

SIMPRODUCTION: A MULTI-PLAYER ONLINE SERIOUS GAME TO UNDERSTAND THE BASICS OF BUSINESS ADMINISTRATION

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Over the last years, entrepreneurship has become a prevalent way to find a professional career for students and recent graduates. However, having courage and the right qualifications is usually not enough to run a successful business. Most entrepreneurs fail at very early stages because of the lack of basic knowledge about business administration. For this reason we have developed SimProduction, a multi-player online serious game where each player manages his own production business and can interact with other players selling and buying resources. In SimProduction, players have to learn how to negotiate with suppliers to get a good deal, sell productions in a competitive market, recruit valuable employees or apply for loans from banks. Playing with players in a pseudo-real-time environment (i.e., each day represents a week in the game) increases players engagement and encourages a different approach to learning the basics of business administration.

Keywords: business administration, entrepreneurship, technology enhanced learning, multi-player, production, serious game, web

1 INTRODUCTION

Many national and international initiatives are intended primarily to help young people to create their own businesses. Entrepreneurship is presented as a way to shape a promising professional future. The successful cases of famous entrepreneurs like Mark Zuckerberg (Facebook) and Sergey Brin (Google) encourage new graduates to start their own business. In most cases these companies offer a new product or technological service, so they are usually driven by workers with a technical background. Unfortunately, the technical skills of these workers are hardly ever accompanied by the knowledge and skills necessary to run a successful company. Moreover, managing a company not only requires knowing and controlling appropriate indicators, but also to establishing relationships with other companies. Sometimes these other companies have divergent or aggressive strategies and may seriously interfere with the final result.

Learning these types of abilities can be really distressing in real life. Liens, mortgages, debts and other problems associated with bad business decisions can be a burden too heavy to start over after a business failure. Thus, it is necessary to have a realistic but safe environment in which future business managers can learn to manage their business and relate to others, without the fatal consequences associated with poor management. This is precisely the paradigm proposed by serious games: Games with a purpose that goes beyond the mere joy of playing and aims to help develop new skills and abilities [1].

For this reason we have developed SimProduction, a multi-player online serious game where each player manages his own production business and can interact with other players selling and buying resources. In SimProduction, players have to learn how to negotiate with suppliers

to get a good deal, sell productions in a competitive market, recruit valuable employees or apply for loans from banks.

In the following sections we detail the features and functionality of SimProduction, in addition to reviewing other initiatives which have addressed similar goals.

2 REAL-TIME MULTIPLAYER GAMES, SERIOUS GAMES, AND BUSINESS ADMINISTRATION

In addition to the recent success of Massively multiplayer online role-playing game (MMORPG) such as World of Warcraft or Guild Wars 2, technologically simpler approaches like real-time web-based strategy games (also known as Real-time browser-based MMOs) have also aroused great interest among users (popular examples of this type of games are Ogame or Travian). Both approaches share a common technology foundation: The presence of a virtual world. A virtual world can be defined as a *"synchronous, persistent network of people, represented as avatars, facilitated by networked computers."* [2] Providing a synchronous virtual world (where actions have consequences that are not necessarily immediate and dependent on other actions by other players) inhabited by people (and not just AI controlled players) substantially increases the degree of immersion that these games offer.

As we mentioned above, serious games aim to take advantage from the dynamics of the games to facilitate the learning of skills and abilities that go beyond mere entertainment. Despite *"fun is just another word for learning"* [3], is not always an easy goal to achieve. In many cases, serious games are too serious to be a game, as educational contents prevail against the dynamics of the game ruining the flow. The flow is what puts players between anxiety (due to excessive difficulty) and boredom (due to lack of difficulty of the task) [4]. It is a dynamic state as it varies depending on the skill and the time devoted to the game. Therefore, well-designed games should offer simple challenges to novice players and more complex challenges to expert players.

In this context, it should also be recalled that not all games are fun, and not all fun things are games. Games have clear rules and objectives that are known in advance. They provide immediate feedback (although the consequences of player actions may be delayed) and pose numerous challenges appropriate to the player's abilities. The key word here is interaction. If it is not possible to interact, it is not a game. [5]

Over the past 40 years, serious games around economics and business management have evolved technologically and methodologically [6]. Although some authors claim that has been the technological evolution that has prevailed on the methodology [7,8], it is possible to analyze the improvements in this field using criteria that evaluate both aspects: Realism, Accessibility, Compatibility, Flexibility and Scale, Simplicity of Use, Decision Support, and Communication [6].

When classifying the serious games available on business management, Riedel & Hauge define a framework with two dimensions: simulation level and skills mediated [9]. Simulation level means the amount of the world that is simulated in the game (i.e., universe - world - nation - industry - inter-organizational, business / organization, intra-organizational, group, team, individual). Skills mediated are divided in hard skills for training (e.g., discipline-based learning, innovation, product/service knowledge, sales, and project management) and soft skills for training (e.g., creativity, team-building, collaboration, negotiation, inter-personal skills). Summarizing the current state of the art, there is a clear gap in the market for satisfying the user needs of inter-organizational relations/ processes training. These include extended and virtual

enterprises, and due to the complexity of contemporary collaborative production their importance and relevance as business success factors increases [9]. Blažič et al. analyzed key business management serious games (i.e., INNOV8, Virtonomics, eRepublik, Virtual Leader, Business Tycoon Online, Wall Street Survival, The Beer Game, Big Oil: Build an Oil Empire) using a number of criteria and concluded that in spite of their limitations, business simulation games are one of the most important methods of acquiring technical and problem-related knowledge.

One of the main aims of SimProduction is the development of a serious game taking advantage of the high degree of immersion that provide virtual worlds created in Real-time browser-based MMOs , as explained in the next section.

3 SIMPRODUCTION: AIMS AND SCOPE

As we described in the previous section, there are several learning applications aimed to train students on management. Some of them are focused on production chains, direction or business management; others analyze the business plans designed by their users, giving advice on their viability in the market. SimProduction shares this latter objective, but proposes the use of a Real-time browser-based MMO game where every player manages a company inside the virtual world. In this scenario, different players control companies from interrelated sectors, becoming clients or suppliers of the rest of the players. This characteristic introduces the possibility of deploying cooperative or competitive strategies in the game, increasing the importance of the communication between players.

Other important characteristic of SimProduction is that it is a real-time simulated game, where each real-world day represents a week in the virtual world of SimProduction. This way, the consequences of players' actions have an impact similar to how they would impact the real world; with the exception that time is accelerated due to gameplay.

From a technological point of view, SimProduction's foundations are based on well-known Web standards like HTML5, CSS and JavaScript for the client side, and PHP for the server side. All these technologies are compatible with the latest versions of current web browsers (i.e., Google Chrome, Mozilla Firefox, Internet Explorer, Apple Safari, or Opera).

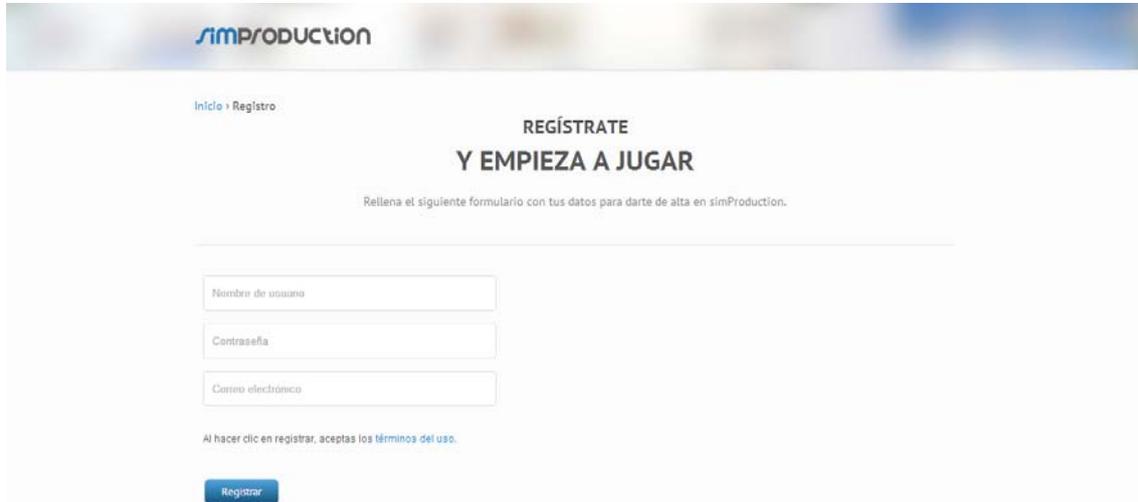
Therefore, the purpose of SimProduction is offering a free and open platform to those who want to know the dynamics of collaboration and cooperation generated when managing companies in interrelated sectors. The complexity of the platform and the detail presented in the virtual world are moderated, which means that it is appropriate for students in their last years of high school and higher.

4 SIMPRODUCTION: FEATURES

In SimProduction, every registered user manages a production company aimed to be profitable. Each company has to collaborate with other sector's companies negotiating with suppliers and clients in an effective way. In the same way, these companies must be able to increase their production with the aim of reducing production costs and being more competitive in the market they are involved.

In order to provide a truthful simulation of a company, several functionalities have been implemented in SimProduction to manage different areas of the company. Once signed up,

players have to select the sector in which their companies will work, choosing between mineral production, tools production and vehicles production. The signing up process is straightforward and only involves filling a simple form with the username, password, and email of the player (see Figure 1).



The screenshot shows the registration page of SimProduction. At the top left is the logo 'SIMPRODUCTION'. Below it, a breadcrumb trail reads 'Inicio > Registro'. The main heading is 'REGÍSTRATE Y EMPIEZA A JUGAR'. Below the heading is a sub-heading: 'Rellena el siguiente formulario con tus datos para darte de alta en simProduction.' The form contains three input fields: 'Nombre de usuario', 'Contraseña', and 'Correo electrónico'. Below the fields is a link: 'Al hacer clic en registrar, aceptas los términos del uso.' At the bottom of the form is a blue button labeled 'Registrar'.

Figure 1: Sign up screen of SimProduction

Once these fields are filled and validated, players have to define some characteristics of their companies, such as their names, logos, and sectors (see Figure 2). SimProduction initially allows to choose between the primary sector (mining minerals), the secondary sector (steel tools production); and the tertiary sector (automotive production).



The screenshot shows the company configuration page of SimProduction. At the top left is the logo 'SIMPRODUCTION'. Below it, a breadcrumb trail reads 'Cerrar sesión'. The main heading is 'CARACTERÍSTICAS DE LA EMPRESA'. Below the heading is a sub-heading: 'Todavía no puedes empezar a jugar. Tienes que dárnos algunos detalles sobre tu empresa.' The form is divided into two sections. The first section is 'Sector de la empresa'. It includes a descriptive text: 'En simProduction, te damos a elegir tres sectores en los que implantar tu empresa. Los tres sectores son los siguientes: la extracción de minerales, la producción de herramientas y la fabricación de vehículos.' Below this text is a dropdown menu with the selected option 'Extracción y producción minera'. The second section is 'Nombre de la empresa'. It includes a descriptive text: 'Indica el nombre de tu empresa. Debes tener en cuenta que será el nombre por el que otros usuarios te reconocerán y debe ser identificativo.' Below this text is an input field labeled 'Nombre de la empresa'.

Figure 2: Company configuration screen

The main objective of the game is to manage a stable business which grows steadily due to a correct management. To achieve this goal, the dashboard of SimProduction is divided in four areas: Financial, Personal, Purchases and Sales. The financial status of the company is shown

in the financial area through a series of graphs that show the trends the treasury follows (see Figure 3). In addition, it also allows the player to apply for loans to the bank (for the sake of simplicity, there is only one inside the virtual world of SimProduction) in order to grow.

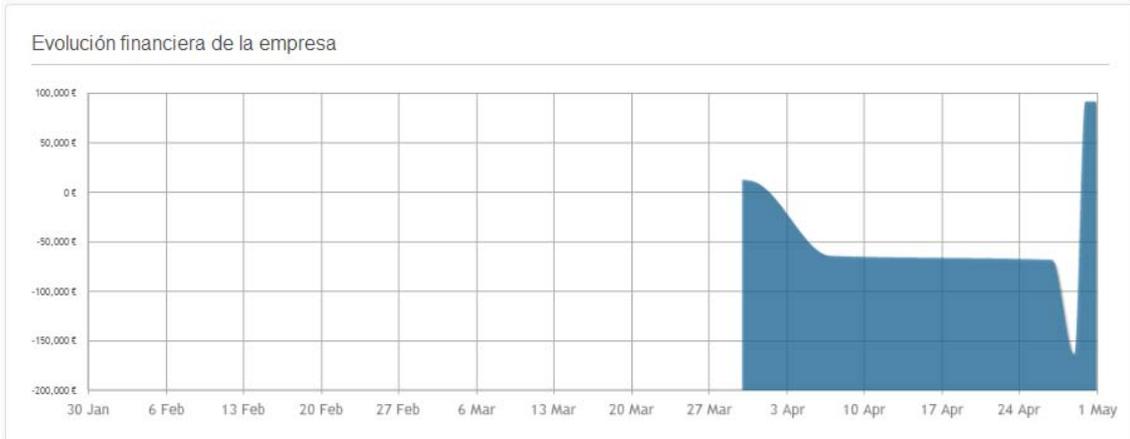


Figure 3: Graph that shows the financial evolution of the company in the bank area of SimProduction

The human resources of the company are displayed in the personal area, providing their names, roles, and knowledge. The level of training of the personnel is one of the essential factors to make the company grow and improve the production process. In SimProduction, the cost of forming the personnel is proportional to the distance between the company and the technological center in which the course is given.

The purchases and sales areas are crucial during the game, as long as they allow learning how the productive process of the company works. In the sales area, players can configure the way in which their products are sold. All products are sold in lots, and therefore volume discounts (i.e., rapped) can be applied. There is a maximum limit of four lots in a volume discount as an incentive for the best clients. In the purchases area, players can buy products from the other sectors in order to produce more and better products in their sector.

In addition to the already explained areas, there are others options aimed to foster the interaction with other players. The first one is a geographic map of the virtual world that shows all the registered companies in the game and allows accessing their contact information. The second one is a message system that allows communicating between users to be able to negotiate with suppliers as well as clients (see Figure 4).

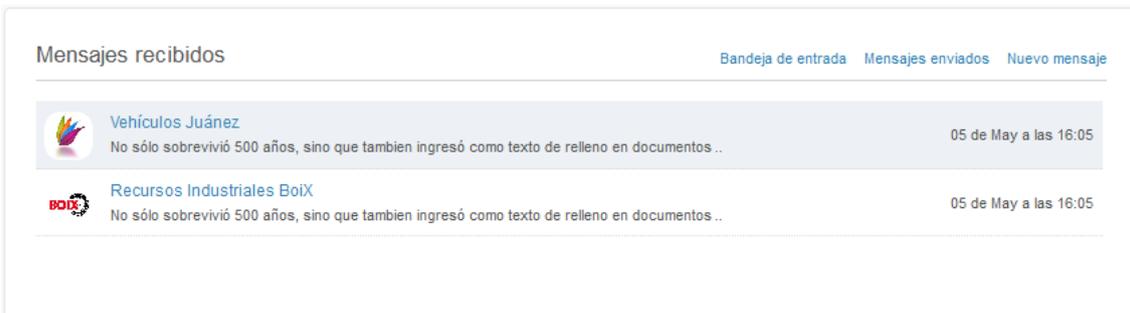


Figure 4: Message system of SimProduction

The strong point of SimProduction is the real-time gameplay and interaction with the rest of registered players. SimProduction players need to purchase products from other sectors - controlled by other players- in order to manufacture their own products. For instance, in the case of a secondary sector company producing steel-made tools, it is necessary to buy mineral as raw material from a company of the primary sector, and vehicles from a company of the tertiary sector to transport the goods produced. In order to obtain the highest benefit, the best deals in the market have to be chosen, negotiating with the supplying company through the messaging system to convince them to provide a profitable offer.

Finally, SimProduction also provides a backend application (see Figure 5) which allows managing the platform remotely without having to log in the operating system of the server in which it is installed. This application relies on the same log in system than SimProduction web-based MMO, but just the users with administrative credentials have access to it.

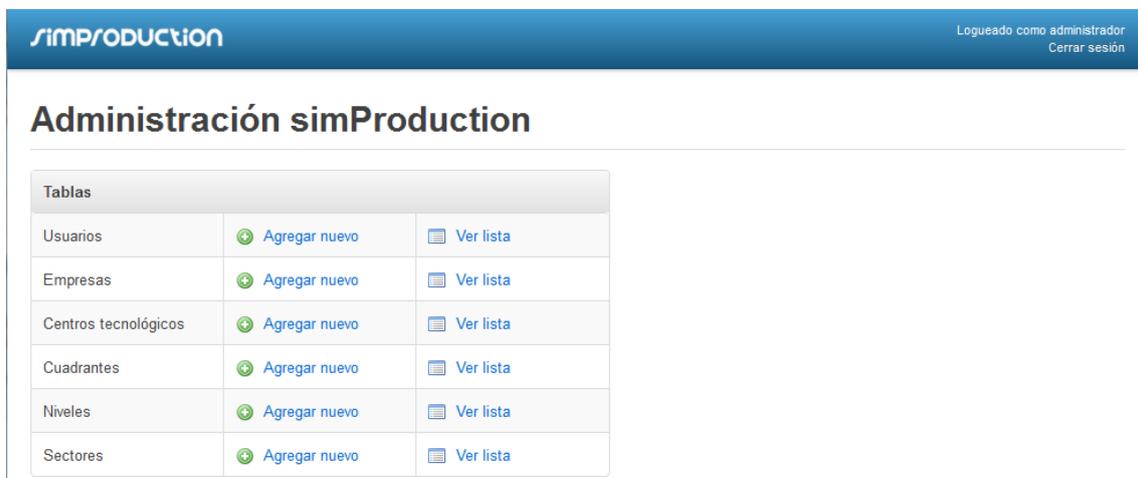


Figure 5: Administration screen of SimProduction

It is important to mention that the backend application provides a comfortable access to all the actions performed in the platform. Therefore, it is a useful tool for analyzing the behavior of players or evaluating their learning process. Once the system has gathered enough data from the players, applying data mining techniques is possible, such as identifying different player profiles [11], or sequence analysis to find relevant patterns of actions [12]. These analysis provide valuable ideas about how to redesign the existing platform to improve the learning processes that take place in it.

5 CONCLUSIONS

In this paper we have presented the SimProduction platform, a Real-time browser-based MMO designed to learn how to manage a company in cooperation and competition with other business managers. In addition to the learning opportunities offered by such platforms, it is also important to note that it also provides usage logs that can be analyzed with the aim of knowing and improving learning processes of their users [13].

However, it is also important to remember the limitations in the use of these kind of simulation games, as Waver et al. addressed in [14]: 1) Considerable simplification of reality; 2) Lack of player's responsibility for his/her decisions; 3) Necessity of engagement of area and hardware

resources; 4) Limitation of education to the scope of the game; 5) Games are treated as entertainment rather than as education; 6) Behaviors and poses of game participants differ significantly from their behaviors and poses in real life.

Despite its limitations, SimProduction offers a new platform for learning through play, and also to analyze and investigate the learning processes that occur during its use.

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