

VIRTUAL BUSINESS GAMES IN HIGH EDUCATION

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1. EXECUTIVE SUMMARY

1.1. Background

Dynamism of modern world, especially the problems of the labor market determine the necessity of widely implantation of active learning methods in High Education System. This paper presents a new approach of the active methods of learning process in the different universities based on the computer business games, designed for undergraduate and graduate strategic management courses.

The actuality of this approach is induced by simulation's complexity and dynamism of the market economic. Under the notion of the computer business games is understood the Virtual Business Games (VBG), a web-based an on-line multi-player business simulation aimed at education of high-school students in economics, politics, and media studies. VBG allows students to manage a virtual company operating either in the industrial production, or in the different economic objects.

1.2. Alternatives

In the Technical University of Georgia have been elaborated some business games based on the simulation of real-world business environment as the decision-making process in industrial enterprise management system, in the marketing firms, and also in the purely economic segment as stock exchange, commodity exchange and banking system. Each of these games has different strategy and rules, algorithms and scenarios. The students learn to manage and optimize their company owned through the distribution of human, material and financial resources. Benefits from these business games is making the practical skills in virtual simulative conditions.

1.3. Conclusions

In the context of the given approach, the Technical University of Georgia is ready to take an active part in the implementation process of the presented computer business games at the universities and in the elaboration models, algorithms and software of similar systems, as an active laboratory method of learning process in the different universities.

2. INTRODUCTION

Economics education studies recommend the adoption of more active and collaborative learning methodologies (Greenlaw, S.A., 1999). More is needed to be done in the classroom to excite students about economics education. Simulations supplement the standard lecture. The word *game* means different things to different people. "Business is a game," proclaimed IBM founder Thomas J. Watson. In reality any human behavior, particularly everyday decision-making or business actions involve the components of games. The solving of the educational problems according to Bologna declaration and Prague Communiqué, the reforms in the system of high education is closely related with distance learning, which in parts means by the active learning methods implementation (Ediberidze A. et al. 2008).

The idea of using computer games to support training and learning objectives is more than several ten years old (Simkins, S.P., 1999). Recent works have explored the potentialities of economical strategy games and simulations in formal education and their alleged advantages over classical e-learning and edutainment tools, e.g. (Dodge B., 2003).

Learning via computer games as one of yet for the past some years, a movement has been a foot to examine how digital games work as pedagogical devices. There are odds of games that are now available in electronic format (Sandford R., et al.2007). While many of these are distributed commercially, many others are available for free play on the Web, and some can be downloaded at no cost.

Some electronic games are merely computerized versions of games that existed long before computers. Others only exist in a computer format. Computer networks have made possible games that allow many thousands of players to be participating simultaneously. The computerized animation and interaction in these games bring a dimension to games.

Gaming is, in short, a vast and complex world. We define active learning games as "a pedagogical technique that uses playful in-class activities designed to actively engage students with key concepts, the faculty and each other". The play of the game involves making a variety of decisions, such as distribution of resources, pricing or expenses variation, and so on.

Players are actively engaged in receiving and paying out money in buying and selling, and keeping track of their money or resources. A player gradually learns effective strategies useful in becoming a better player. Each student plays as an individual, competing against other individuals playing the game (Allgood S. et al. 2004).

Next, we present an overview of active learning games – those that are meant to be conducted during classroom lectures – as a specific pedagogical technique under the umbrella of active learning (Lean J., et al. 2006). Generally, business games have many goals of application. Three of the important ideas that can be summarized as follows:

- Studies or acquisition of knowledge by the games in education;
- Attestation of staff;
- Researches.

Why do we believe that active learning games are effective? We report empirical evidence of the success of this method at Technical University of Georgia, where a number of different active learning techniques have been used in the studies.

This paper presents some examples of such teaching games, which can serve as learning objects, from which both students and educational staff can learn (and, increasingly, *are* learning). And gaming is a rich world, intersecting with campuses at multiple levels.

3. OVERVIEW OF VIRTUAL BUSINESS GAMES

Business simulations have many facets. They combine at least three concepts: simulation, games, and contests. There are at least four elements found in all business simulations or games: The Scenario, Roles, An Accounting System, Algorithms (Dobbins C. et al.1995).

In Technical University of Georgia have been elaborated a series of business games based on the real-world business environments simulation as the decision-making process in divers domain as: the industrial enterprise management system; the project planning; the inventory management; the marketing firms, and also the purely economic segment as stock exchange, commodity exchange and banking system.

Each of these games has different strategy and rules, algorithms and scenarios. The students learn to manage and optimize their company owned through the distribution of human, material and financial resources. Benefits from these business games is making the practical skills in virtual simulative conditions.

A number of activities in above games have been proposed and are being used by various corresponding experts. Generally, every game consists of two parts: initial planning and current management. Generalized algorithm for any variant of games is shown in Figure 1.

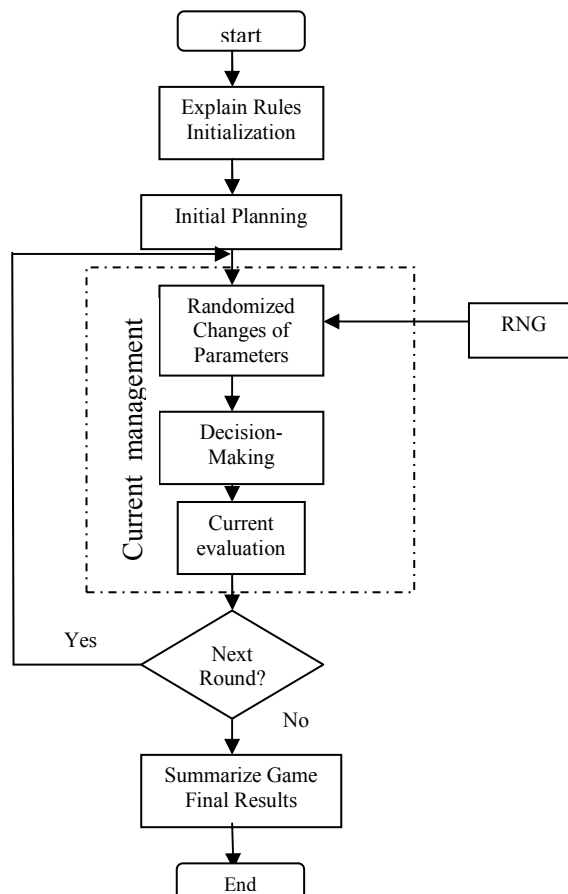


Figure 1. Games generalized algorithm

The games proceed in rounds. An event that takes place in one round can be considered as players' actions or results from the economical and social model or consequences from previous rounds. For approximating the simulation to the reality and for perturbing the gaming situation the contingency

is drawing via the RNG. It is clear, that it requires certain decision to be taken by the players, which should be evaluated at the end of each round.

4. RUNNING EXAMPLES

Every game is a multi-player network game. For each game we provide the name under which it is known, the primary learning objective of the game, a brief summary of the activities that are conducted, the estimated duration as well as the name and institution of the instructor who invented or has practiced this game recently.

“Industrial enterprise management”

Essence: This game gives some experience of dynamic distribution of hypothetical resources in manufacturing for every round of game.
Modeling method: based on J. Foresters model.
Economic instruments: 1. Technologies;
2. Resources;
3. Manpower resources.
Perturbations: Sales opportunities.
Roles: Manager, chief of enterprise.

“Planning and scheduling large-scale projects”

Essence: This game helps understand how scheduling the tasks and dynamic managing them depending on randomized perturbations.
Modeling method: P.E.R.T
Economic instruments: 1. Duration of the tasks;
2. Resources;
3. Gross value.
Perturbations: Scheduling variances.
Roles: Project manager.

“Inventory management”

Essence: This game helps understand how ordering of supplies depending on market demand and selling.
Modeling method: 1. Risk management because of the deficit;
2. Risk management because of the over-indulgence;
Economic instruments: Pricing management;
Emergency request for goods.
Perturbations: Sales opportunities.
Roles: Supplier, provider.

“Free Market”

Essence: This game simulates a market which is free from government intervention (i.e. no regulation, no subsidization, no single monetary system and no governmental monopolies).
Modeling method: Games Theory, Marketing Theory.
Economic instruments: Free (flexible) relations with customers.
Perturbations: Market conditions, damages.
Roles: Employer, owner of a firm, entrepreneur, businessman.

”Stock exchange”

Essence: Virtual Stock Exchange allows to practise buying and selling stocks using imaginary money for purpose of gaining experience with stock trading.

Modeling method: Games Theory
Economic instruments: Stock-exchange deal, price regulation, sell by auction
Perturbations: Market conditions, business climate.
Roles: Exchange dealer, stockbroker, customer.

“Commodity exchange”

Essence: Virtual Stock Exchange allows to practise buying and selling commodities using imaginary money for purpose of gaining experience with stock trading.

Modeling method: Games Theory
Economic instruments: Stock-exchange deal, price regulation, sell by auction.
Perturbations: Market condition, business climate.
Roles: Exchange dealer, stockbroker, customer.

“Banking system”

Essence: This game helps understand how virtual carrying economic policies of state bank against commercial banks to attain social goals.

Modeling method: Games Theory, Banking Management Theory.
Economic instruments: Financial reserves, bank-rates, lending, deposits, circulating notes.
Perturbations: Inflation, economic crisis or depression.
Roles: Bank manager.

5. SUPPORT SYSTEMS

Technically, the VBG is a client-server application; the students can play the game via the Internet. Databases are managed by MySQL. The server part comprises PHP scripts generating the game interface. The client part or application and the economical simulation are written in Java.

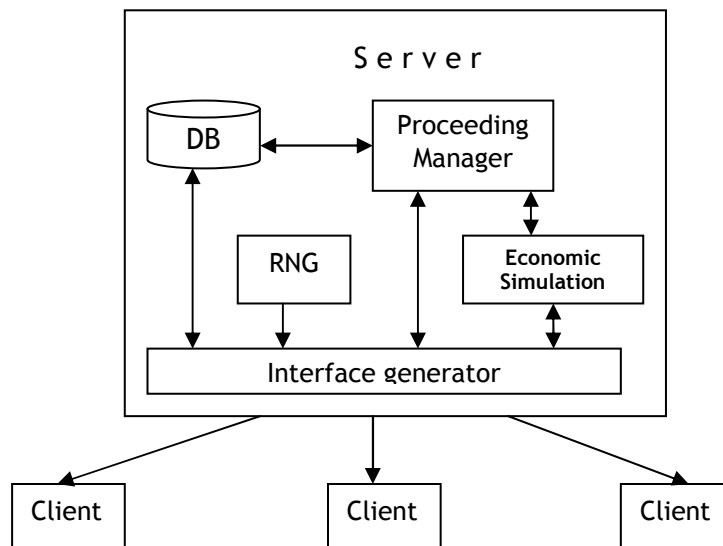


Figure 2. Architecture of VBG

This paper discusses active learning via computer games as an important pedagogical technique in support of traditional education. We have briefly applied to serious games, which are a multi-player round-based strategy game aimed at education of high-school students in economics and

management studies. This series of various genres business games can form a unified wide profile meta-game for universities.

In this context of the given approach, the Technical University of Georgia is ready to take an active part in the implementation process of the presented computer business games at the universities and in the elaboration models, algorithms and software of similar systems, as an active laboratory method of learning process in the different universities.

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