

# A WEB-BASED GAME FOR SUPPORTING GAME-BASED LEARNING\*

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## KEYWORDS

Game-based lifelong learning, web application, three-tier architecture.

## ABSTRACT

Game-based learning has been recognized as an important alternative or supplement to traditional in-class, face-to-face teaching. It can help both adults and children in learning new concepts, acquiring expertise and practicing knowledge. Although game-based learning has been applied mainly for teaching children, it can be quite helpful for adult vocational or university learning. In this paper, a web-based game is presented, which has been developed for enhancing the learning experience of university students. Its goal is to serve as a complement to classes, although it can be used independently. It provides the students with many ways for communicating (synchronously or asynchronously) and acquiring information. Through the use of the game, the students gain easily new knowledge, since they have to search for it, understand it and use it in discussions with other students, who are members of other teams. The game is played by many users simultaneously. Microsoft's ASP.NET scripting environment was used for creating the game's website. The website utilizes also Macromedia's communication technology (Flash Communication Server MX) for enabling real-time communication by several means (voice, text, etc). Flash was used in the website for building the real-time communication modules as well as for creating a more elegant user interface. The game platform can be used by many teachers simultaneously for running different game themes. It also gives the opportunity to visitors to watch games as spectators.

## INTRODUCTION

Game-based learning has been widely adopted for children's learning. Pedagogically highly valued products are on the market and have a proven success in the improvement of learning as well as in children's acceptance. Recently, game-based learning has also been proposed for adult education. Gaming is becoming a new form of interactive content, worthy of exploration for learning purposes. Universities are also looking for a new positioning in the changing setting of lifelong learning. Universities need to develop innovative forms of learning in order to provide concepts for lifelong learning to their prime customers, students. Modern technology requires its employees to be proficient in effective communication, teamwork, project management and other soft skills such as responsibility, creativity, micro-entrepreneurship, corporate culture, etc. Game-based learning is an approach to tackle the above issues.

Analysis of the current situation in the field of the game industry shows that at the same time, new multiplayer environments give opportunities for the interaction of thousands simultaneous players. The multi-user environments enable users to participate in real-time events, experiencing new ways of communicating and interacting. In January 2003 a record number of 120,000 users simultaneously played EverQuest, an online role-playing game (Rowan 2003).

There are many examples of systems that adopt the game-based learning concept. In this paragraph the most important of these applications are presented. A more detailed description of the related work can be found in (Pivec et al. 2003). TopSim (TopSIM 2002) by TERTIA Edusoft provides different business games, which have been used in business education and advanced training. Another web-based game is Myzel (Myzel 2002), an on-line community

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game. The rules of this game are created by the players themselves, during its conduct. The Monkey Wrench Conspiracy (Monkey Wrench Conspiracy 1999) videogame tutorial puts players into the role of an intergalactic secret agent dispatched to deep space to rescue the Copernicus station from alien hijackers. It is a complete tutorial for a complex technical product, designed to teach industrial engineers how to use new 3-D design. The Environmental Detectives (MIT and Microsoft 2002) was developed by MIT (Massachusetts Institute of Technology) and Microsoft within the Games-to-Teach project, where conceptual prototypes for the next generation of interactive educational entertainment are developed.

Various examples on game-based learning, supported by the new digital technology are provided by Prensky (Prensky 2001). More detailed information on various games suitable for educational purposes can also be found in a Survey on online game-based learning (Dondi and Moretti 2003) that contributed to the UniGame project.

Based on the fact that games fascinate people and by applying elements of collaborative learning, researchers of the FH JOANNEUM Graz in the framework of the EU project UniGame created a new game concept. Searching for information, selecting the appropriate and necessary information, development of discussion strategies, “conflict” of the arguments, decision-making process and negotiation are the important central aspects of the game. But the target and the culmination of the game are reaching a consensus in a problem solution. Players learn to understand and to combine different points of view, such as: individual/corporate interests versus team/societies interests; their own standpoint versus understanding the standpoints and opinions of others; from single aspects versus integrating of multiple aspects, from confrontation to cooperation. By playing different roles students learn and obtain both basic knowledge and practical experience and soft skills that are needed for the organizations of the modern industrial manufactures. The developed game concept can be seen as a template where different instructors can introduce different knowledge and contexts to apply game-based learning for their particular topics and specific learning goals.

This paper continues with the description of the game in the second section. The game idea, the game scenario, the main interface areas of the game and some possible use cases are the issues highlighted there. In the next section, the architecture of the game platform is presented by describing the functionality of the different layers of the architectural structure. Then, the fourth section analyzes some implementation issues regarding the technological choices that were made for building the game platform and the selection of the most efficient methods in order to implement the desirable functionality. In the fifth section some future work plans are presented and finally the paper ends with the conclusions, which came up during the design process of the game.

## **UNIGAME: SOCIAL SKILLS AND KNOWLEDGE TRAINING**

### **Game Idea**

“UniGame: Social Skills and Knowledge Training” (UniGame 2003) is a framework that provides the possibility for every interested teacher to apply game-based learning to his/her classes. “UniGame: Social Skills and Knowledge Training” is a game where teachers are able to define various topics. By using this method, the game provides the teachers with the ability to modify most of the game’s parameters in order to meet certain educational purposes.

It can be classified as a role-play game, that fosters participation in problem-solving, effective communication, teamwork, project management, as well as other soft skills such as responsibility, creativity, micro-entrepreneurship, corporate culture, etc. The game is based on constructivist learning approach and collaborative learning. Its fundamental aim is to be used additionally to regular face-to-face or online classes, while its separate use from any class source is feasible.

The game is web-based, thus it is accessible through a website, providing the users with the opportunity to join and participate in the game from different places. Also, it is a multi-user game; therefore many players are able to be involved in the game simultaneously. The players form four teams. Each team is comprised of six players maximum, depending on the game’s topic. The game is moderated by the teacher (as it has been already mentioned, the game is designed to be used as supplement to normal in-class teaching, but it is not impossible to be used independently from a class course). Each game is described by a specific theme created by the teacher. The aim of the players is to comprehend their specific role inside their team and have an argumentation with the players of other teams over a specific subject, which is specified by the theme of the game. The players gain knowledge over this subject by searching for information and using it in the discussions that follow with other teams’ members. The game’s platform offers several means for communication to its users. Users are able to communicate with each other by using private or public forums, both text and voice chat modules and virtual meetings, which are enhanced by audio/video interaction, a shared whiteboard and a presentation table, where users are able to create an on-line presentation. All the above-mentioned functionality is provided to the users in the public forum or chat areas and in the teams or the common virtual conference area.

The game ends when all the specified sub-parts of the selected subjects have been discussed. In each discussion the goal of the players is to reach a consensus with the other teams. If they reach a consensus they gain some points (chips). The amount of points they can win from each discussion has been specified by them before the beginning of the discussions, when the ‘chip allocation procedure’ takes place. In ‘chip allocation’ each team allocates 100 points in total to three of the six available sub-parts of the subject that will be discussed. The winner team is the one

that has attained to gather the higher number of points when the game comes to its end.

### Scenario of the Game

In this section important parts of the “UniGame: Social Skills and Knowledge Training” scenario are briefly outlined. More detailed information about all the possible game’s scenarios can be found in the UniGame website (Dziabenko et al. 2003).

The game initiates by the teacher, who has to define the ‘Game Theme’ that provides the students with the assignments and subjects to be discussed during the game. The students join in the game’s website to participate in the game. During the navigation in the website, the students/users are capable of communicating or searching for information about the particular theme. The playtime of the game varies, fluctuating from several days to few weeks, depending on the difficulty of the theme and the basic skills of the students. The game flow and its various stages are presented in Figure 1.

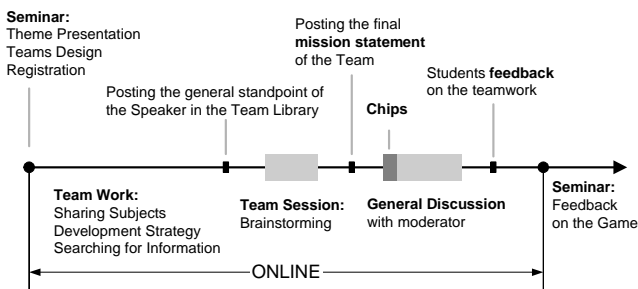


Figure 1: Time Plan of the Game

The basic stages of the game can be distinguished as follows:

#### Introductory Seminar

In this introductory seminar the teacher explains the theme to the students. The teacher provides information about the theme, the particular subjects (interest areas) of the subjects that are available for discussion, the teams that will be formed, and the roles within each team. The teacher discusses with the students about the theme and provides more information if requested. Finally, the teacher and the students reach an agreement about how the teams will be formed and how the whole game process will be initiated and completed.

#### Team Work and Team Preparation

In order to play the game, the students form four teams. These teams are going to have totally different roles in the discussion that will follow. For example, in a theme about environment protection, the teams could be ‘Government’, ‘Heavy Industries’, ‘Environmental Groups’ and ‘Labor Unions’. Each student has to select a particular role within his team. After that, the team members have to connect to the ‘map of the Subjects’, which are relevant for future

discussions. In this screen each member of the team has to select a subject for which he/she will be responsible. Each team has to create a strategy for the general discussion that will take place with the members of the other teams as well as with the teacher (moderator) of the game. The preparation of the team for each subject has to be as perfect as possible in order to confront the other teams in the final general discussion.

During the teamwork, the players develop a game strategy, collect and select valuable information and prepare for the argumentation. Teams communicate and exchange information in the ‘Team Space’, which consists of several screens that allow synchronous or asynchronous communication of the members of a team (Forum, Virtual Conference, Library, Member List and MyInfo). Each team member uploads all relevant collected information about the subject he/she is responsible for, in the Library of the Team Space.

When search for information is finished, each team has to organize a ‘Team Session’. This session enables students to discuss all the problems that came up concerning the subjects. Moreover, the members of the team have to categorize and rank all the gathered information that can be used during the argumentation process with the other teams, in order to use this information in the most efficient way to win the game.

At the end of the ‘Team Session’, the team preparation time has finished; consequently the teams have to present a final mission statement within the game platform. In this statement, the members of each team will outline their general standpoint.

#### Chip Allocation

Following the teamwork and preparation, the teams have to allocate chips (points) to the available subjects. Each team has to decide which subjects are more important for them. The team members can select up to three subjects for discussion. They have a maximum number of 100 chips that they must allocate to the three subjects they selected. The available time for the completion of this procedure is 30 minutes.

During the game the chips allocated to the subjects can be viewed by the members of the team in the screen. However, teams are not able to view the chip allocation of other teams. Only the teacher obtains the all information about allocated chips of all teams.

#### General Discussion

The General Discussion is the process where all teams meet in the ‘Virtual Conference’ screen to discuss the subjects of the provided theme. In particular the representatives of each team participate in this conference. The discussions are moderated by the teacher. The aim of each discussion is to reach a consensus, while the specific role of the moderator is to formalize the reached consensus. If the moderator decides that the teams reached a consensus during the discussion about a subject, all the teams that had allocated chips in this subject win these points. These points are automatically added to their total score. The game winner is the team that

gained the major number of points when all the subjects have been discussed. In this stage, the game ends but the educational process continues with the discussion of the game in a seminar.

#### *Student Feedback and Discussion of the Game in a Seminar*

This is the last stage of the learning procedure. The general discussion is followed by detailed feedback of all the players who participated in the game. This discussion contains a debriefing carried out in a seminar that highlights the most important aspects covered by the game.

### **Important Areas of the Game Website**

In this section a brief description of the most important areas (screens or web pages) of the game's website are presented. Some of these web pages must not be accessible from all the visitors of the website. For this reason, the system specifies users' roles and rights, since there has to be a distinction between visitors, players and teachers. These are the three different users' categories. The areas provided by the system in the game's website are the following:

#### *Training and Help*

These web pages are designed in order to provide the users with all the necessary guidelines on how to participate in the game. This section is composed of several screens which aim to help new users to join in a game, to get information about how to use it and finally to make a practice on how each player's game will be efficient. These pages are essential for the users' familiarity with the game's environment.

#### *Community Area*

The Community Area consists of the game's web pages that can be accessed by all the website's visitors. It consists of two main spaces: the 'Community Chat' screen and the 'Community Forum' area. The Community Area can be used for communication among all the visitors of the game platform, even those who do not participate in a game. The communication can be synchronous (text chat) or asynchronous (forum).

#### *Registration Screen*

The Registration Screen is a web page used for registration in the game platform. In this page, the user notifies its tension to participate in a game and provides the system with all the necessary information. This information includes user's personal data and options. Each user is able to choose which information is going to be visible by the other members of the game's platform.

#### *Play Game Screen*

The Play Game Screen is the introductory page of the games area. This screen is also used for logging-in the game platform. The system identifies each user and provides the personalized components of the platform. Every visitor of the game's website is able to register in the game through

the above-mentioned process and then join in the platform through this screen.

#### *Game Overview Screen*

The Game Overview Screen presents all the ongoing games and provides the user with the ability to form a new game. Therefore this the screen used by both the teachers and the players in order to join an existing game or to create a new one. The users who want to participate in a new game must express their interest through this page, and then wait for the teachers' invitation to join the game.

#### *Introduction*

Each game has an introductory page. This introduction is composed of several screens, which aim to introduce the players in the particular game when they join in it for the first time. These web pages include some quiz screens where the player is challenged to prove his/her knowledge. There are also some teams and role selection screens, which are requisite in order to choose the team and the role that each user will perform.

#### *Chip Allocation*

This section of the platform contains the information regarding the Chip Allocation. The members of each team have to decide which subjects are more important for them and in this screen they have to allocate chips (points) in three subjects for discussion.

#### *Virtual Conference*

The Virtual Conference is the area where the members of a team are able to communicate. In this screen the General Discussion between team members takes place. Text chat, shared whiteboards, audio/video conference and presentation tables are the means of communication available to the players.

#### *Team Space*

The Team Space is composed of several screens, which are used by team members for communicating and exchanging information before and during the General Discussion. These screens are the Team Forum, the Team Virtual Conference, My Info, the Member List and the Team Library.

#### *General Library*

The General Library contains general information about each game's theme. The trainer and the players have access to these pages in order to upload or download valuable information. This information aims the users to participate efficiently in the ongoing discussions. It has to be mentioned that both teachers and students are able to store information in the General Library.

#### *Info-Bank*

The Info-Bank is similar to the 'Library', that is an area where players are able to retrieve information. The main difference is not the type of information but the person that

provides it. In this area only the trainer is able to upload the information that will be accessed by the players during the game.

#### Theme Creation/Modification Screen

The Theme Creation/Modification Screen is the area where each game theme is being created or modified. Only a trainer has access to these pages, which are used by the teachers for creating new themes or modifying existing ones. These web pages contain all the needed information that describes the specific subject the players are going to discuss.

#### New Game Feature

The New Game Feature is the area where a new game initiates. These pages are accessed only by trainers who use them in order to start a game, by defining the theme, the difficulty level and which players may participate in it.

### Possible Use Cases

To illustrate possible application of the proposed UniGame framework, we present two examples of the game usage. A teacher who wants his/her students to reflect actively upon interdisciplinary consequences and ethical behavior of engineers defines a game-theme called *Tunnel Building*. The aim of the game is that 4 teams are competing to make the best offer and technical solution to build a tunnel on the defined location. The solution should consider different parameters like financial frame, time deadlines, technology applied, ecological acceptance, etc. During the game teams can “buy” knowledge from other experts. Teams are also expected to be able to react on unexpected new conditions e.g. new emission law, or the law regarding an area near the tunnel location that was declared for natural park, etc. Teams use the preparation time of the game to elaborate their solution. During general discussion different important subjects should be discussed and a consensus on which solution is the most appropriate should be achieved.

To experience *Multicultural Differences* another game-theme could be defined. In this game students worldwide can form teams. There are various possibilities: multinational teams or each nationality builds own team. Teams should work on the same task e.g. to design a multicultural website. Within the team session teams should work on their proposition, research similar web pages in different cultural environments. Teams should publish their ideas and propositions about functionality and design of a page. Within the general discussion teams have to discuss the subjects and to reach a consensus (e.g. about features of a web page, which design would be the best, which parameters should be considered for cultural adaptation, etc.).

### ARCHITECTURE

As mentioned above, the “UNIGAME: Social Skills and Knowledge Training” game is a web-based game. This means that the players and trainers do not need to install the

game software in their personal computers in order to use the game. This brings the game closer to the habits of today’s users who are accustomed to use Internet applications without having to install any piece of software locally. In addition, the fact that this is a web-based game makes its use easier, since the users are not ‘bounded’ to use it from a specific computer (every information that must be saved about a user is saved centrally and not in his/hers specific computer). The fact that the game must be downloaded every time a user wants to use it is not a problem since the game website is quite lightweight. Moreover, each game area is divided in different web pages; therefore participating in the game is similar to navigating a web site. A simple Internet connection is only needed (additional bandwidth is only prerequisite during the Virtual Conference for a high-quality audio and video interaction between the users).

The game is a web application. The game’s website structure has a three-tier architecture (CTI 2003). This architectural structure is composed of the following three layers: the thin client (a web browser), the middleware (the servers that public through the Internet the game and enable the users to participate) and the storage layer (a database management system). The architecture is depicted in Figure 2 and it will be analytically described in this section.

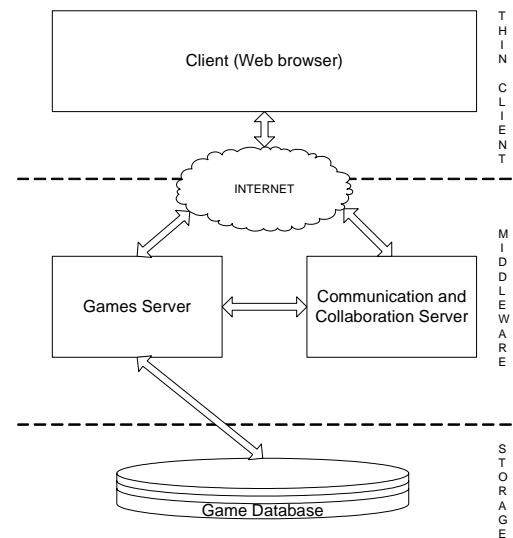


Figure 2: General End-To-End Architecture

#### Thin Client

The ‘Thin Client’ is the interface between the users and the game platform. It is a common web browser (like Microsoft Internet Explorer, Netscape, Mozilla etc.), which is used by the players in order to browse the pages of the game’s website. Macromedia’s Flash Player must also be installed in the browser as a plug-in, since some of the system pages include Flash objects. The Flash Player is available for most of the major web browsers. The thin client is the only piece of software running in the users’ personal computers. It does not contain the logic of the game and does not use the local hard drive for storing information. All information is stored

centrally. This enables the users to participate in the games through different personal computers (since no data is stored locally).

### Middleware

The second layer in the system's architecture is the Middleware. The middleware is the server software that is responsible for the provided functionality. All the game's 'logic' is in the middleware. In addition, the middleware handles the communication between the different users of the game, presents the game to the users and connects (transparently) the client software with the storage system. The two main components that constitute the middleware are the 'Game Server' and the 'Communication and Collaboration Server'. The latter is responsible for the communication between the different users of the game, while the game server is responsible for all the other functionality. In this section these two components of the system are described.

#### Game Server

The Game Server is a web server. When a request comes for a web page by the user's browser, the web server creates dynamically the content of the web page and sends it to the user. The game server contains server-side scripts, written in a scripting language, that are responsible for the on-demand creation of web pages. These scripts include the 'logic' of the game. Wherever there is need for making decisions in the client-side, client-side JavaScript code is utilized. The Game Server, besides the scripts that dynamically create the web pages, contains all the other files that are needed for them, for instance image files or Flash files.

Almost all scripts that exist in the game server connect to the database management system ('Storage System') in order to obtain the needed information or to store information. When there is need for storing users' information (for instance storing a user's profile) the thin client sends this information to the web browser (included in an HTTP message), the Web server passes this information to the relevant script and this script stores the information in the storage system. If there is need for information to be returned, the opposite procedure is followed.

#### Communication and Collaboration Server

The Communication and Collaboration Server is the server software that provides the means for the real-time communication of the system's users. This is an important functionality of the game, since the whole game-play is based on the communication between the users. The pages that enable the users to communicate in real-time contain Flash objects, which provide this functionality. These objects connect to the Communication and Collaboration Server, which handles their 'interconnection'. We will refer more analytically to the Communication and Collaboration Server and the different forms of communication it can offer in the Implementation section.

### Storage Layer

The Storage Layer consists of a Relational Database Management System (RDBMS). It is used for the storage of the data that are required for the functionality of the game. These data are related to the users' profiles, to the themes of the game, to the games in progress or past games, to the presentation of the game site, etc. The thin client (web browser) does not have direct access to the storage system. The scripts of the game server are the only software modules that access the RDBMS.

### IMPLEMENTATION ISSUES

In this section we describe the technological selections we have made for the architecture described above and the way all the desirable functionality was implemented. Also, the interconnection of the various parts of the architecture is explained. These are shown in Figure 3.

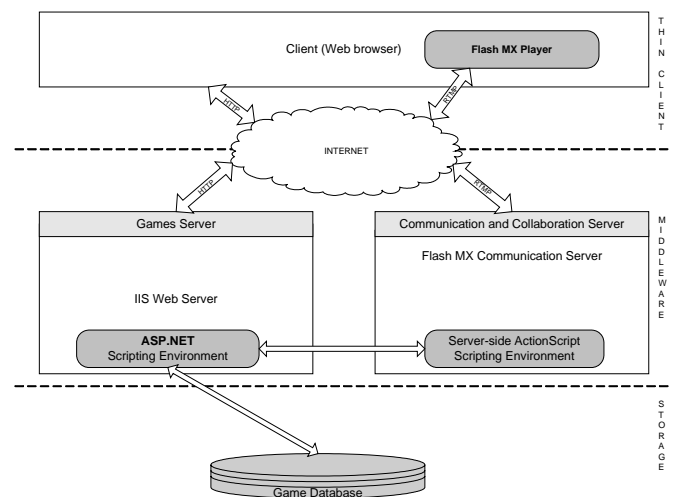


Figure 3: Analytical End-To-End Architecture

As mentioned before, the thin client is a web browser with Macromedia's Flash Player (Allaire 2002) installed. It presents the pages of the website to the users and gets their feedback. Through the web browser the users participate in the different game stages, search for the information stored in the game's libraries and communicate through forums.

The Flash Player is used because it has built-in functionality for the real-time communication of the users, besides being a powerful technology for building aesthetically elegant websites and animations. It is also quite widespread and is provided by Macromedia free-of-charge. It is used in the 'Virtual Conference', 'Team Virtual Conference' and 'Community Chat' pages of the system. These web pages can be accessed by many users simultaneously and constitute the multi-user environment of the system. Users interact through text chat, audio/video conference, shared whiteboards and presentation tables.

The middleware is the 'heart' of the game platform. It is managed and supported by the game administrator. It contains the application's logic, handles the real-time

communication of the users, creates and serves the web pages of the system and holds the various files that are used in the web pages of the system. As mentioned in the Architecture section, the middleware is composed by a web server ('Game Server') and the real-time communication server ('Communication and Collaboration Server'). These two servers should be running in the same server machine or should be running in separate servers that are connected through a Local Area Network (LAN). This choice depends on the most important criteria (cost effectiveness or performance) during the system installation.

The Game Server is the web server of the game platform. Its role is to dynamically create and serve the web pages that compose each game to the browsers of the users. The web server selected to support the website is Microsoft's IIS (Microsoft 2003), extended with the '.NET framework 1.1' in order to support the ASP.NET scripting language (Homer et al. 2002), in which the functionality of the web site has been developed. In addition, XML – eXtensible Markup Language has been integrated with the ASP.NET scripting environment in order to provide the trainer with the ability to easily create and modify the Game Themes. An XML Schema containing the necessary elements was created in order to provide this functionality.

The Game Server is the only part of the system that accesses the RDBMS (Storage System) through the use of the scripting environment (ASP.NET). Users' browsers interact with the Game Server over the Internet using the HTTP protocol.

The Communication and Collaboration Server has been used for enabling the real-time communication among the users. The Flash objects that built this functionality connect to the Communication and Collaboration server and exchange data through it. The Communication and Collaboration server selected in order to support the above mentioned functionality is a product provided by Macromedia, the Flash Communication Server MX (Gay and Allen 2002). The types of real-time communication developed by the use of Flash Communication Server are text chat, voice chat, shared whiteboards, presentation tables and audio/video conference. All this functionality was developed by enhancing Flash Communication Server MX capabilities with the conjunction of the scripting language used for programming the server, ActionScript and the Flash Player as the client. The ActionScript is a scripting environment able to provide and support communication components through network connections, based on a client-server architecture.

The protocol used for the interconnection between the Flash objects that enable the real-time communication functionality and the Flash Communication Server MX is Macromedia's Real-Time Messaging Protocol (RTMP), utilized by the ActionScript scripting language.

An Internet connection is the only requisite for enabling the above-mentioned functionality. Users, who connect to the Internet through a high bandwidth connection, will experience the highest quality audio and video interaction. The user according his/her Internet connection is able to adjust the audio and video quality. By default this

adjustment is taking place automatically when the user signs in the Virtual Conference.

The RDBMS selected for the storage layer of the game platform is Microsoft SQL Server 2000. This selection was made mainly because Microsoft's products IIS and .NET Framework are used in the middleware. Consequently, using SQL Server 2000 for the storage system of the game platform provides better integration between the system's components (Iseminger 2001) and the maximum performance.

As it has been explained so far, the software of the game is distributed between the users' personal computers (web browser and Flash player) and a central server (or more) of the game provider. The Game Server, the Communication and Collaboration Server and the SQL Server can be installed in the same machine in order to minimize the cost of the overall system, or they can be installed in more than one machines interconnected over a LAN, providing the best system performance, specially for the real-time communication functionalities.

In order to show a sample of the system's functionality, a screen from the game is provided in Figure 4, which pictures a screenshot from the game's Virtual Conference. In the Virtual Conference the members of the teams are able to communicate with each other through various ways, such as text chat, shared whiteboards, presentation tables and audio/video conference. Each user is represented by an avatar (a photo chosen from a gallery) while some gestures are shown beside the avatar. The audio/video conference area and the shared whiteboard are also pictured in this figure.

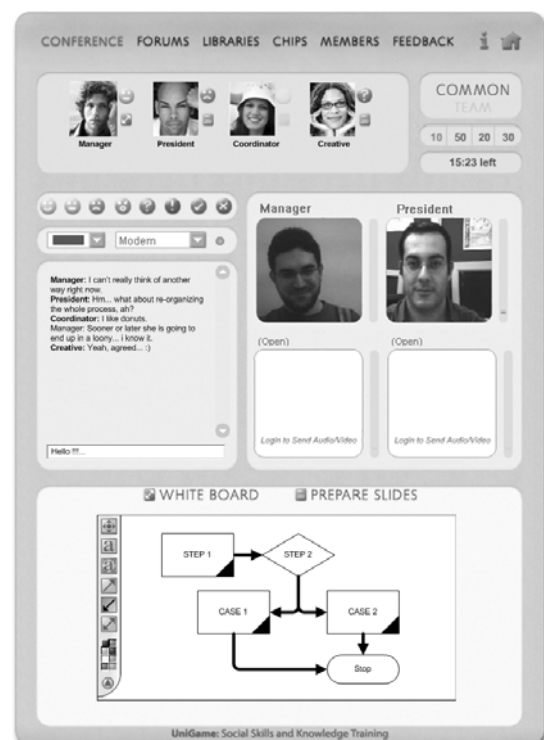


Figure 4: Screenshot from the Virtual Conference

## FUTURE WORK

The “UNIGAME: Social Skills and Knowledge Training” game has been designed with the goal to enhance the communication skills of its users and to make learning easier by using the theory of the lectures in practice. In order to achieve an efficient and powerful platform there is an important phase of the game development to be done. This stage will follow: is the testing and evaluation phase with users. The game will be used in classes with themes that will be developed for these specific classes and the trainers will try to understand whether the game effectively enhances the teaching experience. This evaluation will be used for improving the game concept and achieving better acceptance and playability. In addition, feedback from the users will help in identifying which points of the game could be enhanced. Perhaps some enhancements would be to make the game more media-rich (for example, using streaming video in the introduction) or even enrich the games’ functionality by providing the users with a 3-D multi-user environment, which will enable the students to practice what they have learned during the educational process, or by providing the ability to include external simulation programs.

## CONCLUSIONS

The “UNIGAME: Social Skills and Knowledge Training” is a game aimed at enhancing the traditional learning process, emphasizing e-teamwork and soft skills training. By using the game as a complement to lectures or even as a standalone learning process, it is believed that it will enable the students to understand better the theory, as they apply it in practice. Moreover, the students acquire knowledge in other fields too, such as communication and team management, while they also increase other soft skills such as responsibility and creativity.

Towards this direction, a game environment was created that emphasizes on the communication and collaboration of the users. By joining a team in the “UNIGAME: Social Skills and Knowledge Training” game and participating in the game procedure, the user acquires experience of working as a member of a team, communicating effectively, working as a team leader and using in the discussions knowledge acquired in the lectures or in the game. The game is a web-based and multi-user (multi-player). It offers its users many different communication and collaboration means, such as a text chat module, a forum (public or private) and several areas where they can upload or download information. Moreover, the Virtual Conference area provides the users with the ability to communicate and collaborate through audio/video interaction plus shared whiteboards and presentation tables. Having completed the implementation phase, the game must now be tested in real classes by students and evaluated by the users. The received feedback from the students will help the development process, in order to apply usability and playability improvements to the game, according to the suggestions.

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