SERIOUS GAMING FOR SERIOUS TRAINING: THE PRIME-TIME CONCEPT

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ABSTRACT

This paper reports on the FP6 project PRIME, where we want to take serious gaming to develop an innovative virtual business environment (VBE) where valuable experiences will be gained. An important aim of PRIME is the integration of the VBE within an organization with the intention to be used as part of the working environment – PRIME-TIME. By playing regularly the game, the user can make decisions, take different approaches in negotiations, etc. and learn without risking real consequences. Much like the idea behind flight simulators, this will help in accumulating more experience than what the actual length of the person’s career should allow.

INTRODUCTION

PRIME (Providing Real Integration in a Multi-disciplinary Environment) is a European IST project (FP6-016542) that aims to give business professionals in strategic manufacturing a Learning Environment where they can experiment with new ideas and learn how to handle the entire life cycle of products and processes for all stakeholders of the organization. The PRIME serious game consists of a Virtual Business Environment (VBE) that defines the global business reality where users are responsible for the management of a single Business Unit (enterprise). For more information on the PRIME project please look at the project web site: http://www.alfamicro.pt/prime/.

Most serious game approaches have been directed solely at training based on semi-interactive business case studies. The result is an application based on a well established storyline that provides a setting with information where the stakeholder must select from a predetermined number of choices (Oliveira et.al.).

In manufacturing, the concept of serious gaming has been applied to supply chains, such as the MIT beer game, where a user assumes the role of a stakeholder within a beer supply chain. The problem domain is constrained to limited logistics associated to the management of stock inventory. As such, gaming per se is not new in the business world, but the current solutions are supported by overly simplistic simulations that provide only a minimal conceptual knowledge. Other games developed for educational purposes are reported in Hauge et.al, such as COSIGA [Pawar 1995], SHARE [Schwesig 2005], SPIKO [SPIKO 2006].

The PRIME project will achieve its objectives by enhancing current work environments with a new paradigm based on the collaborative experience within a Virtual Business Environment (VBE) using technologies from the field of virtual environments and serious gaming. In addition, the project provides the necessary methodologies to integrate PRIME in existing work environments – PRIME-Time.

Within the business sector, most serious game ventures have been directed solely at training based on semi-interactive case studies. The result is an application based on a well established storyline that provides a setting with information where the stakeholder must select from a predetermined number of choices. This approach, while effective for process training or knowledge transfer, does not provide the stakeholder with experience transfer that can be called upon in the real world.

In manufacturing, the concept of serious gaming has been applied to supply chains, such as the MIT beer game, where a user assumes the role of a stakeholder within a beer supply chain. The problem domain is constrained to limited logistics associated to the management of stock inventory. As such, gaming per se is not new in the business world, but the current solutions are supported by
overly simplistic simulations that provide only a minimal conceptual knowledge. There is no exploration of the complexities associated with social/business connectivity within multi-stakeholder business environments.

In PRIME, we want to take serious gaming much further to develop a truly innovative virtual business environment where valuable experiences will be gained. Examples of decisions to be made when playing the PRIME game can be the selection of supply chain partners, product lifecycle development, perhaps negotiating contract terms with customers.

In sum, the PRIME concept, portrayed in Figure 2, will allow practicing manufacturing and strategy engineers to log into an engaging game that simulates a complex business environment made up of other users and factors governed by the simulation engine. The game will play out both on the screen (of the device used to connect to it, be it PC, PDA or mobile phone) and users can interact through e-mail, phone, or even physical meetings to conduct negotiations and enter into agreements. By spending for example one hour a week playing the game, the user can make decisions, pursue strategies, take different approaches in negotiations, etc. and learn what outcomes this produces, all the while not risking any consequences in the real life. Much like the idea behind flight simulators, this will help in accumulating much more experience than what the actual length of the person’s career should allow. As a result, the PRIME project will achieve the following innovative factors:

- Increase the dynamic enterprise adaptation ability;
- Prepare industry for multi-stakeholder involvement using virtual techniques;
- Allow safe experimentation for decisions about radical innovation;
- Reduce risk in multidisciplinary work environments;
- Improve collaborative processes in a global environment;
- Productivity improvement and sustainable profitability;
- Improve performance by aligning stakeholder expectations;
- Create awareness of stakeholder expectations.

In sum, the PRIME concept, portrayed in the following Figure 1, will allow practicing manufacturing and strategy engineers to log into an engaging game that simulates a complex business environment made up of other users and factors governed by the simulation engine.

![Figure 1. The PRIME Time element within the PRIME concept.](image)
PRIME Time concept in today’s business environments will help in accumulating much more experience than what the actual length of the person’s career should allow.

THE PRIME TIME CONCEPTUAL ELEMENTS

The PRIME Time concept was developed along the following four dimensions that define the framework of the PRIME Time environment and how it may be perceived as an integrated element of the New Working Environment as it is illustrated in Figure 1 above:

Dimension 1: The Player.
Dimension 2: The Training Environment.
Dimension 3: The Motivation.
Dimension 4: The Management.

As illustrated in Figure 2 above, along the Dimension 1 defined above as “The Player”, we have identified three main concepts that define who is the player and its related activities within the PRIME Time: the Player concept, the Training (of the player) concept and the Evaluation (of the player) concept, which both define how a PRIME game is defined, played and evaluated.

Along the Dimension 2 defined above as “The Training Environment”, we have identified two main concepts: the Time concept that defines when a Player is able or allowed to play PRIME and the Place concepts that define where a Player may play PRIME.

Along the Dimension 3 defined above as “The Motivation”, we have identified two concepts to define why a Player is motivated to play PRIME and why a company or an organization in general is motivated to introduce PRIME Time in its old work environment. These concepts are “Motivation”, which covers both the player and the company and “Award”, which cover ways of compensating players for their good or bad (penalty) performance in PRIME.

Finally, along the Dimension 4 defined above as “The Management”, the technical how’s are defined that describe how the PRIME environment is monitored (the “Monitoring” concept) and managed (the “Management” concept).

In conclusion, the PRIME Time concept consists of the following nine elements:

Dimension 1: The Player.
- The Player concept
- The Training (usage) concept
- The Evaluation concept

Dimension 2: The Training Environment.
- The Time concept
- The Place concept
Dimension 3: The Motivation.
  • The Award concept
  • The Motivation concept

Dimension 4: The Management.
  • The Monitoring concept
  • The Management concept

Each one of them is described separately in the sections below.

The Player concept
The PRIME player is an individual who plays PRIME under tow entities:
  • as an individual
  • as a member of a team

As an individual, the PRIME player may act (a) as the head of a business unit being responsible for all decision processes within the given business unit, or (b) as having limited responsibilities and so with given power for a customized set of decisions.

As a member of a team the PRIME player (c) has a particular role in the team and (d) plays for the team.

Furthermore, we may distinguish two types of the PRIME player:
  • The Human player
  • The Virtual player

The Human player may be a business professional, a student or an academic.
The Virtual player is an “embedded” component of the VBE, the so called Artificial Stakeholder.

The Training (usage) concept
The PRIME player plays a game that is defined with a training scenario. The training scenario may be open or confined to a particular framework.

Each training program or a training session that is performed with a given scenario may have a number of well defined objectives to be achieved within the defined framework or, on the other hand, the player may play having only quite general objectives in his mind, such us acquiring general knowledge about a topic or a situation that he or she does not master well.

In the case where specific objectives must be achieved under a given training scenario, these objectives may be defined by (a) the player himself or (b) his/her organisation.

A learning structure of training may be defined by the Moderator of PRIME or by a teacher or a professor.

The structure, if defined, may be designed into steps (with measurable goals) and take the form of a full or a partial interactive tutorial.

The starting point of a training program or a training session in the VBE may be an existing game or a case study.

In relation to the Player concept, the target learner of training is an individual player or a team of players.

The Evaluation concept
Since the main purpose of playing PRIME is training, it is evident that a sort of evaluation of the performance of the player happens. The following may be elements of an evaluation schema with various combinations:
  • Initial interview (structured)
Assignments
Final interview (structured)
Intermediate check points
Short reports
Set of questions
...

The Time concept
We may distinguish three time models for playing PRIME:

The 1st Time model:
The trainee spends a fixed amount of time at fixed dates and times.

The 2nd Time model:
The trainee has an amount of hours to spend within the given period of time. He/she is free how to spend his allocated time.

The 3rd Time model:
The trainee can use PRIME in anyway he/she likes, without time limits.

The Place concept
There are various options for a place where PRIME may be played:

i. There is a venue for the PRIME player. That involves a dedicated physical space either in a company’s premises or in a university or another educational or training organisation.

ii. We may play PRIME at home.

iii. We may even play PRIME in a public place.

In all the above situations a certain level of internet connectivity is available either wired, wireless or dialup.

The Award concept
Together with the evaluation goes the concept of the Award. A good performance of the PRIME player may be rewarded with an award that may have the following characteristics:

The Tangible Award:
A tangible award may take the form of a bonus (money), some points for promotion, and a certificate for promotion or for skills for a new position.

The Intangible Award:
The intangible award may be seen as an individual intellectual interest, the will to achieve target KPIs in a game, or just reputation and recognition by other PRIME players or peers.

The Penalty
On the other hand, a negative performance in playing a PRIME game may also be translated in a form of a Penalty for the player, again tangible or intangible, in the opposite sense of the awards described above.

The Motivation concept
In a business environment we may consider motivations for the two essential elements: the individual player and the company.

The Player Motivation
What would be the motivation of an individual to play or participate in a PRIME game?
This may be seen from an individual as well as from a group perspective. In both cases, individuals play PRIME alone or in teams either for an award or because this is a way to express their engagement in their professional activity and work.

The Company Motivation
From a business perspective, what would be the motivation of a company to introduce PRIME and, consequently PRIME Time, in their working environment?
The answer to this question looks quite evident: ROI. It is fair to consider that a company will consider the introduction of PRIME in work if there is a perspective for return on the associated investment. This may be understood in terms of expected improved performance of PRIME players in their business tasks and activities.

The Monitoring concept
The PRIME Time environment should be appropriately monitored. We may distinguish the following levels for monitoring PRIME Time:

The User monitoring level
A PRIME user may be monitored in terms of his/her targets when playing PRIME as an individual or a team.
Measures to be monitored could be considered the expected gathered knowledge or experience or simply the performance against achievement of target KPIs.

The Organization monitoring level
At the organisational level specific targets are identified for individuals or teams of individuals.
At this level, a thorough analysis of the achievements seems to be adequate. Essential elements of such an analysis are:
- A plan of the expected results in terms of the designated measures,
- Simple charting mechanism to indicate target performance and achieved,
- Triggering reports when something is going wrong (exceeding a threshold).

The VBE monitoring level
At this level, it seems important to be able to monitor the VBE in terms of keeping track of the events in the VBE and allowing users to cross reference with the VBE.
This is expected to allow extracting the why’s of a PRIME games evolution and so deepening in the sources of corporate knowledge.

The Management concept
The PRIME Time in a new working environment should be appropriately managed in order to be efficient. The PRIME Time management is envisioned in the following two ways:

Service Provider Management
An external company provides PRIME as a service where users logon to engage with the VBE. The management of the VBE, artificial stakeholders, new content and users is handled by the service provider.

Internal Company Management
This is rather the case of a large company that deploys PRIME internally. An internal department/group is responsible for the management activities. The company determines the access policy. The PRIME VBE is only accessible by the company employees. This allows for a trusted environment where the company may put more sensitive information in the internal PRIME VBE. Partners, clients, experts might be invited to participate.

CONCLUSIONS

In this paper we presented the concept of PRIME-TIME as it is developed in the framework of the project PRIME. The four Dimensions of this concept: the Player, the Training Environment, the Motivation and the Management together with their main characteristics have been described in a first level of detail.

In the next phases of the PRIME project the PRIME-TIME concept will be deployed and evaluated. We expect to be able to report on this experience in our next related communications.

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References


