

A DIGITAL GAME APPROACH FOR ENTREPRENEURIAL MINDSETS

ALLEGRA, Mario
LA GUARDIA, Dario
GENTILE, Manuel
TAIBI, Davide
FULANTELLI, Giovanni

*Italian National Research Council
Institute for Educational Technology, Palermo, Italy
{mario.allegra, dario.laguardia, manuel.gentile}@itd.cnr.it
{davide.taibi, giovanni.fulantelli}@itd.cnr.it*

Abstract

The OSLO conference and agenda on “Entrepreneurship Education in Europe: Fostering Entrepreneurial Mindsets through Education and Learning”, highlight the main experiences in Europe and their outcomes regarding the promotion of entrepreneurship in education. Education and training should contribute to encouraging entrepreneurship by fostering the right mindset, providing relevant skills for self-employment, raising awareness of career opportunities as an entrepreneur. Entrepreneurship learning has taken place almost everywhere at secondary school in Europe, but there are no shared entrepreneurship oriented models for different educational levels and systems.

Entrepreneurship is defined (European Commission 2002) as “a dynamic and social process where individuals, alone or in collaboration, identify opportunities for innovation and act upon these by transforming ideas into practical and targeted activities, whether in a social cultural or economic context”; therefore, entrepreneurship in education includes economic, social and cultural factors. For this reason it is important to identify educational models to support students in the development both of personal qualities and attitudes and of formal knowledge and skills, and in particular:

- Personal qualities and attitudes increase the probability of a person recognizing opportunities and acting on them.*
- Knowledge and skills concern what must be done to establish a new enterprise, and how to be successful in developing an idea into a practical, goal-oriented enterprise?*

Our research focuses on the study of ICT solutions concerning on line entrepreneurial environments based on social networking.

Entrepreneurial networking is more than just collaboration since it stimulates the ability to find and create new relationships, the ability and the know how to identify the key competencies that can be useful in developing entrepreneurial mindsets.

Keywords: *Digital Games, MMORPG, MMOLE, Virtual Worlds, E-mindsets*
ACM classification: K.3.1

1. Introduction

In the last few years, some activities have been carried out to introduce and promote awareness in young people of the culture and methodologies used by global enterprises. This awareness is fundamental to allow them to develop the competencies required in an evolving labour market as it responds to the development of the 'knowledge society'. Many young people become disenchanted with their school experience as what they learn at school is often of little relevance to their lives in the outside world and they seek to develop a different range of competences from those offered in the traditional school curriculum (Selandar 2008; Ziegler 2007; and Selwyn 2007). The main aim of our research is designing a training model to stimulate an entrepreneurial mindset in young people and to help them acquire the "modern skills" required by the knowledge society, based on the findings of research in this area. The training model will be run in collaboration with professional/entrepreneurial organizations rather than solely by schools, and will also make use of new ICT tools defined to create innovative and motivating learning activities. In fact, the model will include a new software platform, defined to support students in developing the necessary skills and stimulating their ability to find and create new relationships, the ability and the know how to identify the key competencies and resources that can be useful in developing their ideas.

The professional qualities which are most highly considered today are those typical of an entrepreneur, even in a context of subordinate work (Armbuster 2008). These qualities are conceptualised for this study as: motivation to achieve results and take initiative, tenacity, flexibility and creativity (based on various interpretations of the term 'professional' including Friedson 1994; Quinn et al 1996; Macdonald 1995; Moore 1970 and Abbott 1998). These will be achieved through the involvement of students by the setting up of the training laboratories, making use of active and motivational learning methodologies and technologies to raise young people's level of competences. The laboratories will allow them to acquire the skills required by the knowledge society, while enabling them to take control of their learning processes and giving them the opportunity of expressing their aptitudes and potentialities to make better informed choices.

Our research starts from the analysis of key elements of successful Enterprise Education Programs in Secondary Schools in Europe and, in particular, from the projects indicated in the Oslo agenda and the following experiences in other European countries. The model we are going to define will include active learning experiences, and ICT based environments, so providing pupils with a more rewarding way of acquiring knowledge. In fact, ICT have always played a key role in managerial education, especially in the creation of simulation environments. For this reason the model will include the use of a software platform that will support students in developing the necessary skills identified to foster entrepreneurial mindsets.

Education and professional training should contribute to encouraging an entrepreneurial spirit, promoting a suitable mindset, awareness of the opportunities of following an entrepreneurial career and professional skills.

The Eurobarometer survey (European Commission 2007) indicates that 37% of Europeans would like or would have liked to follow an entrepreneurial career, but only 15% have achieved their ambition. The surveys show that being familiar

with the procedures for setting up an enterprise increases the probability of becoming an entrepreneur. In the surveys carried out by Eurobarometer, the interviewees whose parents were self employed were more inclined towards self employment than those whose parents are employees. According to the GEM survey people who are confident about their skills and their experience are from two to seven times more likely to be involved in setting up or managing a new enterprise; for those who know a young entrepreneur the probability is three or four times greater. On the basis of the British Household Survey, people who have more contact with the business world (through friends, relatives or education) are more likely to consider setting up an enterprise. The educational system must help to promote an entrepreneurial spirit by providing competences and contacts.

An important experience in this field was carried out in Greece, at the technical school "Sivitanidios" in Athens, where virtual enterprises were used as educational tools. The students divide their time between theoretical lessons and management of a virtual enterprise. Since the results are extremely favourable the programme will be extended to all technical schools and will include a new course on entrepreneurship that will consider theoretical aspects and practical notions regarding the drawing up of business plans. Job centres then guarantee students advice and support in choosing an entrepreneurial career.

In this paper we will focus on the ICT solution identified to support the development of entrepreneurial mindsets. Firstly we will describe the general characteristics of some effective on line educational environments and in particular of role playing games. Then we will illustrate the solution identified in our research.

2. Role-playing games

Role-playing games originate as a particular kind of board game in which players act as characters of an adventure that often has a fantastic setting. Under the guidance of a game master (Dungeon Master or DM), that has the task of interpreting not player character roles, and describes for other players what they see and hear in this imaginary world (Fine, A. 1983), players have to move in a theatre of epic fights and monstrous creatures to conquer points and complete their missions.

The first one and the most known role-playing game is "Dungeon and Dragons" (D&D), published in 1974 by authors Gary Gygax and Dave Arneson, fascinated more the 20 millions players.

The worlds of games, the development of personal computers and of the Internet, have greatly increased the development of role-playing games, improving their expressivity and user involvement. The result has been the creation of MUD (Multi User Dungeons&Dragons, computer version of D&D) and after MMORPG (Massive Multiplayer Online Role-Playing Game), evolution of MUD with massive use of graphic and audio contents.

MMORPG belong to the category of MMOG (Massive Multi-player Online Game); one of the most famous present-day MMORPG is World of Warcraft; in its virtual environment every day millions of players interact to achieve personal or common goals and develop their own character (Papagiannidis, S. 2008).

This phenomenon didn't go unnoticed to training sector; role-play techniques focused on the student and his learning process, originating from Moreno's

psychodrama and spontaneous theatre (Moreno, J. L. 1946), have been used as methodologies which are alternative to traditional teacher and content centered strategies. Serious games (those with educational aims) developed from this technique include simulation and role-playing environments facilitating emotive and experiential learning (such as “*learning by doing*”, “*learning by failing*” and “*discovery learning*”) (Kebritchi, M. 2008)”. Besides, by using simulated environments which are specifically created to achieve an educational goal, students can learn in a secure context, where their mistakes do not have damaging consequences (Dieleman H., 2006). As confirmation of the validity of this training approach, nowadays serious games are widely adopted both in the field of business training (Pannese L., 2007) and in military training (McDowell P., 2006), for the rapidity with which competences and knowledge can be acquired..

3. Massively Multi-learner Online Learning Environment (MMOLE)

An MMOLE is a multiuser environment allowing spontaneous and enjoyable learning, thanks to a serious MMOG (game with educational goals) (Foreman, J., 2007).

The social aspects of this kind of environment are extremely important; players can collaborate with other players to reach a common objective. Multiuser environments are preferable to single user ones because they can activate collaborative learning, or rather the acquisition by individuals of knowledge, skills and attitudes resulting from group interactions or individual learning as a result of a group process (Kaye A.R. 1992). The social aspect of the games is therefore one of the most important elements to stimulate since it promotes learning. Collaboration to achieve a common objective requires a clearer and more careful clarification of one’s ideas in order to share them more easily with other players; besides, confrontation with other people’s ideas produces critical reflection and advanced reasoning, leading to more meaningful and permanent learning. The opportunity to have heterogeneous groups, consisting of experts and beginners, promotes what Lave (Lave J. 1991) defines as legitimate peripheral participation. The presence of a beginner in the community of practice must be legitimized by the possibility of having a role within the group, even if the role is peripheral; his wish to become an active and central participant, will develop in a socio-cultural activity that will lead him to interact with expert members, and will allow him to move from the periphery to the center of the community of practice, in a process that enables him to become more expert in an informal way.

An MMOLE has the following characteristics:

- An MMOG integrated with a Learning Management System
- Communication tools
- Progress tracking
- Tutor supervision

LMS integration provides links to traditional e-learning course and resources to deepen game issues. Communication tools allow students to receive feedback both from other students and tutors following the game evolution. An immediate feedback helps students to reinforce desired behaviors. Tracking systems are useful to teachers to follow students’ progress. Tutors supervise learning processes, manage the starting phase, provide feedback to players and stimulate collaboration among them.

4. A new learning environment to enhance entrepreneurial mindsets

Nowadays, millions people in all the world play with MMORPG (A.Meredith, 2009); Yee demonstrates that 22% of players are young students (N.Yee, 2006). Users are in continuous growth and the market is a source of great economic interest (Papagiannidis, S. 2008).

An MMOLE for entrepreneurial education can allow the so-called “virtual situated learning”; in fact, this kind of setting, where the student is immersed in a simulated environment as close as possible to the real world, promotes more rapid learning and provides the necessary confidence for putting into practice in the real world what he has learned in the virtual world (Jones, S. 2007).

For these reasons, the use of multiuser learning environments can support the creation of motivating and attractive settings for enterprise education for young students.

Baldassin analyzed principal market management games and concluded that MMORPG's are their natural evolution, because they overcome limitations regarding the flexibility of the model and the complexity of the business (Baldassin, N. 2007).

Considering the pedagogical and attraction potentialities of the MMORPG and considering Baldassin's studies results, we have decided to develop an MMOLE platform based on a MMORPG to create an environment to enhance entrepreneurial mindsets in young students.

The game will be designed to manage different levels of complexity, in relation to the experience acquired by the players. Players start at a basic level in which they have a simple role, and then, as they acquire more experience, they have new resources that can be used to play at an advanced level where their role is more complex. In this way, at different times a player can occupy a variety of roles and observe and simulate different conditions.

Our solution also focuses on the creation of a networked entrepreneurial environment combining aspects of social networking with relevant aspects from the use of business games. Entrepreneurial networking is more than just collaboration since it stimulates the ability to find and create new relationships, the ability and the know how to identify the key competencies that can be useful in developing their ideas.

Entrepreneurship in education is broadly defined and includes economic, social and cultural factors. Starting from the definition: “*Entrepreneurship is a dynamic and social process where individuals, alone or in collaboration, identify opportunities for innovation and act upon these by transforming ideas into practical and targeted activities, whether in a social cultural or economic context*”, the educational environment, and the model in which it is integrated, must support students in the development both of personal qualities and attitudes and of formal knowledge and skills. These two main elements will give pupils/students competence in entrepreneurship:

- Personal qualities and attitudes increase the probability of a person seeing opportunities and acting on them,
- Knowledge and skills concerning what must be done to establish a new enterprise, and how to be successful in developing an idea into a practical, goal-oriented enterprise.

The MMORPG we are going to develop will be centered on operative enterprise phases (supplying, production, sale, human resource management), but with a strong orientation on the market. It will not be a zero-sum game, that is to say that the winning of a player does not necessarily corresponds to the other's defeat; on the contrary, many activities of the game will be studied to promote cooperation among players to reach a common goal.

From a technical point of view we chose to develop a browser game MMORPG; in fact, browser games provide a compromise between complexity of the development (there are a great number of framework for the optimization of web based application development) and pedagogical potentialities. Today's browsers have the necessary features to carry audio, video and textual contents that, according to Roden (Roden, S. 1991), if opportunely combined increase of the 30% the learning speed of the student.

Another important aspect, comparing our environment to other business games, is that it is not only a simulation game but an on line world. In a simulation game only one person is interacting with the software at a time; instead, in an on line world the user has to interact and cooperate with other users, to improve their business, to make decisions, to reach objectives that they cannot reach alone. The learners are inside a simulated environment, interacting both with the software and other users; so their activities can have effect both on their own enterprise and on the others.

The browser game we are going to develop will include some non-player characters (NPC), designed to perform some tasks guiding students to understand some important mechanisms of the market. For example, if there is an NPC creating obstacles to the development of a company, the owner has to understand the best strategy to defeat it, learning how to protect his/her business from that kind of problems. Besides, NPCs will allow the simulation of important actors of the market. NPC are also useful tools for instructors to facilitate learning events and activate/manage some interactions within the environment.

It is important to notice that the learning environment we are going to develop will be a game in which students will play autonomously, improving their skills and knowledge. But in some phases or situations, instructors can activate managed learning events to bring students to reflect on particular aspects, making the game more effective for learning.

5. Conclusion and future work

Educational MMORPG are now beginning to emerge. In particular, games based on browser MMORPG can allow the development of on line educational environments reducing the cost of production, respect to the first experiences with this kind of games. Considering that nowadays million of people in all the world play with MMORPG and an increasing percentage of them are young students, we think that these environments can have great prospective for learning purposes, especially in some contexts where the simulation of the real world and the interactions with other subjects are crucial. For these reasons we have thought to develop a new model for enterprise education, based on a browser MMORPG, for young students, to make them acquire entrepreneurial mindsets.

Although we will develop a simplified model of the environment in which enterprises work, it will be able to provide students the chance to:

- Learn, through learning by doing and learning by failing methodologies, dynamics in an open market and the main factors influencing the start-up and the success of an enterprise
- Learn cooperative work with other players, to reach common aims
- Develop inductive reasoning attitudes (what-if analysis), analysis, planning and verifying capability and problem solving.

It is important to highlight that the new learning environment probably will be able to involve students in the first phase and, if it is well structured and attractive, also in the following levels of the game; the integration of the game in very well known social networks will be another way of attracting and engaging young students. But to be an effective learning environment it is crucial in the design phase to create the right “rules” to interact in the virtual community, guiding students through the key factors of the complex world of the market. However, to make students acquire entrepreneurial mindsets it will be important to involve them in all the activities of the educational model we are designing with educational institutions and associations of enterprises.

References

1. Baldissin, N. and De Toni, A. F. and Nonino, F., *Evolution of the Management Games: Towards the Massive Multiplayer Online Role Playing Games?*, “International Conference Learning with Games”, Sophia Antipolis (France), 24-26 September 2007.
2. Dieleman, H. and Huisinigh, D., *Games by which to Learn and Teach about Sustainable Development: Exploring the Relevance of Games and Experiential Learning for Sustainability*, “Journal of Cleaner Production”, 14, 9-11, 837-847, 2006.
3. European Commission, *Flash Eurobarometer N.192*, “Entrepreneurship Survey of the EU (25 Member States), United States, Iceland and Norway”, The Gallup Organization Hungary/Europe, 2007.
4. Fine, G. A., *Shared Fantasy. Role-Playing Game as Social Worlds*, “The University of Chicago Press”, Chicago, 1983.
5. Foreman, J., & Borkman, T., *Learning Sociology in a Massively Multistudent Online Learning Environment*, “Games and Simulations in Online Learning: Research and Development Frameworks”, In D. Gibson, C. Aldrich, & M. Prensky (Eds.), 49-58, Hershey, PA: Information Science Publishing, 2007.
6. Jones, S., *Adding Value to Online Role-plays: Virtual Situated Learning Environments*, “ICT: Providing Choices for Learners and Learning”, Proceedings Ascilite Singapore, 2-5 December 2007.
7. Kaye, A.R., *Collaborative Learning Through Computer Conferencing: the Najaden Papers*, “Springer-Verlag”, 1992.
8. Kebritchi, M. and Hirumi A., *Examining the Pedagogical Foundations of Modern Educational Computer Games*, “Computers & Education”, 51, 4, 1729-1743, 2008.
9. Lave J. and Wenger E., *Situated Learning: Legitimate Peripheral Participation*, “New York: Cambridge University Press”, 1991.
10. McDowell, P. and Darken, R. and Sullivan, J. and Johnson, E., *A Complete Open Source Game and Simulation Engine for Building*

- Military Training Systems*, “The Journal of Defense Modeling and Simulation: Applications, Methodology, Technology”, 3, 143-154, 2006.
11. Meredith, A. and Hussain, Z. and Griffiths M. D., *Online Gaming: a Scoping Study of Massive Multi-player Online Role Playing Game*, “Electronic Commerce Research”, 9, 1-2, 3-26, 2009.
 12. Moreno, J. L., *Psychodrama*, “Vol I. Beacon House”, 1946. (tr. It.: *Manuale di psicodramma*, “Il teatro come terapia”, Astrolabio-Ubaldini Ed., Roma, 1985).
 13. Pannese, L. and Carlesi, M. and Riente, L., *Mettersi in gioco: Serious Games e apprendimento esperenziale per la formazione in azienda*, In Marconato G. (Ed): “Le tecnologie nella didattica”, Erickson, 2007.
 14. Papagiannidis, S. and Bourlakis, M. and Li F., *Making Real Money in Virtual Worlds: MMORPGs and Emerging Business Opportunities, Challenges and Ethical Implications in Metaverses*, “Technological Forecasting & Social Change”, 75, 5, 610-622, 2008.
 15. Roden, S., *Multimedia: the Future of Training*, “Ultimedia Digest”, 1, 1991-92, 78-81, 1991.
 16. Yee, N., *The Demographics, Motivations and Derived Experiences of Users of Massivelymultiuser Online Graphical Environments*, “PRESENCE: Teleoperators and Virtual Environments”, 15, 309-329, 2006.