

Game Environment and Design Thinking Approach for New Digital Careers

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Abstract. To compete with today's rapidly changing labour market one has to continuously self-adapt towards new attitudes and mindset. To assist such an endeavor the combination of entrepreneurship and STEM (Science, Technology, Engineering and Mathematics) skills is considered favorable. Following these basic premises, the paper presents a European project, TEAM_STAR, focused on developing a 3D game environment to promote these new skills in secondary school students for new digital careers.

Keywords: Serious Games; Entrepreneurship Education, Design Thinking and STEM.

1 Introduction

The current situation, as shown by the Eurostat data (Eurostat, 2020), related to the unemployment rate of young people is high in different European Countries. For example, concerning the EU Media (35,2%), Italy has an unemployment rate of 42,7% followed by Greece with 40,6%, Bulgaria 35,8%, and Latvia 30,4%.

Youth unemployment (labour force aged 15 to 24 years old - the earliest point at which mandatory school education ends) tends to be higher than unemployment in older age groups. Typically, teenagers who are fresh out of education do not find jobs immediately. Note, the trend is higher in emerging economies than in industrialised nations.

In the European Union, unemployment, in general, has been on the rise since 2008, which is attributed to the economic crisis that has led to a considerable job loss, fewer job offerings, and consequently, to an increase in the unemployment rate (Eurostat, 2020). All in all, the number of unemployed persons worldwide is projected to rise, and this is not due to the economic crisis alone but also the industrial automation of processes previously performed by workers.

The transformations of the worldwide economy lead to the need for digital skills for nearly all jobs where ICT complements the existing tasks. Careers such as engineering, accountancy, nursing, medicine, art, architecture, and many more - require increasing digital skills. However, based on the Eurostat data, the percentage of young people who

have basic or above-average overall digital skills in 2019 is 51% in Greece, 43% in Latvia, 42% in Italy, and 29% in Bulgaria(Eurostat, 2020).

Several key competencies facilitate young people's transition to the job market and future career prospects to cope with this situation.

In this direction, according to EU Commission communication ‘Rethinking education: investing in skills for better socio-economic outcomes’ (Commission, 2012), entrepreneurship education, a one of the key competence, is recognised as the supporting tool for young people to develop a broad set of competencies applicable in all walks of life, not simply about learning how to run a business. This means acquiring ‘the ability to think critically, take the initiative, problem-solve and work collaboratively’. Consequently, real-world experience, through problem-based learning and enterprise links, should be embedded across all disciplines and tailored to all levels of education to create new opportunities for business creation as a career destination.

In this context, the European Commission, in the framework of the Erasmus+ Programme, has co-founded the *TEAM_STAR project - Enhancing entrepreneurial Skill for new digital Careers* involving five European countries (Latvia, Italy, Bulgaria and Greece) and seven organisations.

2 The Project Core

The TEAM_STAR project idea comes from some needs in secondary schools as established during the proposal design:

- Promoting entrepreneurial and digital skills in school curricula in terms of factual knowledge, skills, and attitudes.
- Encouraging the development of critical thinking and problem-solving skills in students to cope with new digital challenges.
- Promoting STEM (Science, Technology, Engineering and Mathematics) approach to reinforce interdisciplinary and multidisciplinary teaching in a different context with the involvement of all academic disciplines and guaranteeing social inclusion and gender equity in this particular field.
- Reinforcing school and teacher networks to share resources and best practices.

In this context, the project team intends to respond to these needs through the following activities:

- Defining a common framework for digital entrepreneurship following the EnteComp Framework.
- Designing a new curriculum for the promotion of new digital careers with a particular focus on STEM skills development with the support of the European Digital Competence framework.
- Operationalising such curriculum through applying the design thinking method to promote the development of creativity, innovation, and entrepreneurial mindsets.
- Supporting STEM skills useful for professional careers for both teachers and students.

- Improving the collaborative sense among teachers and schools through the exchanging of experience, best practices focusing on the interdisciplinary and multidisciplinary approach.

2.1 Entrepreneurship Education and New Jobs

Entrepreneurship is considered an essential skill acquired through lifelong learning. The entrepreneurship key competence includes creativity, innovation, and the ability to plan projects to achieve objectives. Being universal, entrepreneurial skills can encompass various attitudes: hard skills like technical and financial and soft skills like communication and leadership.

The Oslo Conference and the "Entrepreneurship" agenda Education in Europe: Fostering entrepreneurial mindsets through education and learning" (Europejska, 2006) shows that entrepreneurship education activities are mainly aimed at:

- Encouraging students to develop the necessary skills, knowledge and attitudes, that enable them to become active players in their learning, career and lives;
- Promoting awareness among participants involved and stimulate their attention to the opportunities offered by entrepreneurship education;
- Encouraging and supporting entrepreneurial behaviour and innovation.

"Entrepreneurial competence" today is seen as a "composition of an entrepreneurial attitude, entrepreneurial skills and knowledge of entrepreneurship" (Antonaci et al., 2014), in particular:

- An *entrepreneurial attitude* is related to how "to become entrepreneurial", i.e. developing an entrepreneurial mindset and gaining awareness of one's potential. Therefore, educational interventions in this sector must help assume mental and operational attitudes supporting future entrepreneurs in acting and taking the responsibilities required by the role.
- *Entrepreneurial skills* are about "learning to become an entrepreneur", i.e. acquiring the knowledge and skills needed to turn ideas into action. These skills can be soft (social-communication skills) or hard (more technical skills such as drawing up a business plan).
- *Knowledge of entrepreneurship* refers to "learning to understand entrepreneurship", i.e. understanding the concept of entrepreneurship and related conceptual and social issues.

Hytti (Hytti & O’Gorman, 2004) points out that entrepreneurship education can be developed regarding three different objectives: learning to understand what is meant by entrepreneurship, fostering an entrepreneurial mindset and learning how to become an entrepreneur.

In secondary school, entrepreneurship education aims to help young learners develop the competencies, skills, and knowledge crucial to developing an entrepreneurial mindset.

Therefore, it is necessary to implement practices that develop skills and attitudes such as leadership, collaborative work, motivation and tenacity, initiative, and risk-taking. In this context, methodological approaches based on experiential learning in which

the learner plays an active role (e.g. learning by doing, collaborative work, etc.) appear more efficacious.

3 Game Environment and New Jobs

The use of Serious Games in the entrepreneurship environment is already considered as a way of encouraging students' motivation and developing the appropriate set of skills (Almeida, 2017). Introducing the students to experience some aspects (strategic-decisional, managerial and more directly operational) of the entrepreneur's work through business management simulation games, the technique enabled "Students in classes using the game scored significantly higher means than classes that did not" (Blunt, 2007).

In terms of content and methodology, the effectiveness of the conducted activities using Serious Games is directly connected to the functionalities and appropriateness of the selected games. Therefore, it requires a highly detailed choice of games (Antonaci et al., 2014).

Several serious games have been used within the project framework in developing mainly operational skills that an entrepreneur must possess (Smith, Schallenkamp, & Eichholz, 2007) such as *Hot Shot Business*, an example of an online game environment, *SimVenture Evolution*, among the single-player game, and *GoVenture* as multi-player game example.

3.1 Hot Shot Business

The game is a collaborative venture involving Disney Online and the Ewing Marion Kauffman Foundation. It helps young adults (ages 9-12) learn the skills necessary to become successful business owners (Everett, 2003).

Hot Shot Business encourages people of all ages to engage in and be supportive of entrepreneurship. Promoting entrepreneurship as a legitimate field of study in higher education and supporting successful entrepreneurs to give back to society, the game improves the academic achievement of disadvantaged children. Finally, it helps students earn self-sufficiency through emphasising math, science, and technology skills in the education setting.

3.2 GoVenture

This is a first-person strategy game centred around 'business/market adventures' (Simmons, 2017). The player is expected to make decisions while organising a virtual company and work over ten simulated years. Each game session lasts one virtual month and ends with a feedback report assisting the player in balanced decisions for the next session. The players can operate in Organisation, Sales & Marketing, Operations, and Finance.

3.3 SimVenture Evolution

It is the brand name for a series of educational computer games and simulations developed and published by MediaSpark Inc. The players manage companies on their own or in teams. In this game, one can define the product, sector and market, or choose various pre-set scenarios/simulations. The game's objective is to run a successful business in competition with other companies run by other players or against virtual opponents.

4 Design Thinking and New Jobs

To encourage innovation starting from people and work contexts, the project uses the Design Thinking methodology. This method is suitable for developing new skills and technologies for companies and has already given excellent results in the development of products (Hacker, Sachse, & Schroda, 1998), services, experiences, web interfaces (Lindberg, Meinel, & Wagner, 2011) and innovative teaching (Dym, Agogino, Eris, Frey, & Leifer, 2005).

Given a problem, Design Thinking breaks down the creative process into five stages, making the design accountable and iterative at every step of the process. The characteristic phases are: Empathy, Definition, Ideation, Prototyping and Testing, each of which consists of a specific kit of tools to implement in any situation and context. Integrating the design thinking approach in a game environment can make the learning processes more effective and, thus, motivating in preparing the students for new digital careers.

5 Conclusion

In the framework of the TEAM_STAR project related to the combination of STEM careers and entrepreneurship features, some skills are considered in common, such as technical knowledge, a knack for problem-solving, and an analytical mindset. In addition, STEM education fosters the entrepreneurial spirit through a project-based curriculum that focuses on applying science, technology, engineering, and mathematics studies to address real-world problems.

In the coming months, the project team will develop a game environment to help students improve STEM and entrepreneurial skills and increase their motivation through the design thinking approach for STEM and ICT careers and a 3D-Learning Environment.

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