

## 3.2

---

# PLANNING THE LEARNING OF GENERAL COMPETENCES USING 3D VIRTUAL ENVIRONMENTS

---

### 1. STRUCTURE OF THE EDUCATIONAL PROPOSAL

To carry out the experience in the 3D World, the three teachers who took part drew up an educational proposal. The three proposals had the same structure and stages, and the only difference was the subject that was being taught. The subjects were:

- “The Fundamentals of Sports I”. Free elective subject of 6 credits on the Diploma for Physical Education Teachers (1997 curriculum). A total of 11 students took part (4 women and 7 men).
- “School Organisation”. Core subject of 4.5 credits on the Diploma for Infant Education Teachers (1997 curriculum). A total of 33 students took part.
- “Marketing Management”. Compulsory subject of 6 credits on the Master’s Degree in Strategic Business Management taught at the Universitat Rovira i Virgili.

Below we shall describe the main features of the work carried out in the three subjects.

#### 1.1 The environment

The environment used was OpenSim, a platform that enables users to create virtual worlds. One of the aspects that most interested us was the integration of this 3D platform with the University’s virtual campus, Moodle, because this would allow us to record all the activities undertaken in the virtual world for the participants. To this end we used the module known as Sloodle. OpenSim contains tools for personalising avatars, chatting with other users and modifying the terrain so that 3D spaces can be created that simulate different work areas and environments.

#### 1.2 Avatar

The users represent their identities and characteristics by transforming their avatars and interacting with the avatars of other users (Suler, 2002; Wood et al., 2005; De Lucia et al. 2009). One of the first things participants had to do in this experience was personalise their

avatar. They all had a default avatar and they could change its appearance, move it and communicate with it by using the options of the environment (Figures 1 and 2).



**Figure 1.** Avatar-world interaction



**Figure 2.** Interaction between avatars

### 1.3 Resources

Each group had access to a central island and an empty island, which they could access by means of a teleporter. The island is the region (virtually physical) in which the avatars move and interact. On each island there was one dispenser with basic resources and another with extra resources. By doing the activities, students could win points and then exchange them for extra objects. The central island had a resource centre that provided information about the topic of the project.

### 1.4 Educational proposal

The educational proposal for the three subjects was designed on a project based learning structure (PBL).

The project that the students had to carry out for the subject “Fundamentals of Sports I” was to organise a five-day School Sports Event, with both sporting competitions and social activities. It was prepared over a period of four weeks, students had unlimited access to OpenSim, and it had to be presented to a sports committee. The project was both competitive and collaborative: three groups competed to make the best proposal and the members of each team were all responsible for a particular area of the project.

Table 1 lists and classifies the activities to be carried out as part of the educational proposal. It shows where the related 3D object can be found and the Moodle activity it represents.

**Table 1.** Categories of the activities carried out

Category	Activity	Instruction	Space	Moodle object	Moodle activity
Personal organisation	My team: people in charge and aims of each area	Determine the people in charge and the aims of each area.	Meeting point /Island group	Note + Chat	Task assignment
Spatial organisation	Public address system	Decide where the public address system is to be installed.	Island group	Chat	Chat
	Publicity	Decide where the advertising hoardings are to be located.	Island group	Chat	Chat
	Sports facilities	Decide where the sports facilities are to be located and how they are to be oriented.	Island group	Chat	Chat
Documents	Access points	Set up control points for access to the sports areas.	Island group	Chat	Chat
	Identity cards	Establish an identity system for spectators and athletes.	Central island	Sphere	Task assignment
	Spectators	Draw up a list of ways to encourage attendance.	Sports hall /Island group	Note + Chat	Task assignment
Lists	First-aid kit	List of things required for a first-aid kit.	Island group	Note	Task assignment
	Sponsors	List of possible sponsors what they are expected to contribute.	Central island	Sphere	Task assignment
Budgets	Security budget	Draw up a basic budget of income and expenditure for security issues.	Central island	Sphere	Task assignment
	Advertising budget	Draw up a basic budget of income and expenditure for advertising.	Central island	Sphere	Task assignment
Schedule	Competition schedule	Draw up a preliminary competition schedule.	Central island	Sphere	Task assignment
Planning/ predicting	Miscellaneous	Individual questionnaire on all areas	Meeting point	Desk	Questionnaire
	Information	List of all the information that must be provided before and during the event. Describe the content of the advertising messages.	Central island	Sphere	Task assignment
	Sports/competition equipment	Draw up a list of all the resources (sports material and equipment) that will be required for the event.	Central island	Sphere	Task assignment
	Sequence of actions	Individual questionnaire on all areas	Sports hall	Desk	Questionnaire
	True/False	Individual questionnaire on all areas	Dressing room	Desk	Questionnaire

Explaining/ arguing	Legislation (Professional football)	Describe the legislation and regulations governing security measures that must be taken into account when organising a first- or second-division football match.	Island group	Chat	Chat
	Visit	Presentation of the model to the sports committee.	Island group		

The students of the subject School Organisation were asked to plan a school symposium to be held in a rural area and involving three schools of different types. In groups of five members each, they had to organise a meeting of teachers and students, and plan a series of activities taking into account the level of the students and the spaces available. They also had to plan and design their proposal and present it to the other groups.

The items that had to be included in the proposal are listed below together with their weights and deadlines:

- Decide what sort of school is required (choose the various spaces bearing in mind the students, activities, needs, etc.) and the focus of interest. Justify the decision. 15%, 1 June.
- Review the presentation on Moodle:
  - ◆ Reflect on the different spaces required
  - ◆ Make a small drawing-model of what you aim to construct
  - ◆ Transfer the project to the virtual world
- Activities:
  1. Read the instructions for organising and running a school provided by the Department of Education of the Catalan Government:
    - The number of teachers for a particular number of infant or primary students.
    - The need to inform the Inspectorate of Education.
    - Decide what to do with those students who are not allowed to go on the excursion.
  2. Draw up the Annual Plan and get approval from the School Council.
  3. Relate outcome targets to competences / skills.
  4. Plan the activities to be carried out: order, spaces, people in charge, etc.
  5. Consider the possibility of applying for subsidies and funds.
  6. Present the organisation of the activity to the staff council.
  7. Draw up an information leaflet for families.
  8. Organise a meeting for families.
  9. Prepare a first-aid kit.
  10. Arrange for all the necessary authorizations and telephones.
  11. List the necessary materials (camera, signed permission to use students' images, list of students who are not going on the excursion, allergies, sun cream, mobile phone, etc.). Suggest a person in charge.
  12. Plan the meals and drinks (timetable, food, etc) of the students and teachers.
  13. Evaluate the activity.
  14. Draw up a flow chart of what to do in the case of absence or the late arrival of students on departure day. Extraordinary situations. 15%, 12 May.
  15. Take into account the presence of a diabetic student. Things to bear in mind. 15%, 19 May.

16. Consult the instructions on organizing and running infant and primary state schools (2010-2011). How to respond and what to do when there are accidents or incidents. Choose a practical case and act as teachers. 15%, 26 May.
17. Add any other material, activities or remarks you feel to be appropriate.
18. Prepare a presentation of about 10 minutes to tell the class what has been planned. 20%, 1 June.

For the subject Marketing Management, the aim of the project was to prepare a proposal entitled Participation in a Trade Fair that was to last about 4 days. At this professional trade fair, which was open to the general public at the weekend students had to present and provide a new product and/or service.

Three different areas were identified:

- Creative. In this area decisions need to be taken about preparing and designing promotional material to be used at the trade fair
- Financial. In this area, decisions need to be taken about the programme and the budget
- Logistics and infrastructure. In this area decisions need to be taken about reserving and designing fair space.

A programme with a range of activities was drawn up.

Code	Activity	Space	Stoodle object	Moodle activity
1	Questionnaires: Questionnaire on competences (general and digital) Questionnaire on learning patterns (LML)	Class		Face-to-face
2	Virtual tour	Class		Face-to-face
3	Act. 1: My team: people in charge and objectives per area	Moodle	Chat + Nota	Task assignment
4	Act. 2: Development of the new product	Moodle		Task assignment
5	Act. 3. Design of promotional material	Moodle		Task assignment
6	Act. 4. Selection of trade fair	Moodle		Task assignment
7	Act. 5. Budget proposal	Moodle		Task assignment
8	Act. 6. Reservation of fair space	Moodle		Task assignment
9	Act. 7. Distribution of the stand			Chat
10	Act. 8. Construction of the stand	3D		3D
11	Visit from the evaluating committee	Class		Face-to-face presentation

**Table 2.** Tasks to be carried out in the teaching activity proposal

### 1.5 Criteria governing the projects.

The following criteria had to be taken into account when drawing up each project: a) each group was responsible for managing their own island; b) all the members of the group communicated by means of the island's chat room and a special room called "meeting point"; c) the resources available depended on the organization of the event and a limited budget assignation; and d) each member of the group headed a particular work area.



Figure 3. Island or region in the virtual environment.

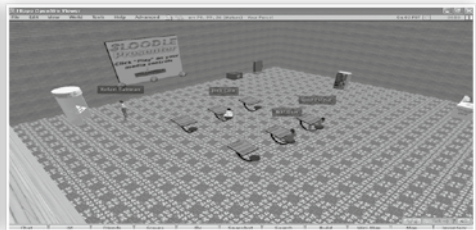


Figure 4. Meeting point.

### 1.6 Project stages

Figure 5 shows the different stages of the experience. The preliminary stage, the only one that was face-to-face, and the activities involved installing and getting to know the 3D environment, personalising the avatar and creating groups. In the planning stage, each work group designed their proposal and their organizational model by carrying out tasks or activities. In the development stage, each group constructed the project model that they had planned in the previous stage within the 3D environment. The result of this stage was the final design of the island. In the evaluation stage, the groups presented their proposals in public.

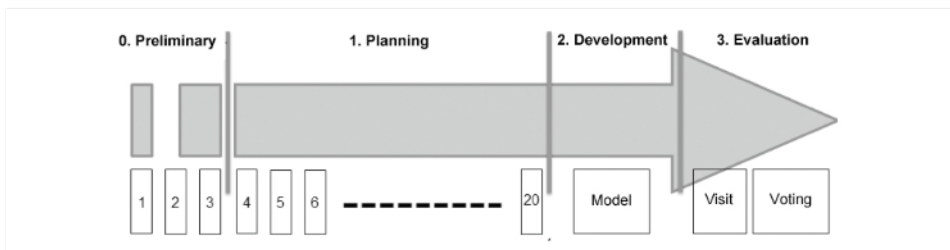


Figure 5. Stages of the project

## 2. TEACHING PERSPECTIVE

This section summarizes the personal perceptions and reflections resulting from the teaching activity described in the section above from three points of view:

### 2.1 The teacher

The teacher must be digitally competent and guide the students. The activity must be planned in detail if learning is to be autonomous and the teacher should only intervene to clear up doubts and encourage constructive learning.

If these initiatives are to be developed and applied in teaching, the schools and students must have access to the hardware and platforms, and also have the necessary advanced computer techniques. In teaching innovation projects, it is essential to have institutional support to provide the extra infrastructure that is not required for face-to-face teaching in the classroom.

The teacher needs to have a good command of all the issues to be able to respond to any unforeseen questions. If the simulation is to be evaluated as part of the subject, the teacher must be aware that getting used to a new virtual environment can take time, and this should be borne in mind when planning the subject. On- and off-line arrangements should be made by teachers while the activity is being carried out so that they can respond to any doubts and incidents that may arise. Teacher-student communication competences are developed not only in the academic sphere but also in the social and personal spheres.

Virtual scenarios make it possible to vary the complexity to match the various degree courses and the years in which they are taught. However, we required technical assistance to adapt our proposal to the simulator. Having to rely on a computer technician in the preliminary stages prevents total control over the planned teaching activity.

## **2.2 The virtual world**

The choice of the simulator took some considerable time. Analysing different simulators and finding just one to which a range of teaching proposals could be adapted was the biggest challenge. Once the decision has been made, the adaptation of the tasks and activities depends on the technical requirements of the simulator. Controlling waiting and connection times is fundamental to the success of a pedagogical proposal such as this one.

Although the simulator is free, instruction manuals and tutorials are essential to the teaching activity, as is technical support to install the program on the students' and teachers' computers. It should be pointed out that the educational proposals were presented and put into practice for a four-to-five week period, which makes it very necessary to include some time for students to adapt to the simulator if the educational proposal is to be a success. Educational proposals that are spread over longer times should not really need to incorporate a period of adaptation to the simulation program.

## **2.3 Students**

The students were very positive about taking part in this teaching innovation experience. They regarded it as a way of developing general and specific competences that would help them to develop as individuals and professionals.

The environment encouraged group work and the use of technology to learn. It enabled ideas to be presented attractively and in an organised way, and the display was an aid to understanding. However, it does have some drawbacks: it requires a broadband connection to Internet and sometimes there are problems when several users try to log on at once.

The digital competence of the students has been observed in an intuitive environment, but the interface was in English, which was an added difficulty for those least competent in the language.

The figure of a group delegate or coordinator encourages different roles within the group. The continuous assessment activities require considerable effort to be made by the students. It is important to plan the time spent on these activities carefully and to focus on their real aims because the tool can be used at different levels of complexity. It is the teacher's task to make these

levels clear. And, because there is a considerable creative component to the simulation proposal, it is particularly important to clearly state the dates on which all activities start and finish.

One of the most important activities carried out by the students was the personalisation of their avatars, which reflect their personality and can even be regarded as their professional presentation.

Teamwork is essential if the proposal is to be successful and it is also very helpful to have mechanisms to help create teams with complementary learning profiles and ways of working. As proposed by Wolfe and Chacko (1983) and Jaffe and Nebenzahl (1990), the average number of students in a group was 3, which is just the right number to make an efficient, cohesive group. We believe that this composition was highly effective and fundamental to the preparation of the proposal, and it helped create the expected cohesion and co-responsibility.

By assigning different roles for the different decisions to be taken we have been able to develop specific competences for all the roles, which should reflect the professional realities of each subject area. Both students and teachers should be aware that during the various activities conflicts will arise between participants and will need to be solved. However, the solution to these conflicts was regarded as a part of the learning process and the formation of professional competences.

In this sort of initiative it is important to be aware that there may be initial objections by students who are not so technologically competent and it may be necessary to provide extra support and tutorials to prevent dropout. It is very important to prevent students from being discouraged by not knowing how to work the simulator.

It should be pointed out that the final presentation in public was very important because it enabled things to be shared, and showed what the simulator had contributed and how it had been used by each of the work groups. It also provided students with the opportunity to reflect and explain the objectives they had reached and what they had learned during the experience. Many students pointed out the need for some sort of help to find their way around the environment.

### **3. SYNTHESIS**

To sum up, decision making in the professional world must be quick, dynamic and adaptable to new situations. Virtual experiences now make this dynamism both possible and motivating.

If these tools are to be used properly and teaching innovation initiatives are to be successful, the work teams must be interdisciplinary, technical staff must be available and the institution must provide support. Teaching staff must also be provided with institutional training in the field of educational innovation.

We do not wish to finish our description of the experience without pointing out that the level of group motivation, commitment and cohesion was considerable, and that the extent to which the academic objectives were achieved was assessed very positively.

We should also say that 3D environments are a very useful tool for training future professionals independently of the field or the subject area because they provide a form in which they can apply the competences required of them. In this teaching activity, the students used their knowledge to design three projects. They were members of a team but also had individual responsibilities. They worked on the competences as future teachers or professionals in their professional field.

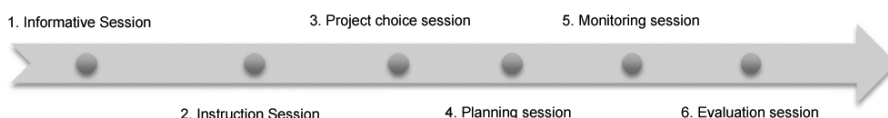
The students received no previous training on how to use the program. They freely learned how to use the environment, how to construct their avatar and how to interact with their avatar, their colleagues and the environment. Despite the complexity of the virtual world, they managed to overcome the obstacle of having to cope with an unknown environment and acquired a good command of it with hardly any technical help.

In short, the use of a simulation process in a virtual world encouraged students to plan and to be more creative.

Before entering a virtual world of this sort, teachers must be clear what their aims are and must plan their activity on the basis of the criteria of evaluation: that is to say, the environment should not be the objective but the resource. The relation between the amount of time spent and the learning outcome should also be evaluated. The analysis should include the competences, not only the objectives achieved.

Using this environment and with the support of the teacher, the students will carry out a project that will require them to organize themselves, take on tasks and make decisions as a group throughout the process. If this proposal is to be implemented successfully, students must have the external support and advice of professional experts in virtual worlds and the encouragement of participation.

Therefore, if a proposal of this sort is to be undertaken, the stages described below should be followed:



**Figure 6:** Proposal of project stages

i

- 1. Information session:** Presentation of the environment In this session, the tutor explains the 3D program to the students: the stages, the objectives, the methodology, and, most importantly, the role and tasks of the teaching staff and students. It is, therefore, in this session that the teaching staff will decide whether to take part in the programme or not and they will decide exactly what they commit themselves to for the rest of the course
- 2. Instruction session:** Introduction to the environment. In this session the 3D program is put into context: the concept of participation, the rules on participation, ways of participation, the functions of delegates, participatory bodies and the development of the programme.
- 3. Project choice session.** This session is fundamental to the development of the programme because students have to choose the project on which they will work throughout the course. The choice of project will involve diagnosing classroom needs and it must be taken jointly by teaching staff and students.
- 4. Planning session.** In the third session, the project chosen is analysed, the tasks are planned and the roles of each of the students assigned. In this session, concepts of participation are discussed: cooperative work, team work, dialogue, collective decision making, commitment and responsibility.

- 5. Monitoring session.** In the fourth session, the tutor monitors how the projects are developing and the extent to which both teachers and students are internalizing the participation competences. If necessary, delegates are provided with new participation tools.
- 6. Evaluation session.** This session presents and analyses the various projects carried out during the course and evaluates the participatory processes that have taken place and the learning and competences acquired.

To sum up, simulation in 3D virtual environments is a challenge that can improve learning in teaching scenarios on both undergraduate and postgraduate courses. Teaching platforms such as Moodle are essential to the development of such initiatives and prepare students for new learning scenarios. We should point out that one of the most important results of this empirical application of simulation is that students have the perception of having learned content in a more dynamic way and that it is the perfect complement to a face-to-face course.

## REFERENCES

- Baruch, Y. (2006). Role-play teaching: acting in the classroom, *Management Learning*, Vol. 37 (1), 43-61.
- Daly, S. P. (2001). Student-operated Internet businesses: True experiential learning in entrepreneurship and retail management. *Journal of Marketing Education*, 23, 204-215.
- De Lucia, A., Francese, R., Passero, I., & Tortora, G. (2009). Development and evaluation of a virtual campus on Second Life: the case of Second DMI. *Computers & Education*, 52, 220 - 233.
- Faria, A. J., Hutchinson, D., Wellington, W. J., & Gold, S. (2009). Developments in business gaming: A review of the past 40 years. *Simulation and Gaming*, 40(4), 464-487.
- Jaffe, E.D., Nebenzahl, I.D. (1990). Group interaction and business game performance, *Simulation and Gaming*, Vol. 21(2), 133-46.
- Kennedy, E.J., Lawton, L. and Walker, E. (2001). The case for using live cases: shifting the paradigm in marketing education, *Journal of Marketing Education*, Vol. 23 (2), 145-51.
- Li, T., Greenberg, B. A., & Nicholls, J. (2007). Teaching experiential learning: Adoption of an innovative course in an MBA marketing curriculum. 29(1), 25.
- Pearson, M.M., Barnes, J.W., Onken, M.H. (2006). Development of a computerized in-basket exercise for the classroom: a sales management example, *Journal of Marketing Education*, Vol. 28 (3), 227-36.
- Porter, T. S., Riley, T. M., & Ruffer, R. L. (2004). A review of the use of simulations in teaching economics. *Social Science Computer Review*, 22(4), 426-443.
- SLOODLE: <<http://www.sloodle.org/>>
- Smith, L.W., Van Doren, D.C. (2004). The reality-based learning method: a simple method for keeping teaching activities relevant and effective, *Journal of Marketing Education*, Vol. 26 (1), 66-74.
- Suler, J. R. (2002). Identity management in cyberspace. *Journal of Applied Psychoanalytic Studies*, 4(4), 455-460.
- Vos, L., & Brennan, R. (2010). Marketing simulation games: Student and lecturer perspectives. *Marketing Intelligence and Planning*, 28(7), 882-897.
- Wolfe, J., Chacko, T.I. (1983). Team-size effects on business game performance and decision making behaviours, *Decision Science*, Vol. 14 (1), 121-33.

- Wood, N. T., Solomon, M. R., & Englis, B. G. (2005). Personalization of online avatars: is the messenger as important as the message? *International Journal of Internet Marketing and Advertising*, 2(1/2), 143–161.
- Wright, L.K., Bitner, M.J., Zeithaml, V.A. (1994). Paradigm shifts in business education: using active learning to deliver services marketing content, *Journal of Marketing Education*, Vol. 16 (3), 5-19.

#### **AUTHORS**

**Luis Marqués**, Department of Pedagogy. Rovira i Virgili University. Tarragona, Spain.

**Cinta Espuny**, Department of Pedagogy. Rovira i Virgili University. Tarragona, Spain.

**Noemí Rabassa**, Department of Business Management. Rovira i Virgili University. Tarragona, Spain.