encouraged as a tool for self-reflection and mutual enrichment.

Online learning for teachers needs an effective and "scientifically well-grounded" learning environment, complying not only with the principles of andragogy (Knowles, 1975) but going even beyond, leaving sufficient space for self-determination and adopting a heutagogical approach. Heutagogy (Hase & Kenyon, 2000) is considered as the study of self-determined learning. It applies a holistic approach to developing learner capabilities, with learning perceived as an active and proactive process, with learners serving as "the major agent in their own learning, which occurs as a result of personal experiences" (Hase & Kenyon, 2007, p.112). Heutagogy can be seen as a theory of distance education which extends the andragogical approach.

In developing the training courses, the designers took advantage of their previous experience in the field of online adult learning through different initiatives aimed at meeting the apparently conflicting needs of socialisation and autonomy of an adult audience by offering an andragogical and heutagogical approach (Benedetti, 2018).

In 2000 Garrison, Anderson and Archer defined the model of the "Community of Enquiry" (CoE) as consisting of three key elements which should be included in every online learning environment, according to the constructivist and constructionist models: the cognitive element, the social element and the teaching element. The three dimensions were developed in the training courses as follows:

- *the cognitive element* was represented by the learning material provided in the platform as a starting point for reflection and via the shared forum spaces; in particular, it was a key part of the self-study course;
- *the social element* referred to the interaction among the participants both in the synchronous mode through webinars and live meetings in Minecraft and OpenSim and in asynchronous mode through the forums, where they were asked to post their reflections on the learning materials provided in the platform;

- the *teaching element* referred to the coaching and moderating role of the forum moderators and the teaching activities during the live meetings in Minecraft and OpenSim.

The development of the training courses was led by the idea that knowledge is generated by the ability to build connections within a network. Knowing how to choose what to select and understand the meaning of information is in itself a learning process. The ability to identify connections between fields, ideas and concepts is a central skill to be acquired. The learner approaches the study in the way s/he prefers, individualizing his or her approach to the content through autonomous selection leading to the personalization of the learning pathway.

In distance learning, participants are encouraged to prepare projects linked to objectives in relation to the specific subject and context (Alan & Stoller, 2005; Thomas, 2017; Thomas & Schneider, 2020). The project requires constant negotiation between the interior and the exterior. Each learner develops his or her own project by collecting the ideas received from the teacher and subject tutor, transforming cultural learning into an instrument of experience and personal appropriation. The project implies ‘double thinking’, in the sense of foreseeing and imagining a possible world, while working at the same time to achieve it. The project assigned the participants opportunities for forum interaction in the self-study course, while in the teacher-led course, the project was represented by the game they had to build *in-world* in Minecraft or in OpenSim (Beckett, 2002, 2006; Beckett & Miller, 2006).

Self-knowledge includes the possibility of making the student rediscover his/her design skills, so that the individual can not only make his choices but also return and change them if a choice is no longer suitable. In distance learning, each training course is aimed at strengthening the spirit of a scientific community based on individual and collective collaboration, sharing and creativity (Beckett & Slater, 2005, 2018, 2019).

Technology can support this cooperative approach offering tools and virtual environments for sharing different participants' experiences. By creating a Personal Learning Environment (PLE) (Chatti et al., 2010) centred on the student's individual needs and learning styles, trying to plan and implement tailored learning pathways, the potential of webtools and media may be exploited in order to make the learning experience effective and powerful. To this end, it is important to foster as many formal and informal learning environments as possible within training pathways and to build a Community of Practice (Wenger et al. 2002), consisting of teachers and practitioners.

## **Course Context and Planning**

Both of the teacher training courses were planned and delivered with the aim of enabling individual and cooperative learning. Individual learning was fostered especially through the delivery of learning materials and video-tutorials, which were meant to elicit content-based learning and at the same time reflection and meta-cognition. Cooperative learning was mainly fostered through discussion forums and during live events in the teacher-led course, in particular weekly webinars and synchronous meetings with experts in OpenSim or Minecraft. This combination of autonomous learning and cooperative learning was meant to be the most effective formula to enhance life-long learning.

The training courses' teaching model received inspiration from Scardamalia's theory model on knowledge building (Scardamalia & Bereiter, 2006), which emphasized collaborative work and research rather than individual inquiry. This means that distance learning may not lead to ‘studying alone’ but that it should be organized in order to ensure collaboration and the sharing of ideas for those involved.

The knowledge building perspective adopted was also supported by UNESCO (Meek & Davies, 2009). The training courses addressed language and CLIL teachers' continuous professional development from a life-long learning perspective. Both the self-study course and teacher-led course were delivered through a Moodle platform and involved 5 modules, each containing several tasks, reading lists, videos, resources and

instructions. The core learning material was provided by reports and resources arising from the teachers. Universal Design Principles led its development as per the following four areas:

### ***Course Information***

Moodle was relatively intuitive to use and provided the complete course syllabus in one long page view. Following the design principles, an image of the virtual world used prefaced the course followed by the introduction chapter, a brief course description, an introduction video, a syllabus and recommendations for study time. Clear instructions for students followed about where to begin and how to navigate current content, thus meeting the ‘less than three clicks’ design principle. Each module provided tasks, communication instructions for the forum and guidelines. Students were made aware of participation expectations, technology requirements, access instructions to the various virtual environments, reading lists and course materials.

### ***Course Content***

Care was taken not to infringe any copyright laws when presenting course material. There was a “Welcome” and “Let's get acquainted” discussion. Each module began with an image or video and a clear title as well as a coloured text title marker which included the number of the module. In the self-study course personalized learning was evident. All of the modules were open from the beginning and no pre-requisites were imposed on the students. All of the tasks were designed for self-study and none of the assignments had due dates or grading deadlines. Modules included three forms of interaction:

- a) student-student interaction (ie. discussion forums);
- b) student-teacher interaction (feedback provided by the tutors in the discussion forums, students’ portfolios were open and accessible to peers);
- c) student-content interaction (engaging and varied content such as reading, watching videos, playing games *in-world* was provided).

### ***Assessment***

Multiple methods of assessment were used, such as forum discussions, tasks, portfolios, written essays and detailed instructions and guidelines for completing assignments and discussions were provided at the outset.

### ***Course Accessibility***

Instructions on how to login to virtual spaces were provided. Consistent module and text styles were used and hyperlink text incorporated the destination, words and phrases to provide context for screen-readers.

### **Methodology**

Two questionnaires were delivered to the participants in both courses: one at the beginning and one at the end. Interviews were also conducted at the end of both courses in June 2019.

Relevant data from the questionnaires, together with data from the interviews and the final student reflections posted in the forums on the elearning platform were used to answer the following research questions:

- RQ1: How beneficial and effective is Continuous Professional Development on game-based learning and immersive worlds for foreign language and CLIL teachers?
- RQ2: What are foreign language and CLIL teachers’ reactions and opinions about being trained in a Community of Practice in immersive worlds?

### ***The Self-Study Course***

The self-study course was attended by 24 participants, the vast majority of whom were upper secondary school teachers of English from Italy and Turkey. As already mentioned, the self-study course was planned

to foster autonomous and independent learning through the learning materials in the platform. Forum discussion was elicited to foster reflections and opinions about the study materials. The initial questionnaire was aimed at understanding the participants' background, learning styles and needs in order to plan and deliver the course accordingly. The final questionnaire was aimed at investigating the impact of the course on the participants in terms of learning outcomes, professional development, knowledge acquired and skills developed.

In the initial questionnaire the majority of the participants self-evaluated their digital competences as 'good', and indicated that they often used learning technologies in their work (Beetham & Sharpe, 2019). Active and interactive methodologies such as work group and project work emerged as the most frequently applied. The majority of teachers affirmed that they used games to motivate and reward their students, to foster collaboration and develop creativity, socialization and peer learning. Regarding their knowledge and use of Minecraft, Second Life and OpenSim, the majority of respondents reported that they had never used these platforms, but they felt that game based-learning in school curricula would be beneficial for students, especially in terms of increased motivation and development of 21st century skills.

### ***The Teacher-led Training Course***

The teacher-led course represented the second iteration of the online course although with a different format. Live sessions *in-world* in OpenSim and Minecraft and weekly webinars to conclude each week's work were regularly scheduled as an integral part of the course, requiring more active and engaging participation from the teachers in the immersive worlds. Like the self-study course, it was developed as a five-week format and provided the participants with the opportunity to choose between two immersive environments to explore for language learning and teaching: OpenSim and Minecraft. 16 participants joined the course and the majority were Italian teachers of English at the upper secondary level. Their previous experience in the topics addressed by the project were self-evaluated as 'quite highly' skilled in ICTs. The majority also declared that they used learning technologies 'quite often' in class. The course was designed for two groups to work in parallel in different environments and with different learning materials. In the forum, the participants were encouraged to interact and share their ideas and comments about the learning materials. At the end of each week, a weekly webinar was run involving all of the participants in a lecture related to the main content of the week. The digital portfolio was the transversal task of the course, as it was in the self-study course in order to encourage participants to collect memories from their learning experience and to have a positive impact on their professional development.

## **FINDINGS AND DISCUSSION**

### ***The Teachers' Voice from the Self-Study Course***

The discussion forums worked very effectively throughout the self-study course in particular where they represented a core element of the course and were appreciated by the teachers, who used it to share their opinions and reflections on game-based learning in immersive worlds and on the learning material provided in the platform. These discussions were aimed at encouraging peer learning, so that the participants could feel like integral members of a Community of Practice. Several comments from the discussion forums clearly identified how the CoP supported their training. In particular, two detailed comments from one of the participants are reported below:

What are the advantages of learning through the making of a game? What about the development of cooperation skills in the creation of a game? The constructionist gaming combines, in a meta-cognitive approach, game-based learning with project-based learning, developing team working skills or cooperation skills or role-play based learning.

The four freedoms of play (fail, experiment, assume different identity and effort) lead students to a new idea of learning, more enjoyable and motivating. It's the immersive dimension of the 3D world

which helps students experience a ‘real’ situation they can be involved in. Moreover, the chance of synchronous activities in a setting where foreign language is the only way of communication urges to act according to the rules of ‘real life’ situations, finding out linguistic solutions immediately, so playing games in a virtual environment definitely enhances language learning. (Participant 5)

The comments show how powerful the learning experience in a 3D world was for the trainee teachers, enhancing their motivation, enthusiasm and engaging them in very challenging and rewarding activities. Such activities included role-plays and production tasks involving ICTs:

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Role-Play activities are fit for the purpose of learning a foreign language in 3D worlds; the constructivist paradigm (to be active creators of one’s own knowledge) is the natural infrastructure to implement such activities: the more the students are the makers of their own scenarios, the more they will be motivated and engaged. Once the scenarios are ready, the playing of the roles can be enriched by the element of improvisation and the methodology of problem-solving.

3D worlds are, in some way, closed worlds, because you make use of elements from its immediate environment, even if you can import elements from outside, and it’s not easy to show other people the activities and the final results, unless you shoot pictures or videos to publish on a website or blog or social network on the Internet. There is still much to do in the technology area of usability and accessibility (user-friendly tools, easy-to-use software for hearing and speech impaired students) and in the field of evaluation and assessment (creation of rubrics with criteria planned for 3D world didactical activities). (Participant 5)

Based on these comments it is worth underlining how conscious the trainees were of the potential of game-based learning in immersive worlds, as a practical implementation of the constructionist approach. They also pointed out the social dimension of the games, particularly beneficial for students who used the target language in a meaningful context, thereby reducing their affective filter (Krashen, 1985).

After downloading the theoretical material on game-based learning in immersive worlds and exploring the potential of Second Life, OpenSim and Minecraft from a ‘passive’ perspective, mainly through videos and other resources, in the final questionnaire the participants stated that they were quite satisfied with the introduction to virtual worlds, as not much active engagement in virtual worlds was required. This was done on purpose, as the ultimate goal of the initial training course was to guide the participants through an introductory learning experience in a virtual and immersive world, following a tailored-made pathway designed to be adjusted to individual participants’ learning needs and free time.

This more ‘passive’ approach was appreciated by the participants as it was perceived as a ‘teaser’ to activate their curiosity to learn more about language learning in immersive worlds through a more practical ‘hands on’ approach in the second teacher-led course. The fact that there were no time constraints on the activities in the first course was also appreciated by the participants who did not have scheduled meetings to attend.

One of the participants in the self-study course decided to continue the learning experience and enrolled in the teacher-led course as well. It would be interesting to offer such learning pathways within the continuous

professional development courses attended online and face-to-face by teachers in Italy and in Europe. In fact, language learning with technologies and in particular language learning in virtual and immersive worlds is still an unexplored teaching field that could be encouraged more among teachers. This is partly due to the fact that specific technical skills are required, therefore training both on technical and digital literacy and on language learning and teaching in immersive worlds could have a significant impact on the school curriculum and contribute to improve students' level of competence in foreign languages. According to the teachers, the self-study course helped develop the following competences:

Building games in virtual worlds. (Participant 3)

It consolidated or deepened the use of different strategies to gamify teaching activities and base them more on learning by doing and situated learning approach. (Participant 1)

Building some gaming activities for children. (Participant 6)

I developed a further understanding of new virtual worlds and their possible uses in education. Relations. (Participant 2)

Instructional design competencies, from analyzing learner needs to developing training assets. (Participant 8)

Innovative approaches to learning about game-based learning additional ways of involving students, new ways to build educational games and other ways to develop creativity. (Participant 4)

One of the questions on the final questionnaire was related to the possible use of the different immersive worlds for their future teaching: "How likely are you to use the following in your teaching in future?": answers suggested that Minecraft and OpenSim were more popular than Second Life, mainly because of the privacy constraints on the students.

### ***The Teachers' Voice from the Teacher-Led Course***

In the teacher-led course the forum was a valuable learning space which enabled the trainee teachers to share ideas, comments and experiences. As a moderated forum it provided several opportunities for the participants to learn from their colleagues. Every week a specific forum was created in order to collect the participants' ideas and comments on the various learning materials and readings suggested. As a result, the forum collected a wide range of meaningful insights and reflections, as shown in the selection of three extracts, where examples of comments from each of the five weeks have been quoted. The quote can be considered learning materials in themselves as they are dense with reflections and relevant literature references chosen by the trainees.

*Re: Does it make sense to build a boardgame in OpenSim/ Second Life?*

*Saturday 22 June 2019, 22:33*

In a virtual world, board games should use some of the features offered by that unique environment, like leader boards and feedback for players. There is also the opportunity to build in multimedia and have students respond to sound, pictures, and/or video.

Another reason to play board games in a virtual world even if no extra features are added would be if the players were physically distant, and playing in the virtual world gave them an opportunity to hang out and play in a common virtual space. This is true of most MMORPGs [Massive Multiplayer Online Role-Playing Games], but smaller more traditional card and board games are often played by geographically distant players in Second Life and Open Sims.

P7, what you did with that map of the British Isles is AMAZING. I love the way it is physically and audibly interactive in the Open Sim, and then also has the online quiz element, with the two complementing one another and facilitating learning from more than one direction. Brilliant! (Participant 6)

## Extract 1

*Re: Week 4 Suggested Readings*

*Saturday 1 June 2019, 19:15*

[the review of research provided] is such extensive and interesting reading that one does not know what to tackle first! My comments will not be very systematic as the material would need several readings and much thought to be processed decently.

A. I am familiar with MOOCs [Massive Open Online Courses] and 3DVLEs as I have tried several examples of the former (for example three courses by the European Schoolnet Academy and a number by EVO) and am a regular attendant of WVBPE [Virtual World Best Practices in Education] conferences and the like. Conversely, I have no experience in PBL [Project-based Learning], even though I attempt, from time to time, to create classroom experiences that may 'feel authentic'.

Among the three, I feel that MOOCs are least relevant to me as a teacher, being MOOCs a modality that works very well with adults but not with under-age students. 3DVLEs are at the core of our interests - we would not be here otherwise, while PBL makes sense just as a possible component of a teaching activity in a virtual environment. On the other hand, these three modalities might be combined. For example, in an eTwinning (telecommunication) project taking place in a virtual world, learning to build a specific object could be an example of PBL.

B. While academic works need to distinguish between and categorize different teaching approaches, the real teacher often has to combine different methods finding a unique way to satisfy

- administration requirements: timing, syllabus, organizational demands...
- class requirements: size, diversity of students, special needs, social background....
- community (fellow teachers) requirements: sharing of spaces and devices, consistency of methods with the same groups of students, interpersonal challenges (innovators are often perceived as challenging by their peers and are often met with irritation or jealousy).

Finally, I wonder which school would be willing to pay me for the needed skills ... In Italy teachers do not have a 'career': either they are teachers, or they are not. Consequently, the professional who takes the pain to acquire digital, pedagogical and organizational skills is paid as much as the teacher who totally relies on pre-packaged materials that s/he delivers frontally to a class, year after year. Innovators here have a totally intrinsic motivation!" (Participant 7)

## Extract 2

*Re: Week 4 Suggested Readings*

*Sunday 2 June 2019, 19:00*

The readings and both of your comments are fascinating. I used to teach more PBL, TBL [Task-based Learning] or communicative approaches when I was working as a corporate trainer. Now I'm teaching more English for Academic Purposes, writing development, speaking objectives and so on. I'm also involved in CLIL courses too, such as Economics, Psychology & Sociology. When I was reading about the authentic contexts, I think it's relative. Is EAP an authentic purpose, or is English for Specific Purposes, more authentic? Or does it mean realistic compared to the real world, but they not have to ever do that task in the real world, like flying an airplane. I love the intercultural interaction possibilities of telecollaboration, and often do contrastive cultural role playing.

It's a steep learning curve to use 3DVLE's [3D virtual learning environments] with the main barrier, getting all the students online. At the same time, being able to design motivating tasks for the students is always the challenge, and I think a 3DVLE would help that. A first step for me, may be for one student to interact with a Bot/task to develop and demonstrate the functionality. I hope I'll be able to do this. (Participant 8)

### Extract 3

From the comments reported in extracts 1-3, it is worth underlining that the participants in the teacher training course had the opportunity to reflect on and discover new ways of teaching, to reshape their teaching strategies, and consider new game-based scenarios for language learning and CLIL. A clear result of the course was the level of synergy and cooperation among the participants, which opened the way to further possible cooperation and joint projects in future, as stated by one of the participants in the following comment:

I really appreciated the effort to apply the gamification theory to designing and then creating an educational game within a virtual world. I also found exchanging ideas with the other participants greatly helpful. I am already planning some further collaboration with P3 (on a different course).  
(Participant 6)

Based on questionnaire data, the trainee teachers indicated that they developed several inter-related competences as a result of their participation (see Figure 1): language competence (10%), digital competence (14%), teaching competence (14%), knowledge of immersive methodology (21%), ability to design games (14%), and their ability to create games (17%).

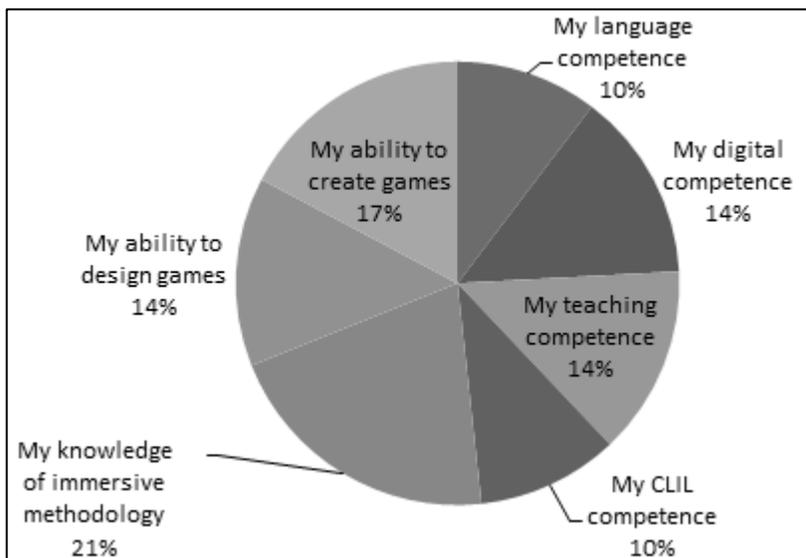


Figure 1. Teacher competences developed during the course

The trainee teachers' comments provided several insights into the competences they developed during the course:

The course has shown me a new way to teach in the CLIL approach using games. (Participant 2)

Again, as someone already quite informed on the theory behind all the competencies listed, the course really only helped me improve in regard to the practical implementation of said theory, namely, how exactly to build what I already knew I should be building. (Participant 1)

I really appreciated the effort to apply the gamification theory to designing and then creating an educational game within a virtual world. I also found exchanging ideas with the other participants greatly helpful. I am already planning some further collaboration with P3 (on a different course).

Furthermore, there were many opportunities to reflect about teaching methodology and I loved that. After all, I am taking these kinds of courses to become a better teacher! (Participant 3)

I feel I've learnt a lot of new skills. (Participant 4)

All the course was really interesting and I hope to put in practice what I learnt during my next school year. (Participant 5)

It was a new world of teaching for me, and really inspired me to present about my experiences at an ESP conference, and consider for many months, how I can develop this as a teaching weapon. As yet, it is still a feasibility study, but I want to use it with my university students next semester. (Participant 6)

### **The Final 'Show and Tell'**

The main goal of the teacher-led course was for the participants to learn more about immersive worlds for language learning and to help them create games *in-world* with specific learning objectives, considering their specific target students. Therefore, a final 'Show & Tell' exhibition was held at the end of the course, so that the participants could describe and comment on their creations. For the majority of the participants the use of game-based learning in school curricula was perceived as beneficial, as the following comment shows:

Games make students interested in the lessons. The students are already familiar with the games and they do not want to work on papers, write long paragraphs. They do not realize that they learn while playing games, but implicitly, they learn and it stays in their brain for longer. (Participant 8)

They mostly rated as quite positive their students' reactions to game-based learning and digital games, as shown in Figure 2 (positive 25%, quite positive 50%, very positive 25%).

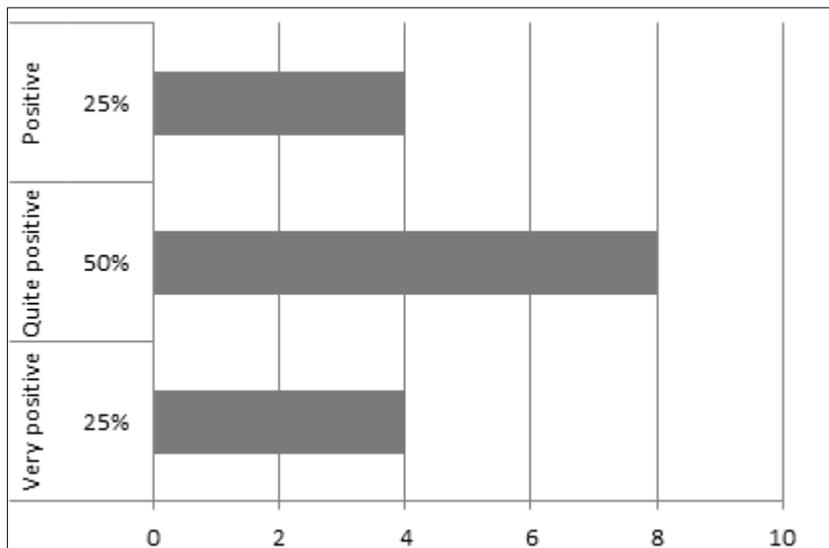


Figure 2. Students' reactions to game-based learning and digital games in the school curriculum

They also thought game-based learning would result in improvements in the students' learning outcomes, with particular reference to increased motivation, as illustrated in Figure 3 (related to language competence, increased motivation, subject knowledge, and 21<sup>st</sup> Century skills).

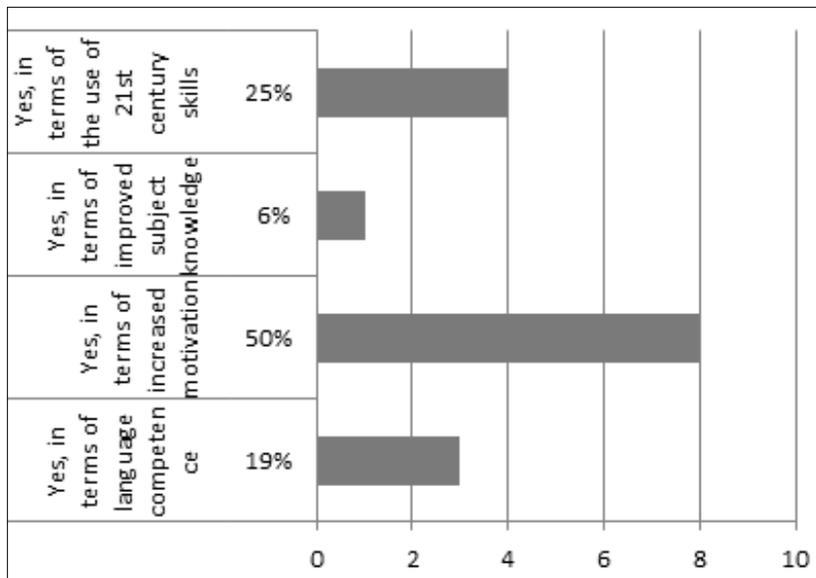


Figure 3. Improvements in the students' learning outcomes

The attitude of the parents to game-based learning was considered neutral (38%) and positive (31%) as shown in Figure 4.

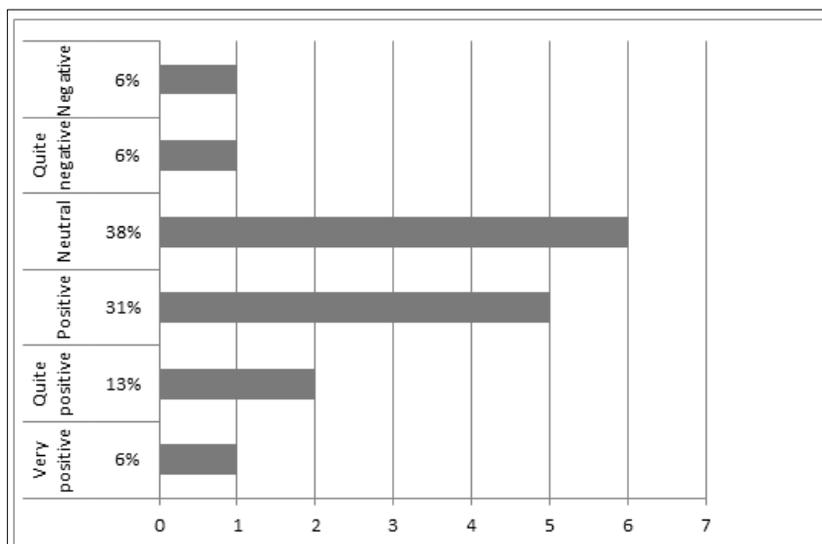


Figure 4. Reactions of the students' parents to game-based learning?

In the teacher-led course the final live exhibition presented an opportunity for the participants to share and discuss with their peers the games they had created and the rationale behind them: it represented the core of the course. Several types of game were created as described below.

### Academic Research Game

The Academic Research Game (Figure 5) was designed by two participants to be played by teams of players and to provide hands-on practice of picking a topic and beginning a literature review with library based tools and databases. Each square prompted the students with a task in the text chat. By the end, students had developed a research document in their race to the top.

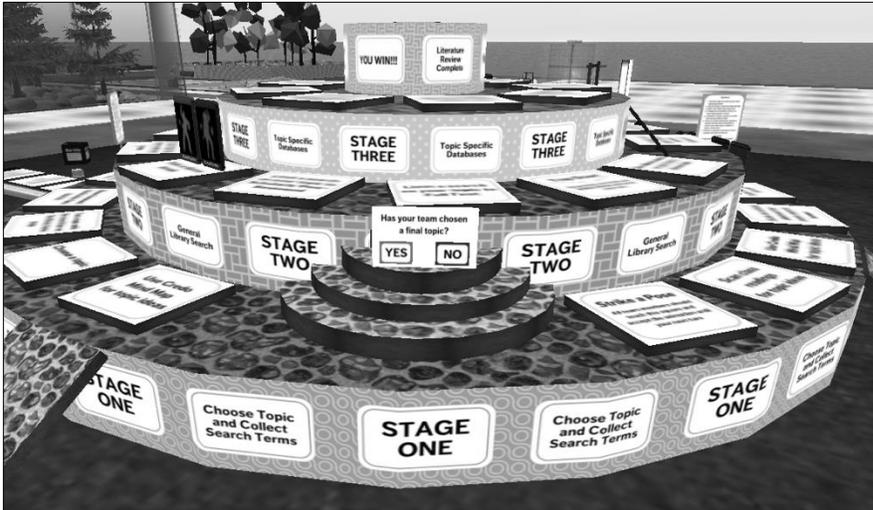


Figure 5. Academic Research Game

### *Topographical Map Utilizing Sound Script*

The topographical map (Figure 6) was created in an application called Blender and imported into OpenSim. The game was dynamic and physical as bumping into the cylinders triggered a script that named a city. Interacting with the map helped student to complete this web-based exercise successfully.



Figure 6. Topographical Map Utilizing Sound Script

### *Alice in Wonderland Hunt and Image Sort*

This Cheshire cat based hunt and image sorting exercise (Figure 7) tested students' understanding of the story line by asking them to put the images from the original illustrations in order.



Figure 7. Alice in Wonderland Hunt and Image Sort

### *The Board Game*

This hand drawn game (Figure 8) included a variety of elements and was noteworthy both for the hand-drawn board and the variety of different types of activities used to engage students in language practice. The variety of well-designed tasks (including listening comprehension that used embedded video and audio clips) was created to sustain high degrees of class engagement.

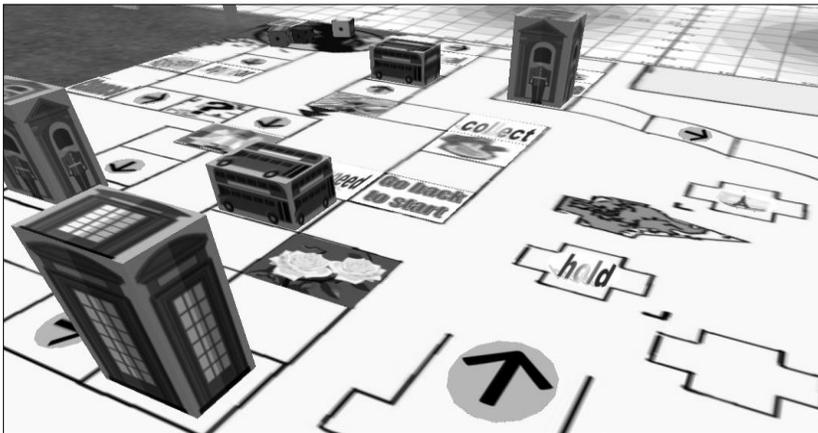


Figure 8. Board Game

### *Mysterious Forest Maze*

The mysterious forest maze game (Figure 9) was an example of how important preparation is to designing activities in virtual worlds. The students created an inviting woodland landscape peppered with clues and puzzles to be discovered and solved by participants. While the use of the puzzles may have attracted some students' interest, the landscape was especially designed to stimulate learner engagement.



Figure 9. *Mysterious Forest Maze*

### *Memory Game*

This memory game (Figure 10) is an example of what can be done with a traditional game in a virtual world that could not be done in the classroom. As soon as the student matched the correct image to what was being said in the picture, the game told the player in the text chat, “That is correct.” If incorrect, the cards quickly reverted to face down to indicate the students’ need to try again.

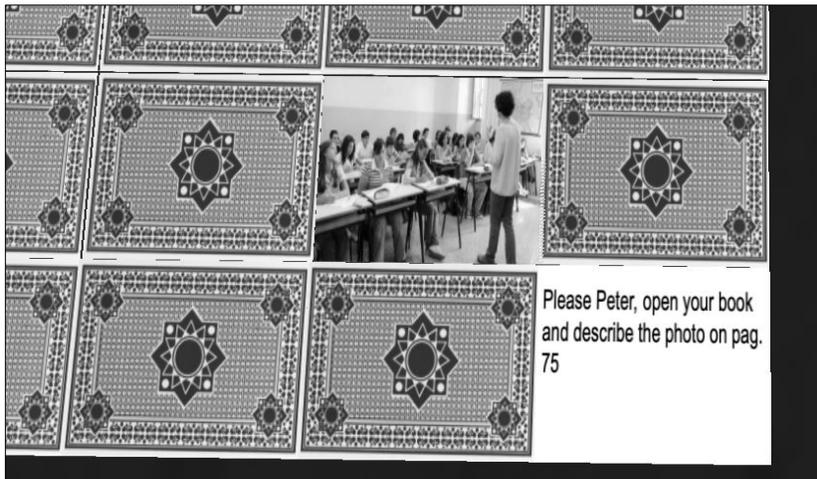


Figure 10. *Memory Game*

### *Bank of Japan (Simulation)*

This role-playing game (Figure 11) allows players to interact with bot tellers in the bank to ask for help and the correct forms, and to interact with the ATM machines to practise recognizing which buttons need to be pressed to initiate different transactions.



*Figure 11. Bank of Japan (Simulation)*

### *Quest in Minecraft*

The Secret Lab of Dr Moreau (Figure 12) was designed as a quest in Minecraft, located in the basement of a House, where a Mysterious Portal leading to another world appeared.



*Figure 12. Minecraft Quest The secret lab of Dr. Moreau*

The gallery of immersive games represented a very powerful and useful repository which could also be used for future teacher training initiatives.

## **SOLUTIONS AND RECOMMENDATIONS**

At the end of the two teacher training courses it was deemed crucial to collect feedback from the participants to investigate the strengths and weaknesses of the two courses, especially considering a possible future reiteration of both training pathways. Several solutions and recommendations arose from the teachers' interviews.

Two online sessions aimed at interviewing the participants were organized using the Zoom platform. During the first meeting a series of relevant issues were discussed, with a view to further development and continuation of the project aims. The informal agenda of the meeting was focused on a post-intervention

evaluation, starting from a general overview and leading to the more specific analysis of a small subset of aspects: level of interaction, adequacy of resources and organizational timing.

In general, all of the trainee teachers agreed that the courses were both very interesting and well-structured. The duration was judged as coherent in terms of the courses' purpose and, in one case, was even deemed too short. Other participants pointed out that the courses had been very useful, as they helped attendees "to discover" new skills. Furthermore, all of the trainees agreed that game-based learning is strongly inclusive: it encouraged collaboration and developed creativity while engaging students. A very interesting insight came from one of the participants who pointed out how game-based learning could also be beneficial for special needs students in terms of improving their self-esteem.

Collaboration was identified as one possible weak aspect of both courses. Several participants agreed that collaborating with other teachers should be improved; more opportunities for collaboration would be better in future, for example, to enable trainees to perform tasks collaboratively, such as designing and making games together. The topic of collaboration arose directly from discussions about the opportunity to transform the participants' group into a Community of Practice. The possibility of building a sustainable Community of Practice involving the trainee teachers was proposed by participants who already were members of other CoPs (for example in Edmodo world) and therefore had experienced the support and the benefits it can provide.

As far as the learning contents of the courses were concerned, the participants agreed that the theoretical oversight provided, as well as the reading materials, were adequate to the courses' purposes and the participants' characteristics. The Moodle-based course structure received very good evaluations because it was able to provide information in a step-by-step process. No problems were reported regarding self-study, motivation or the course length. On the other hand, practical sessions were not sufficiently developed: as one trainee pointed out, "we built things but did not test them". Linked to this aspect, a participant observed that a possible limitation stems from the lack of scripting-related competences needed to make artefacts that were able to react to interaction and suggested that scripting could be included in future course planning.

One remark about the time needed to perform reading tasks was that due to time constraints for many participants, it was difficult to complete some tasks. On the other hand, the reading list was only a suggestion and the task was not compulsory; indeed, the possibility of incorporating brief descriptions of the core content of the readings at the very beginning of the sessions was welcomed. The readings were unanimously judged positively and highly relevant to what was going on and not difficult to understand or filled with technical jargon. Finally, the relationship between synchronous and asynchronous events was evaluated as positive and balanced.

At the end of the two training courses, all of the participants were asked in Moodle to express their final reflections in order to better understand the added value of their learning experience and its impact on their professional profile. Their comments and insights underline the teachers' belief in the potential of immersive worlds for redesigning language learning and CLIL teaching pathways.

Some of the answers from the participants below can help us to understand how teacher training initiatives can improve teaching skills and techniques and lead to innovative learning environments and methodologies in future, such as video creation (Barwell, Moore & Walker, 2011; Thomas & Schneider, 2018):

I believe a virtual world is the world where most of the modern teaching/ learning should happen. This kind of vision is strictly connected with the new tech world of education, where teachers are tutors and students work and learn together (peer-to-peer) to create new didactical material to be shared on the Internet: when students make and share games, they learn not only about course content but also about their own thinking. (Participant 1)

On the other hand, gamification and Digital Pedagogy can help create a system that enables learners to rehearse real-life scenarios and challenges in a safe environment. There are many benefits a

learner can get from a game-based learning experience, in the friendly environment the students can easily progress through the content and it can help higher recall and retention of the acquired knowledge. Additionally, an immediate feedback and the guidelines suggesting behavioural change motivate action or give a sense of achievement. Also, the new approach praises games and stresses their additional therapeutic or cathartic load. Indeed, the VR can provide constant electronic stimulation which surely can facilitate language learning. (Participant 3)

I definitely feel immersion in a virtual world could contribute to language learning classes in loads of different ways, not very easy to sum up. Just to mention the main ones: boosting students' motivation for learning, drawing on their 'natural' drive for technologies and videogames; creating new, different and engaging areas to socialize their language and communication skills; providing catching and challenging game-like learning environments, open to a never ending range of variations; feeding their crave for 'making' things, manipulating and moving while learning. (Participant 2)

Avatars can speak *in-world* and listen but can also text in the target language in a variety of ways (Instant messages, local chat, notecards), so listening, speaking, reading and writing will all be thoroughly practised. Virtual worlds a+ can be powerful storytelling tools as well: by creating short *in-world* movies (machinimas) students will be able to narrate simple or complex stories and act their roles as in a real movie and be filmed using an infinite variety of outfits and clothes and settings/environments. (Participant 4)

When you teach through immersive teaching, your class becomes a players community, opened to anyone. In Immersive teaching everyone looks out for others, because they work peer to peer. Pupils with more experience learn to help their schoolmates who are still beginners. Pupils learn to respect everyone's needs, planning and organizing their activity to solve the immersive game. In order to allow everyone to participate to the learning path actively, usefully and independently. (Participant 5)

You can plan an interesting CLIL lesson according to Coyle et al's (2010) model: *language of learning* (content) essential vocabulary and grammar associated with the topic for a communicative approach. The language is used in authentic interactive settings in order to develop communicative skills, rather than focusing exclusively on grammar; *language for learning* (meta-cognition and grammar system) the kind of language needed to operate in a foreign language environment. Learners need skills for pair work, cooperative group work, asking questions, debating, enquiring, thinking, memorizing... *language through learning* (cognition) new meanings would require new language. It needs to be captured while during the learning process, then recycled and developed later (Participant 6)

Minecraft can offer students a virtual canvas for creating nearly anything they like using pixelated building blocks. Their creativity has almost no boundaries. At the same time, and for this reason, it is a recognized learning tool, used by teachers around the world to teach Math, History, Art, Physics, or nearly any other subject. Apart from that, it is, of course, an excellent tool to generate interest in your students. (Participant 7)

Some disadvantages were also pointed out in terms of lack of flexibility, technical infrastructure, collaboration at school, as shown in the following comments:

3D worlds are, in some way, closed worlds, because you make use only of elements from its immediate environment, even if you can import elements from outside, and it's not easy to show other people the activities and the final results, unless you shot pictures or videos to publish on a website or blog or social network on the Internet. (Participant 2)

There is still much to do in the technology area of usability and accessibility (user-friendly tools, easy-to-use software for hearing and speech impaired students) and in the field of evaluation and assessment (creation of rubrics with criteria planned for 3D world didactical activities). (Participant 1)

## **FUTURE RESEARCH DIRECTIONS**

As a general recommendation to policy makers, stakeholders and practitioners, the two training pathways represented a significant example of innovation in the field of language learning and CLIL (Coyle et al., 2010; Cinganotto, 2016), using technologies which are recommended by the European Commission in the 2014 report “Improving the effectiveness of CLIL and language learning: Computer Assisted Language Learning”.

Working in immersive worlds and playing games with the students can represent an effective way to bridge ‘role-play’ and ‘real-play’, which is the common paradox in foreign language classes. On the contrary, it is quite evident both to students and to learners that this is a fictional situation, in which real life is actually far from what happens in class. Therefore, it is significant how immersive worlds can reproduce real life situations and interactions, reducing Krashen’s affective filter; through their avatar *in-world*, the learners can speak and text chat without anxiety, thereby disguising his/her identity or face and promoting uninhibited interaction.

Benefits in terms of language competences can be significant, as well as in terms of CLIL, as also stated by some of the trainee participants who mentioned the possibility of building games or objects *in-world* related to History, Science, Art or other subjects. Participants can therefore participate in ‘hands on’ and concrete activities about subject content, an essential ingredient of CLIL. Moreover the ‘learning by doing’ and ‘learning by playing’ principles are borrowed from language teaching and can represent an important added value of this approach.

The courses’ use of 3D immersive gameworlds like Minecraft and in Open Sim represented an effective way to stimulate language awareness in teachers, as recommended by the latest European Council Recommendation (2019) on the need for a comprehensive approach to the teaching and learning of languages, which states that the language dimension should be a transversal element of the school curriculum, in any subject, not only in foreign languages. Moreover, the topics of plurilingualism, pluriculture and language diversity can be addressed through an online course similar to those we have seen in this project. Considering the nature of many language classes, which are more and more multi-ethnic and plurilingual, temporarily hiding one’s own identity, origin and home language through an avatar, can push learners to express themselves freely and independently, embracing language and cultural diversity, equity and social justice.

As a final consideration, attending online courses similar to the ones created as part of this project may help enhance visual literacy: images, video, graphics, infographics can play an important part in learning a language, as mentioned in the EU’s Key Competences Framework (2018), where visual literacy is listed in the descriptor of the first Key Competence, named ‘literacy’. A foreign language should be taught through visual, multi-modal and immersive inputs, as happens *in-world*. That is why both training courses will possibly open up the way to new training initiatives in the field of immersive language teaching and learning: making teachers aware of the importance of game-based and immersive learning may help innovate their teaching strategies and techniques, contributing to general school innovation, from a holistic point of view.

## **CONCLUSION**

This chapter examined two online teacher training initiatives, a self-study course and a teacher-led course, as part of a project focusing on the potential of game-based learning and immersive worlds for language learning and CLIL. The two courses were delivered through a Moodle platform and organized with learning materials for each week to be read and commented on in specific forum threads. The participants were

guided through the exploration of the different learning environments with the help of digital content, tutorials and videos. The self-study course was designed as a ‘soft and gentle’ approach to the topic, mainly through suggested readings, videos and forum discussions.

The teacher-led course was developed as a blended course with learning materials in an approach combining forums with synchronous meetings in OpenSim and Minecraft. The weekly webinars in Zoom were aimed at reflecting with the participants on different topics related to game-based learning and gamification, with reference to the learning materials available in the platform (Marino, 2004).

The teacher-led course was aimed at helping teachers actively work *in-world* and create games for language learning and teaching: some of the games produced *in-world* have been described in the chapter. The course was quite demanding, especially because of the fixed appointments in OpenSim and Minecraft and the weekly webinars. Despite that, the teachers found the workload rewarding and stimulating.

The teachers’ voice, collected from the forums, the interviews and the final reflections, provide several insights for teachers and teacher trainers working in the field. In fact, virtual and immersive worlds are still a field yet to be fully investigated, which needs to be disseminated more among teachers and practitioners, as the general idea is that these technicalities require specific and very demanding digital skills, which are often not easy to develop (Middleton & Mather, 2008; Mawer, 2014). However, as the lessons learnt from the two courses show, a relatively small amount of commitment, passion and willpower may be enough to start navigating *in-world*. A larger number of courses or MOOCs on language learning in Minecraft and OpenSim can help to guide teachers and innovate their teaching style and techniques, moving beyond the traditional lecture approach in class. As a consequence, more Communities of Practice could help teachers grow and learn together with their colleagues, interweaving formal and informal training at the same time. Moreover, this could be a good way to introduce gamification and workshop activities with the students, persuading their families that playing games in class is not a waste of time, but on the contrary, that it can be very powerful way of improving the level of competence in foreign languages. As a general suggestion, disseminating the results of the course, especially the games created by the participants *in-world*, could be a way to let teachers experiment and understand the added value of immersive worlds for language learning in general and CLIL in particular. The games created by the participants can also be made available as open educational resources for teachers to play and learn with their students in a virtual and immersive library.

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## KEY TERMS AND DEFINITIONS

**CLIL:** Content and Language Integrated Learning or CLIL is an approach to foreign language teaching in which a content-based subject (e.g. business studies) is taught in the target language rather than in the first language or L1 of the learners.

**Community of Practice:** or CoP is a group of people who interact to share a mutual interest or passion in order to improve their understanding and learning.

**Game-based Learning:** or GBL is a type of teaching in which the principles of games are used, often to improve learner motivation, engagement and/or performance. These principles may include points or leaderboards for example.

**Immersive Worlds:** these are online environments that aim to mirror the physical and/or fantasy world, in which users can build and create objects and interact, often in spoken and written language.

**Minecraft:** a 3D immersive video game in which users build structures and buildings from resources that they discover and mine. Depending on the mode (either game or survival mode) users can cooperate or compete against other users to achieve their objectives.

**Moodle:** a virtual learning environment (VLE) or course management system (CMS), Moodle is an open-source learning platform that enables teachers to store learning materials and activities to organise courses.

**OpenSim:** or OpenSimulator is a multi-user open-source 3D immersive environment which enables users to create and customize content and can be used for education and learning via voice and/or text chat.