



# The Serious Game “Top Eleven” as an Educational Simulation Platform for Acquiring Knowledge and Skills in the Management of Sports Clubs

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Accepted: 21 September 2021 / Published online: 9 October 2021  
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## Abstract

The aim of this study is to examine whether students of a sport management undergraduate course can gain knowledge in the management of a professional soccer club, by participating in a commercial serious game. Serious is considered the cyber game that its purpose exceeds entertainment. For this case study, the serious sport club management game was “Top Eleven”. The theoretical model that this study was based on, is Misfeldt’s “scenarios based learning” for the transformation of a serious game into an educational means. It includes dimensions that cover part of the sport management class content in the National and Kapodistrian University of Athens, School of Physical Education and Sport Science. The transformation consisted of educational scenarios vested to the serious game, in order to add educational parameters to its basic elements with the purpose to relate further to the sport management class. The application showed that Top Eleven covers adequately Misfeldt’s model dimensions; therefore it can be used as an educational tool. Furthermore, an evaluation of the class gamification was conducted by the participating students ( $n=62$ ). The data collected showed that the majority of the students ( $f=61$ , 98.4%) agreed that the participation in the serious game was “helpful” to their sport management class education process. They further agreed that they gained “very” or “very much” knowledge related to the management of a professional soccer club ( $f=41$ , 66.1%) and that 59.7% ( $f=37$ ) of them would choose to work in a position of “sport club manager” as a result of the experience they gained by participating in the serious game.

**Keywords** Scenario based learning · Sport management games · Serious games for learning · Gamification in higher education

## 1 Introduction

Technology dominates modern times. Smart devices and internet are present in everyday life. Part of it is virtual reality, used to imitate the human activity in many areas, with a way increasingly like physical life. This allows using technology for fun, but also for gaining

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experiences that would not otherwise be possible, especially when it involves risk; economic, social, or physical. Therefore, such technology has also been entered the field of education to better train learners (Baalsrud et al., 2013; Boskic & Hu, 2015). The main reason is that due to students' inexperience, they cannot address work problems or make decisions that would jeopardize an organization's relationship with its customers, investors, suppliers, or governmental agencies. Consequently, in education, especially in higher education, digital programs in form of simulators and/or serious games run as virtual work environments with complex conditions, very close to reality. As a result, learners can see, almost immediately, the effects of their work decisions as they apply the knowledge they have acquired during their professional education. Another reason for using serious games in higher education is the cost for obtaining the very expensive stimulators (Carvalho, 2017; Aldrich, 2009).

Even though this study does not fill a theoretical gap, it does give insight to the relevant bibliography, by filling a gap in gamifying sport management education, since it attempts to give evidence of validation of a serious game not before present in the related bibliography as an auxiliary educational tool. Research via Google Scholar search engine, resulted to only one source, out of 24 academic works, which refers to the serious game of the study "Top Eleven" (2016), as potential means for improving teaching process (González Pérez et al., 2014).

In Greece, especially in the field of sport, there has been a limited proportional effort to train stakeholders about how one can build and manage sport organizations (Afthinos, 2017).

Therefore, the purpose of the present study is to investigate the possibility of converting a commercial, online, popular, free-to-use, serious sport club management game, into an educational sport club management simulator. Its further intent is making knowledge acquisition more "student friendly", but also to develop the use of inexpensive simulators in the educational process (Hanghøj, 2011; Zarraonandia et al., 2015). In this attempt, the learner benefits twice: on one hand acquiring the experience and skills through management actions, by merely participating in the serious game, and on the other, by utilizing the game to do extra assignments in form of educational scenarios (Zarraonandia et al, 2015).

## 1.1 Research Questions

Based on the above, the research questions are:

1. Is it possible to convert a free-to-use, online, popular, serious soccer club management game, the "Top Eleven", into an educational sport club management simulator, and therefore, be used as an educational tool?
2. Is the Top Eleven helpful, if vested with class assignments and used as an educational simulation procedure, in increasing students' awareness/knowledge with regard to a sport club general manager's duties/job position?
3. Does the serious game Top Eleven influence students' choice, as a result of their play experience, on acquiring a soccer club manager job?

## 2 Literature Review

### 2.1 Games in Education

Innovations are part of higher education. Therefore, the search for new ways to improve the educational process is a priority. Computer games are very popular in today's youth, so

in some cases they enrich the learning process, to increase the interest and involvement of students (Gee, 2005). Aldrich (2009) classifies personal computer games, into three main categories: video games, serious games, and educational simulations.

Video games address the user's ability to respond to visual prompts, requiring immediate judgment in decision-making. This group includes fighting games, chasing games, sport games, etc. (Afthinos, 2017).

Serious is a digital game that its purpose goes beyond entertainment (Boskic & Hu, 2015). It simulates operation of a real system (e.g., legal entities as a whole or a part), and it is more concerned with the critical thinking and user's ability to make decisions, gradually creating digital environments within its rules. This group includes digital games for the development and management of cities, sports clubs, etc. (Afthinos, 2017).

Educational simulations are digital games that simulate the operation of real systems, where participants make specific choices, seeking to meet targeted learning outcomes. The group of serious games combines video games environment, with the structure of educational simulations. However, serious games differ from video games in that they include specific learning objectives and intended results. They also differ from educational simulations, as they often have lower cost production (Afthinos, 2017 in Aldrich, 2009).

## 2.2 Serious Games in Education

The exploitation of popular serious games by converting them into educational means is not unknown to the educational community, as they are an alternative financial solution that is nonetheless proved effective (Boskic & Hu, 2015; Baalsrud et al., 2013). The design of serious games as well as educational simulations, have evolved to the extent that their complexity, technology, and cost of production often prevent the educational community from undertaking such projects (Zarraonandia et al., 2015). For this reason, we use “sustainable” solutions, which in this case are popular serious games (Boskic & Hu, 2015; Baalsrud et al., 2013).

The effectiveness of transferring knowledge through a game, makes the use of serious games a serious investment (Azadegan et al., 2012), compared to costly educational simulators (Carvalho, 2017). To test the effectiveness of games, many scholars have suggested that they should include basic and characteristic elements. McGonigal (2011), for example, argues that effective games should have: clearly defined goals, regulations, feedback mechanisms and voluntary participation. Furthermore, specific elements related to how the learner should meet the game's goals, challenge him to use his creativity and strategic thinking to respond to the game in the best possible way. These, combined with the fast feedback on the outcome achieved, make the learning process through games more interesting (Boskic & Hu, 2015), and more effective. The way it has just been described as attempting to increase learning interest is by “playing” or by the international term “gamification”. This term has become increasingly popular in education (Boskic & Hu, 2015), because it involves introducing elements and design of games into the learning process in terms of its content, structure, or both (Kapp, 2012), aiming to meet educational goals.

Serious games have long been in questioning from academia on their training and learning effectiveness through systematic reviews or case studies. On that, research results vary from neutral to high scores of learning gain (Guillén-Nieto & Aleson-Carbonell, 2012; DeSmale et al., 2015; Bakhuis Roozeboom et al., 2017). Effectiveness of a serious game was also used for screening and orienting new managers. Gooding and Zimmerer suggested as early as 1980, that for young managers to better prepare for their new job in an

organization, they should spend an orientation period playing an industry game before their employment. The game would be tailored to the specific organization, so that managers could be accustomed to the company's expectations.

Serious games are being used in higher education as learning tools from the beginning of the millennium when simulation games started being used in a more professional way (Michel, 2016), and they have been gradually developing during the last decade, after researchers started focusing more into the factors influencing their learning effectiveness (Guillén-Nieto & Aleson-Carbonell, 2012). As serious games we consider the ones that have the purpose to educate, train and provide information to students (Khenissi et al., 2015).

In Sport Management's traditional courses, students have almost no experience to the real world of sports, until their first day of internship in a sport organization. By that time, nothing has exposed them to any real work complexity or obstacles and problems to face. To avoid the real risk towards the organization, a gamified virtual work environment with the form of a serious game/simulator can help the student to acquire the necessary experience, skills, and competences while he/she is operating it by using his/her professional knowledge (Afthinos, 2017).

## 2.3 Game Based Learning

Game based learning has been successfully used in making theoretical knowledge more approachable to higher education students (Ebner & Holzinger, 2007). In that, placing educational scenarios in a playful process support the basic idea in creating a game-based learning educational tool (Barrows & Tamblyn in Ebner & Holzinger, 2007). Misfeldt (2015) presented a theoretical model that included the dimensions of creating or transforming a serious game into a learning medium, utilizing scenario approaches. In this case, the educational scenario is the serious game's content. The dimensions of the model include the subject's content, the requirements of the educational level and the institution, the educational tool for the transfer of knowledge and requirements, with the aim of acquiring students with both specialized knowledge and professional skills (Fig. 1).

## 2.4 The Serious Game Top Eleven

TOP Eleven is an online serious game that Nordeus Software Company released in May of 2010, for iOS and Android platforms, and for pc users. Its gameplay is a single-player, role-playing with multiplayer interactions. Players can access it through the Facebook social network platform, or by visiting the game's web site (Nordeus, 2021). The game

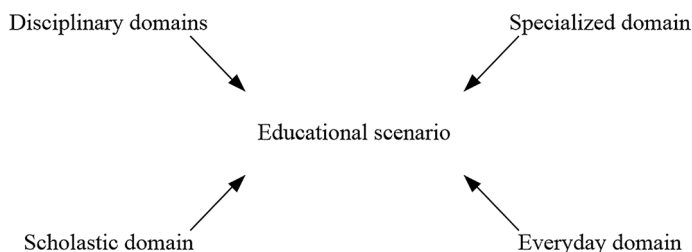


Fig. 1 Misfeldt's scenario-based education (2015, p. 184)

has significant links with the world of international football, since it uses the famous football manager José Mourinho, as the official face that has the role of a player's mentor. Mourinho appears in the gameplay giving advice and making comments based on his professional experience, for developing a TOP Eleven team. In the world of social gaming TOP Eleven "represents the social gaming evolution of the traditional football manager computer games" (Lopez-Gonzalez, & Griffiths, 2018, p. 6), and "It covers all aspects of managing a football team" (Milošević et al., 2017, p. 13). According to Vermeulen (2017), Top Eleven—Be a football manager, was one of the 5 most often played social network games, being the third in the total ranking. The game also ranked as the 10th most popular game on Facebook, by number of active users worldwide (Metricsmonk 2016; Super Data Research 2014, in Fiedler et al., 2018), and it is one of the best football manager games on Android OS (World Today News, 2020).

Top Eleven (2016) serious game consists of a perpetual cycle of interrelated decisions by its manager, in monthly time length periods that lead a sport team's successful course (Fig. 2). More specifically, player decisions derive from the game menu (Fig. 3).

The gameplay structure of Top Eleven is relevant to a sport club's "real" management work positions (Afthinos, 2017), appearing in the following Fig. 4. The organization chart depicts the five basic managerial work positions of any football club, namely: directing of a sport club, marketing management, accounting, sport facilities management and coaching. In these work positions, the director undertakes the responsibility to carry out the club's Board of Directors' decisions through the specialized staff he/she supervise. When the serious game functions as an educational medium, a student impersonates the director of the club, who takes over both the roles of the Administrative Board, as well as the responsibilities of five to seven positions derived from the club's Board of Directors members' roles.

## 2.5 Gamification Patterns

The game fuels from an infinitive quantity source (Ašeriškis & Damaševičius, 2014), with the form of income (\$) or tokens. There is no time limit in the game, except the season period (4 weeks) which restarts after each season ends. Users can enter the game at any given time. The game follows specific constraint patterns, such as end of participation in an event (i.e., Super League, Champions League, etc.), but continues

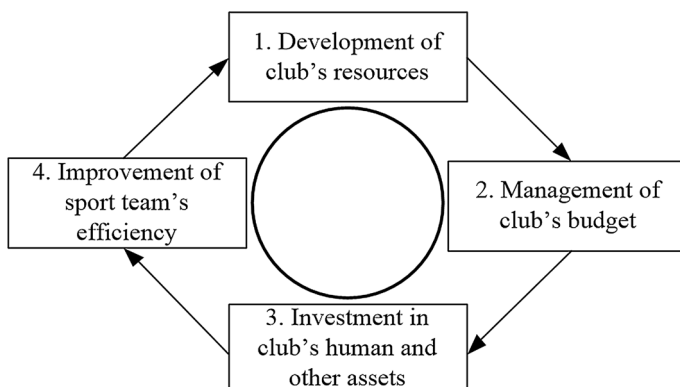


Fig. 2 The circle of Top Eleven's gameplay decisions

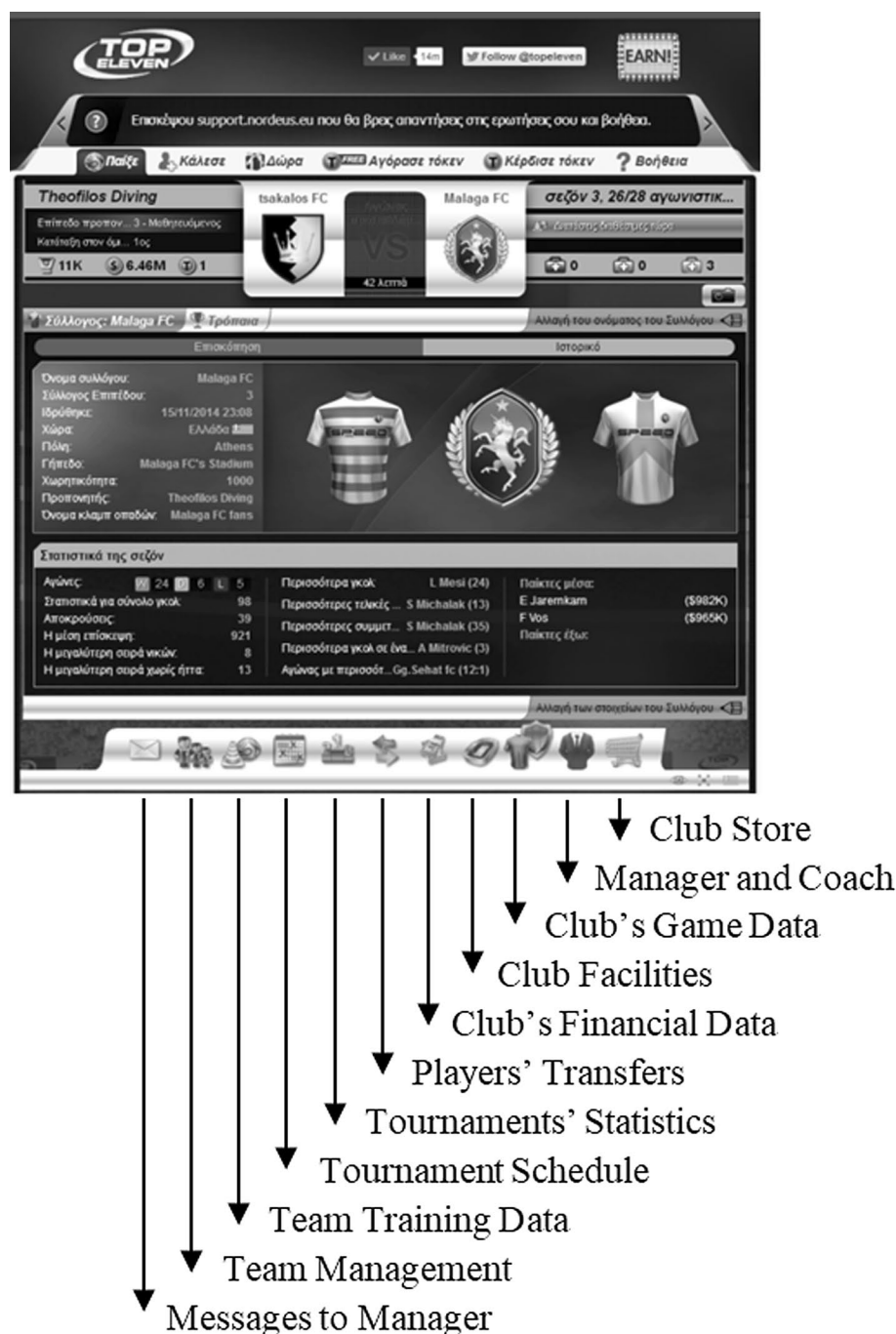
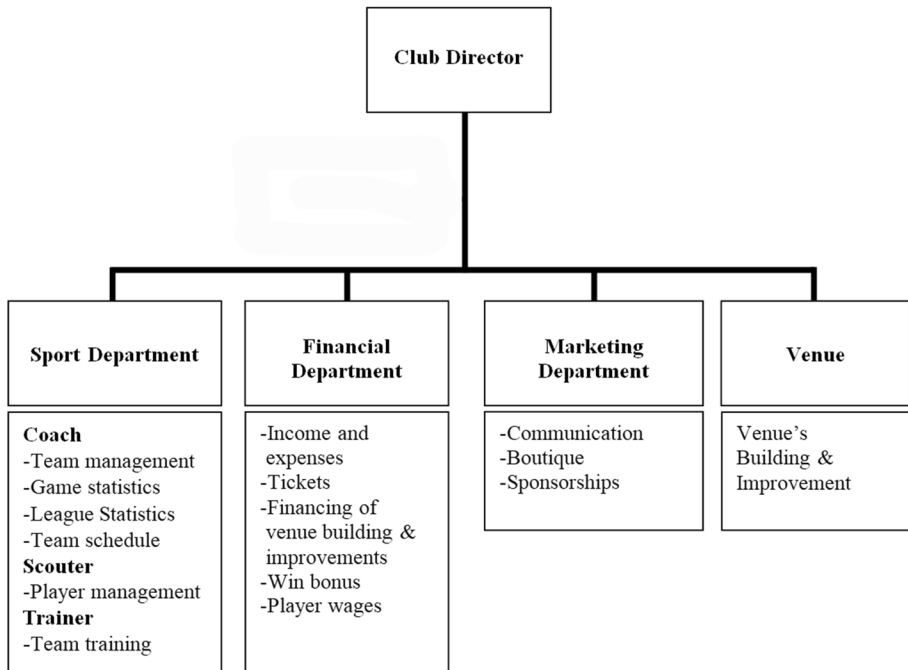


Fig. 3 Screenshot of Top Eleven's main menu and its relation to the gameplay decisions



**Fig. 4** Organization chart layouts of Top Eleven’s play elements (white background) to the basic sport club’s organizational functions/departments (blue background)

to keep users’ teams active in the basic League, even if they do not support them. Property patterns appear at the “Facility” menu, where users construct, develop, and expand main and assisting sport facilities. Construction time accelerates if it is prepaid in tokens. That does not speed up the flow of game though; it just amplifies the user’s income potential (i.e., larger stadium, more tickets). An analysis of the game is necessary to show the details of the game mechanics, and the types of patterns that govern the gameplay.

## 2.6 Establishment and Operation of a Sport Club

Sport clubs are legal entities operating in the society, providing sport services. Their establishment and operation in Greece stem from the existing Sport Law (1999) and include the following three basic steps:

Step One. Request to become a legal entity. It involves two actions: Establishment of a charter by the founding members, and filing a request at the court for state recognition.

Step Two. Accreditation by the state bodies which oversee the legal operation of the sport clubs in Greece (State and sport federations).

Step Three. The annual sport club’s obligations in terms of operation activities are legal (i.e., tax return filing, participation in sporting activities) and supportive (i.e., marketing activities).

### 3 Methodology

#### 3.1 Type of Research

This is a case study aiming to transform a serious sport game into an educational tool of managing a football club using Problem (scenarios) Based Learning.

#### 3.2 Sample

A total of sixty-two students (40% Male and 60% Female), aged 18 to 19 y.o., ( $n=62$ ) participated in the serious game of Top Eleven. All were attending the “sport management” class in the second semester of the four academic years’ studies in the Physical Education and Sport Science Department of the National and Kapodistrian University of Athens, Greece. Participation in the game was voluntary, with the criteria of (a) player is a student in the “sport management” course, (b) has basic computer literacy (internet browsing) and (c) has the will to engage in a new process/assignment. Students’ response to the application, was rewarded after evaluation by the class instructor.

#### 3.3 Means of Data Collection

Selecting the serious online sport game “Top Eleven, 2016” as a platform for educational purpose relied on the following criteria: (a) its sport content ([www.topeleven.com](http://www.topeleven.com)) since football (soccer) is the most popular sport in Greece, (b) its free access via a Facebook account, that makes it easily accessible via internet from computers and smart phones alike, (to avoid privacy issues using Facebook to use the serious game, the students created an account of their sport club’s name, to use it for the purpose of the educational simulation), (c) the “user-friendly” interface and gameplay, and (d) that its main purpose is managing a soccer club through decisions whose accuracy determines meeting the club’s objectives. Furthermore, it also covers the basic principles proposed by Misfeldt (2015) to be considered as educational. Students attending the class, evaluated the game’s educational vested elements for the purpose of this study, through questionnaires collected via the course’s e-class embedded e-mail.

#### 3.4 Procedure

The study followed two phases. At the first phase, students gained experience in managing a soccer club by participating in the Top Eleven serious game for at least three 4-week playing sessions, included in a total of 12 out of the 13 weeks long semester of the “Sport Management” class they were attending. During this period, the instructor of the “sport management” class offered to the participating students more exercises in the form of related scenarios according to the educational goal, as a vested extension to the serious game (Fig. 4), such as:

1. Communication of the club’s activities to its external environment through its Facebook account.
2. Recording and analysis of managerial and financial data.



### 3. Production of organizational and economic plans and reports.

At the second phase, the participating students evaluated their class assignment through a questionnaire received via e-class mail option. The questionnaire consisted of a set of demographic questions and four research questions, two closed ones with a five level Likert scale (very poor, below average, average, above average, excellent) and two bipolar (yes/no), as well as a "why" question, giving the opportunity to the students to explain the reasons for their choice.

## 3.5 Data Analysis

The first research question was an implementation-case study using qualitative research approach i.e., content analysis of the sport management course book, to produce the educational questions vested to the Top Eleven serious game. Data collected from the students' evaluation of their experience, fed an analysis of paired samples t-test (2nd Research question) and descriptive statistics (3rd Research question).

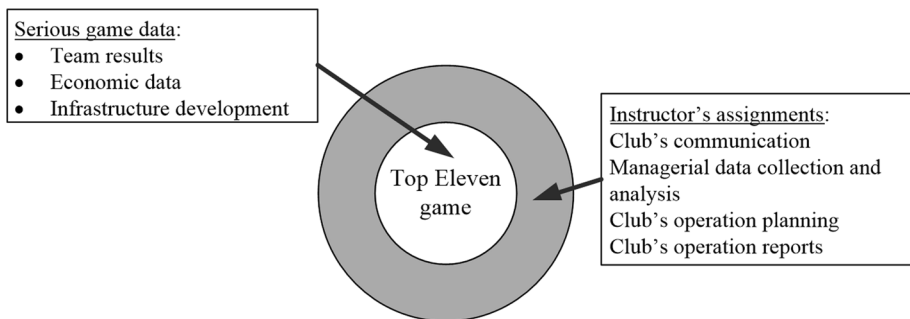
## 3.6 Validity and Reliability

This study's application is valid because the research goal, which is to "gain experience in managing sport clubs": (a) matches Top Eleven game's content, and (b) it reached success, since students acknowledged that they gained knowledge and experience by using the serious game as educational means. Further validation is necessary, to make this argument stronger. The research process is reliable because the application relied on data which derived from the study's digital serious game.

## 3.7 Limitations of the Study

By its nature, the study's serious game has limits to its structure. Therefore, data collected from the game, relied on the following parameters (Fig. 5):

- (a) Participation (by default) in three competition levels: Championship, Cup, and European competition for the eight best championship teams.



**Fig. 5** The student during the gameplay makes decisions in two lines of instructions: the game's and instructor's

- (b) Arrangement of optional friendly matches.
- (c) Development of the club's sport infrastructure such as stadium, academy, medical office, and parking Management of the club's finances.
- (d) Team coaching and training.

The above serious game parameters do not fully show the structure of a Greek professional football club, nevertheless, they do so to a satisfactorily degree, when the intent is to offer an introductory virtual reality day-to-day football club operation in functional areas of economic management, event management, team management, and communication.

The present study is also limited to McGonigal's elements for considering whether Top Eleven is fit as an educational game or serious game, as well as its educational effectiveness relies on students' self-reported data. Although the use of self-reported data in institutional research is considered a more subjective measure, there are observations stating that (a) they have greater bandwidth than objective data, (b) they apply as the only source of extracting certain types of information and (c) they are not regarded as deficient as standardized tests (Astin in Gonyea, 2005). Self-reported data in the form of questionnaire surveys are "indispensable and a valuable contribution to higher education research and assessment" (Gonyea, 2005, p. 85).

## 4 Results

The present work is a case study on the exploitation—conversion of a commercial serious sport game into an educational means by applying the related literature, in order a student to gain experience in managing a soccer club.

### 4.1 Research Question 1

The first research question states: Is it possible to convert the serious game Top Eleven into an educational sport management simulator; that is Top Eleven possesses the dimensions needed to transform into a learning medium, utilizing scenario approaches?

To address this question, we first had to test the sub-question of whether the Top Eleven serious game possesses elements that can classify it as an education auxiliary tool. In order to do this, we used McGonigal's work (2011) who argues that a game is educational when provides evidence of: "Clearly defined goals". For this study, there are two goals: (a) The purpose/goal of the Top Eleven serious game is the participating team to win the championships, while (b) the educational goal is to train the student-team manager in basic management skills, necessary to run a soccer club, in form of scenarios delivered by the "sport management" class instructor (Table 1). The effectiveness of the student-team manager appears by his/her ability to turn the team into a champion, but also to efficiently response, in terms of quantity and quality, to educational scenarios delivered by the instructor.

### 4.2 Regulations

The game has: (a) specific play rules, but the students were also (b) required to meet deadlines and hand homework deliverables to the "sport management" class instructor.

**Table 1** Presentation of educational scenarios and their expected educational simulation outcome

Educational scenarios	Expected educational outcome
1 The student acquires and edits (name, contact information, sport activity etc.) a sports club charter, in order to use it for creating a new sports club	For the completion of the educational process, the student needs to find and read the full text of a sport club charter, in order to decide the necessary editing adjustments to its articles so that can fit to his/her club. In this way, he/she learns about the content, and therefore the role, of a sport club's charter
2 The student sends the formatted club charter to the course instructor, who acts as the court judge that examines the legality of the request to establish a sport club (examination of the charter and approval or request for specific changes and re-editing)	The student realizes that a sport club needs state authorization to operate in accordance with the state constitution and the laws
3 The student creates an e-mail account with the name of the new sport club. It is necessary for the club's digital existence, but also in order to establish the first means of communication of the club with its environment	The student creates one of the main communication means of a modern sport club
4 The student creates a new exclusive account on the facebook social network as: (a) a means of accessing the serious Top Eleven game and (b) a new means of communicating the new club	The student creates the second main communication means of a modern sport club
5 The student creates a soccer club via facebook account in the serious game (simulator) Top Eleven (name, logo etc.)	The student gains experience creating and using a serious sports game as a management simulator
6 The student configures the club's profile on facebook	The student is trained on how to produce a sports club's profile on facebook
7 The student posts on the club's Mission, Vision and Philosophy on its facebook page	The student is trained in the management of a sports club guided by principles
8 The student creates a group of classmates on facebook who are perceived as the fans of the club	The student is trained on how to communicate the clubs activities to its fans
9 The student activates the club's facebook with news from its operation	The student is trained as a facebook communication account manager for the club. During this process collects information from the club's simulated activity (match results, player transfers, number of match spectators, etc.) and publishes it on the club's facebook account
10 The student creates a letterhead for the new club, with the club's logo and contact information (e-mail)	The student is trained in the production of a sport club's letterhead, with the necessary contact details, for the official electronic communication of the club
11 The student creates a seal for the new club's official communication	The student is trained in making a seal, as described in the club's charter. Through that he/she learns the link of the seal to the club's charter
12 The student creates a digital archive as an official book of the club's correspondence protocol	The student is trained in recording and managing formal incoming and outgoing e-mail of the new club

**Table 1** (continued)

Educational scenarios	Expected educational outcome
13 The student creates a digital archive as a formal book of minutes of the Board of director's meetings	The student is trained to record important decisions made by its club administration concerning budgeting (i.e. expenses), athletes' transfers, ticket pricing policy, etc
14 The student creates a digital archive as a book to record the club's finances (revenues and expenditures)	The student is trained on how to record the club's finances
15 The student creates the club's organizational Chart as it derives from the simulation of the club in Top Eleven	The student understands that managing a soccer club requires a combination of work specializations such as: finance, communication, facilities, coaching, etc. At the initial stage of a sport clubs life, a person undertakes all these responsibilities. But, as the club grows, these roles are transformed into specialized jobs with specific responsibilities of different trained professionals. The student is also trained in creating organizational charts

### 4.3 Feedback

In this study the gamer was receiving feedback from two sources: (a) the game that has a specific feedback mechanism in form of outcomes to decisions of the gamer compared to the other players and the game itself. (b) the instructor who assesses and gives feedback to the students’ deliverables in the educational scenarios.

### 4.4 Voluntary Participation

Participation in the game was voluntary as part of the “sport management” course, but the class instructor evaluated and rewarded the student’s response to the application.

Based on the above, the serious game Top Eleven itself, as well as the vested educational elements, fit to the McGonigal’s model, and on the evidence provided, complete the educational requirements of a game.

Following this positive finding, we proceeded to test the second sub-question, about if it is possible to convert the educational able serious game Top Eleven, into an auxiliary tool in teaching a sport management course. In order to do this, we vested the educational serious game with sport management scenarios adopting the approach “learn by play”. This education method relied on “Problem/Scenario Learning”. Specifically, Misfeldt (2015) presented a theoretical model that included the dimensions of creating or transforming a serious game into a learning medium, utilizing scenario approaches. In this case, the educational method includes the serious game’s content, as well as scenarios related to the teaching subject. In the present study, the model’s dimensions (Fig. 1) include/represent:

1. *The teaching subject’s content* as described in the course syllabus (Afthinos, 2017).
2. *The requirements of the educational level and the institution* as specified in the course description with regard to the School of Physical Education and Sport Science of the National and Kapodistrian University of Athens (Sport Management, 2009).
3. *The educational tools for transferring the knowledge and skills*, that is: The Top Eleven Serious Game ([www.topeleven.com](http://www.topeleven.com)) and the National and Kapodistrian University of Athens e-class educational platform (E-class, 2003).
4. *The student’s acquisition of specialized knowledge and vocational skills* as illustrated in Table 1.

Based on the above, the conclusion is, that it is possible to convert the free-to-use, online, popular, serious soccer club management game Top Eleven, into an educational sport club management simulator, by vesting to it educational scenarios, aiming on specific educational goals since it seems to fit to Misfeldt’s model dimensions.

### 4.5 Research Question 2

The second research question stated: Is the Top Eleven helpful, if vested with class assignments and used as an educational simulation procedure, in increasing students’ awareness/knowledge with regard a sport club general manager’s duties/work place? To answer this question, we used the educational scenarios presented in Table 1 vested as educational elements to the serious game Top Eleven and asked the students attending freshmen sport management class to take part and to test the knowledge they obtained through the gamified educational process. In this study  $n=62$  students participated in the form of a class

assignment. As part of this process, the students developed and managed their own virtual soccer clubs by using the “Top Eleven” serious game. The assignment took place during the second half of the class, having first the students taught the basic management principles. The aim of the assignment was to familiarize the students in managing a professional Soccer club, and by doing so, to find basic principles of sport management in the gaming process, as part of a club’s management workplace. At the end of the class, the students filled a questionnaire assessing the vested class assignment’s elements to the serious game they participated in.

A paired samples t-test applied to compare students’ self-reported awareness about a club manager’s job place, before and after participating in the Top Eleven serious game. The result showed a significant difference in the scores, before ( $M=2.32$ ,  $SD=0.90$ ) and after ( $M=3.82$ ,  $SD=0.97$ ) the game participation;  $t(61)=-10.346$ ,  $p=0.000$  indicating that students who participated in the game, significantly increased their awareness of a sport club manager’s job place (Table 2).

Prior to participation in the Top Eleven serious game, male students’ ( $n=25$ ) expressed an “average” awareness level about a sport club manager’s duty ( $M=2.80$ ,  $SD=0.96$ ). By comparison, female students ( $n=37$ ) reported a “below average” awareness level ( $M=2.00$ ,  $SD=0.71$ ). After participating in the serious game, male students raised their awareness level about the sport club manager’s duties, from “average” to “above average”, ( $M=4.04$ ,  $SD=0.89$ ). On the other hand, female students rose doubled their awareness level, from “below average” to “above average” ( $M=3.68$ ,  $SD=1.00$ ). Comparing the awareness increase between male and female students, after their participation in the Top Eleven serious game, results indicated that male students reported a knowledge progress of 44.29% (from  $M=2.80$  to  $M=4.04$ ), where female students progress of 84.0% (from  $M=2.00$  to  $M=3.68$ ).

Most (98.4%) of the students that participated in the Top Eleven serious game, agreed that the simulation helped them as an educational procedure (Table 3), to acquire knowledge on managing a sport club.

#### 4.6 Research Question 3

The third research question stated: Does the serious game Top Eleven influence students’ choice as a result of their play experience about acquiring a job place as soccer club managers? To answer this question, we checked Top Eleven’s influence on students about selecting the job. The fact that the Top Eleven serious game helped students in their Sport Club management knowledge was further supported by the results (Table 4), associated with their decision to consider working as a sport club manager after the serious game experience.

**Table 2** T-test results of students’ awareness on the job of a sport club manager pre- and post-serious game participation

Outcome	Before the game		After the game			95% CI for mean difference				
	M	SD	M	SD	n			r	t	df
	2.32	.90	3.82	.97	62	-1.79	-1.21	.26*	-10.346*	61

\* $p<.05$

**Table 3** Serious game's educational contribution in students' Sport club Management awareness

Educational contribution	Frequency	Percent	Valid percent	Cumulative percent
Contributing	61	98.4	98.4	98.4
Non contributing	1	1.6	1.6	100.0
Total	62	100.0	100.0	

Students' decision on applying for a sport club manager's job place after their participation in the Top Eleven serious game was almost 60.0% positive. On the other hand, 40.0% of them chose not to. Regarding the second choice, a student commented that participating in the serious game made her realize that the sport manager's job description did not suit her, because of "the many responsibilities and requirements involved".

## 5 Conclusion

The purpose and the original contribution of this study compared to current research already published is that it investigated the feasibility of converting a commercial, online, popular, and free to use serious sports club management game, into a simulator for providing the students with relevant awareness/knowledge using a game environment. The innovative approach to this was that we extended the original concept of the game by vesting educational assignments that students need to complete by using data and situations extracted from the game. It also provides lengthy sport management education scenarios, which fit to vest the serious game Top Eleven in order this popular, user-friendly, no cost game, applies as an auxiliary educational means, for an introductory class of sport management. On that, the students who participated in the study, admitted that they acquired knowledge on what it means to manage a soccer club and therefore based on their simulating job experience can now express their opinion on whether they would like to pursue this career path. It further presents one of the most attractive and no cost simulators, for teaching an introduction to sport management, which is missing from the current relevant bibliography.

**Table 4** Serious game's influence on students' choice regarding acquiring a job position as a sport club manager

	Frequency	Percent	Valid percent	Cumulative percent
Positive on a sport manager's position	37	59.7	59.7	59.7
Negative on a sport manager's position	25	40.3	40.3	100.0
Total		62	100.0	100.0

The results of the application showed that the popular game Top Eleven can classify as "serious" because its features fit the arguments of Aldrich (2009) that is, it relies on critical thinking and the user is able to make management decisions, gradually managing digital environments, according to the rules of the game ([www.topeleven.com](http://www.topeleven.com)). It also fit the argument of Boskic and Hu (2015) that its purpose goes beyond entertainment. As such, it transforms from a commercial popular game to an educational tool, as proposed by Boskic and Hu (2015) and Baalsrud et al. (2013). This study showed that it is possible to use the serious game Top Eleven as a laboratory platform, being as such part of a "sport management" class. Suggestions of Hanghøj (2011) and Zarraonandia et al. (2015) for utilizing alternative and economic ways of teaching, which in this case was performed at no cost through the popular social medium of Facebook ([www.facebook.com](http://www.facebook.com)), is also confirmed. Part of this effort's goal also was, to offer to learners two benefits: (a) acquire the necessary awareness/knowledge to manage a soccer club by merely participating physically in the game; and (b) apply extra educational activities in the form of vested to the game scenarios/instructions, as suggested by Zarraonandia and his colleagues (2015). In particular, the present application showed that it is possible for a student to gain experience in setting up and running a soccer club through the implementation of relevant training scenarios. Specifically, the application covers relevant key topics of the annual operation of a sport club's board of directors, steaming from the current Greek Sports Law 2725/99 (Sports Law, 1999) (such as: club charter, application for state recognition, logo, letterhead, club official book of records, annual administrative and financial planning, and reporting).

Also, the application includes actions enough in number and specialization for the executive positions of a sport club, such as those derived from the literature (Afthinos, 2017), namely: recording the club's daily financial transactions, daily communication activities, managing official mail documents and file management. The application also showed that all the dimensions of the model proposed by Misfeldt (2015) for educational serious games comply, because they include: (a) the subject's content as derived from the educational scenarios, (b) the instructor's requirements as well as the institution's educational level, as both appear in the class syllabus, (c) the means of transferring knowledge trainees both (d) specialized knowledge and (e) professional skills.

The Top Eleven serious game, being itself a popular social platform, is suitable as an educational medium for sport management students, once vested with the necessary scenarios, following in this way similar Game Based Learning (GBL) methods used in higher education (Ebner & Hollinger, 2007).

The results of this study support earlier works about serious games in education. Specifically, participation in a serious game contributes in improving students' knowledge on a specific educational subject taught (Klassen & Willoughby, 2003). Also, the increase of the awareness level after participating in the serious game supports earlier findings in related research, about learning effectiveness of games (Guillén-Nieto & Aleson-Carbonell, 2012).

Regarding students' possible choice of a profession because of their game participation, which in this study appeared to influence positively, most of the participants (60.0%), not much inside appears in earlier research, excluding Gooding and Zimmerer (1980), who suggested the use of business games for the in-job orientation of new managers.

## 5.1 Future Research

This application relies on elements related to the core activities of a sport club's administration and management, and not the specialized and detailed management of its discreet



areas such as finance, marketing, and sport team. This is something that could be pursued in the future in a more focused study as Top Eleven game is well suited for such research initiative.

Furthermore, as a follow-up to this study a control group can add validity to the education results. Regarding evaluating the education process, future research can use the “framework for evaluating simulations as educational tools” model proposed by Schumann et al (2001). It adopts Kirkpatrick’s four levels Framework assessments of reaction, learning, behavior, and results (1998) to wave limitation of the present study, in education assessment, based solely on students’ perception.

Another research approach may include more education simulators that focus mainly on education results, combined with the Top Eleven serious game, for supporting educational outcome measurements.

**Acknowledgements** Not applicable

**Funding** Not applicable.

**Data Availability** Data available upon request in “Research Gate” ([www.researchgate.net](http://www.researchgate.net)) under the author Z.K. and the title of data file: “The Serious Game Top Eleven-Data (sav) files”.

## Declarations

**Consent to participate** Students participated voluntarily on the course’s teaching procedure basis.

**Consent for publication** Not applicable.

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**Publisher's Note** Springer Nature remains neutral with regard to jurisdictional claims in published maps and institutional affiliations.

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