DESIGN AND IMPLEMENTATION OF A GAME BASED LEARNING RELATED COMMUNITY[1]

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ABSTRACT

A web-based community aims at providing communication and collaboration tools to a special interest group. This paper describes the functionality and architecture issues of a community which aims to bring together users who are interested in the field of game based learning and lifelong learning. The architecture and implementation issues of the platform developed are analyzed and their exact use is explained. More specifically the members of the community are provided with tools in order to share their knowledge and experience in game based learning through enhanced forums and chats, to read news or receive a newsletter concerning the aforementioned issue, arrange meetings, and make use of shared spaces. All these services are enhanced in order to meet the needs of this special interest group which is unique as it includes the collaboration of game developers, pedagogues and simple users. Furthermore, we describe a methodology to build a fully functional community with tools for communication and collaboration starting from a simple template and using core content management techniques.

KEYWORDS

Web community, game-based learning, life-long learning, special interest group, content management system

1. INTRODUCTION

The World Wide Web is expanding constantly and the Internet becomes a main factor of remote communication. More and more people every day become members of the Internet community but they cannot understand the extent of this community. High-technology software exists that promotes remote communication, but still the users act as units, they are faceless and they do not tend to be members of any web-based community. In the past, it was believed that the relationships established via online communication are more hostile, divisive and uninhibited [Kiesler & Sproull, 1992], but the differences between computer mediated and face-to-face interaction diminished over time. Besides, the on-line communication promotes the social skills of the participants, because they have to communicate with someone that they do not see, and so, they have to form the character of the interlocutor.

Many attempts have been made in order to motivate internet users to act as groups. The basic idea is to create a web-based community aiming to bring together Internet users that have similar interests. Many online communities, supporting high-level communication tools, have tried to bring users together but failed owing to negligible participation of the members. In order to construct a successful community, members must be able to fulfill their purpose and accomplish those goals that require other members to participate [Ferguson et al, 2002].

Game-Based Learning is an issue that concerns game developers, educators and trainees. The teaching methods based on educational games are expected to be extremely attractive to either University students or people who are concerned about Lifelong Learning. In addition, the social and educational aspect of this type of communities [Bouras et al, 2003] is becoming increasingly interesting both from a technological and social perspective. Besides, the Internet's characteristics facilitate the development of unique forms of interpersonal and group interaction. [Oren et al, 2002]. Therefore, we intend to create tools for an on-line community where the users can be organized to groups in order to discuss their ideas and exchange the knowledge of their own.

Developers, game providers and pedagogues have tried in the past to collaborate aiming at the creation of either communities or games that can be used for educational aspects. TopSIM[2] provides different business games that have been used in business education and advanced training. [Myzel, 02] is another online community game. The players have to select a role and try to survive in the virtual world of Myzel with its various planets and complex social and political life. [Environmental Detectives, 2002] was developed by MIT and Microsoft within the Games-to-Teach project. It is a handheld PC game where players role play as scientists investigating a rash of health problems in their city stemming from point-source pollution problems. Finally, Unigame[3] is a project that introduces the concept of game-based learning with a focus on higher education sector and lifelong learning.

All the above, introduce some attempts that have been made in order to bring Internet users together. But, actually these attempts, except Unigame, do not include the collaboration of developers, game providers and pedagogues altogether. Our main goal is to create advanced tools for a community that will try to bring together Internet users with the intention to exchange ideas, knowledge and experience in order to produce more efficient educational games, and it will be focused both to technological and pedagogical perspectives.

This paper is structured as follows. In the next section, the idea, which generated the project of promoting Game-Based Learning in Universities and Lifelong Learning among a virtual community, is described. In section three, the design issues and the architecture of the community are analyzed including specific schemas. Afterwards, the implementation issues and the main functionalities of the community are explained. In the final section, some concluding remarks and proposals for future work are provided.

2. SIG-GLUE DESCRIPTION

SIG-GLUE[4] aims at creating a community (Special Interest Group) for exchange of ideas and knowledge in the research field of Game-Based Learning in Universities and Lifelong Learning. This community will try to bring together both developers and users of educational games. The mission of this community will be multi-dimensional: The ultimate mission of SIG-GLUE is to enhance the quality of education in universities and

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[2] TOPSIM, Business games, Planspiele (by TERTIA Edusoft) http://www.topsim.com
[3] Unigame: Game-based Learning in Universities and Lifelong Learning / MINERVA. http://www.unigame.net
[4] SIG-GLUE: Special Interest Group for Game-based Learning in Universities and Lifelong Learning / Elearning Iniative, http://www.sig-glue.net

lifelong learning by further promoting the idea of learning through games. The SIG-GLUE partners, as well as various GBL researchers, aim to disseminate the idea that using games in education (or training) enhances the motivation to learn and improves the process of understanding and learning. Through the development of this community and the use of the communication and collaboration web-based platform that will be created, we believe that we will help developers to create better educational games. This will be achieved by promoting the exchange of ideas, knowledge and experience in designing and implementing educational games. The SIG-GLUE community will try to bring together as many developers, educators and users as possible. It will try to convince people about the value of game-based learning and explain how they can benefit from it. It will support educators to select the games that suit their needs or participate in the design of a game that will be adapted to their specific needs. Finally, it will support developers and encourage them to create better educational games. Creating a detailed specification of educational and gaming element and establishing a 'quality stamp' for educational games would further promote the above goals.

The tools of the community will promote communication between developers, educators and simple users, which is difficult to be contacted with other means of communication tools. What is to be noticed is that the discussions between them should not be limited into only technological or only pedagogic issues but to expand in order to meet the demands of the simple users.

The community will contain workgroups with each group covering a thematic field of interest in Game-Based Learning. In each workgroup there should be a moderator who will guide the communication and collaboration between the members of the group. But, research has proved that in a formal workgroup or discussion the role of this "virtual teacher" should be limited [Sotillo, 2000]. The participants of the workgroups should not be like a worker, but they should be coequal and exchange without any limitation their experience and knowledge. The role of the trainees in the community is very important because they are going to be the actual user of any developed game.

3. DESIGN ISSUES - ARCHITECTURE

In this section are provided the basic requirements for the development of the web community aimed to provide SIG-GLUE members with basic and advanced functionalities in their communication. As this community will provide users with educational issues about game-based learning it can be seen as a web-based collaborative learning tool that contributes to knowledge acquisition and therefore should respect a number of instructional supporting measures [Cohen, 1994; Slavin, 1996]. These measures have been developed to stimulate learning – favorable activities and have been proven as suitable for face-to-face situations as well as have been partially tested for net-based collaborative learning [Hron et al., 2000; Weinberg et al., 2002]. As net-based communication's characteristics differ, it is also important for some specific characteristics to be pointed out and taken into consideration [A Hron & H.F. Friedrich, 2003].

3.1 Description of user requirements of SIG-GLUE members

The basic needs for communication and collaboration of the community are organised as shown in Figure 1:
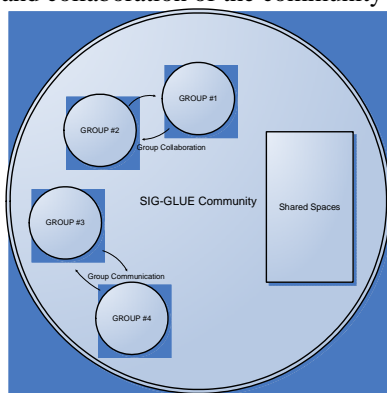

Figure 1: Web community requirements

These requirements include:
- needs for communication with each other or in groups
- needs for collaborating in groups on
- needs for shared spaces to store and archive information and finally
- needs for making available or disseminating information to the public

3.1.1 Communication tools

SIG-GLUE members need to communicate among themselves in order to exchange opinions, ask questions, offer advises etc. Communication should be both direct and indirect, and both private and public.

Direct: Direct communication requires that all participants participate at the same time and that communication is exchanged almost instantly (i.e. with no or little perceived delay).

Indirect: Indirect communication does not require that all participants participate at the same time, and communication may not be exchanged with a (possibly large) delay.

Person to Person and Group Communication: Although SIG-GLUE is a community where group communication is of importance, the environment should allow for person-to-person communication as well.

Private, Public and Semi-public: Communication is private when it is not revealed to others than the intended (and know to the originator) recipients. Private communication is needed for exchanges that are of private nature, or do not concern others and might overload them with useless information.

However, taking into consideration that the main purpose of SIG-GLUE is to allow a large number of people interested in Game-based Learning to communicate and exchange results, it comes that the very most need is for public communication. All related members need to easily access all communications and information exchanges within the community and gain the most from this. In addition to its public nature, this type of communication needs to be archived and offer for future reference.

3.1.2 Collaboration Environment

Members of the SIG-GLUE community will need tools to support their co-operative work. This is especially true for the SIG-GLUE Working Groups where in each group its members will have a task to execute co-operatively. As this community will expand with people all over Europe (and the world) this environment will form a shared working environment of the members of SIG-GLUE. The environment should cover the following requirements.

Document sharing: A very common task that all the members will face is the need to compose documents for their work. But when many people compose documents, this work becomes more practical when the environment supports document sharing, where all members of a specific workgroup can access the documents. Access control is also necessary, as there will be situations where only some members of the group could alter the documents while the rest will just read them.

Calendar: A calendar will be useful to keep the members informed about scheduled conferences, online meetings, and other events or milestones. For the Working Groups a calendar can be used for scheduling tasks and monitoring work progress. In addition each member might benefit from a personal calendar. All these various levels of calendars (personal, WG-wide, community-wide) should be merge-able so that one may see in one's calendar the entries one is interested in and/or pertains to one's work within SIG-GLUE.

Support for workgroups: Members of the community must be organised into workgroups. The existence of the workgroups will result in better co-operation, more efficient work and better results. The environment must group members of the same group, support super-members and moderators of each workgroup and provide services that apply to the members of the whole workgroup.

3.1.3 Shared Spaces

As the numbers of SIG-GLUE members increases the use of attachments to exchange information becomes infeasible. In addition forums do not usually support attachments to keep the space requirements down. An alternative is to have one (or more) shared spaces where files can be put (uploaded) and made available to SIG-GLUE members. Specific workgroups of SIG-GLUE will also need to share their results with the community or exchange their documents in private. Depending on the scope of members having access to shared spaces can be public, or private.

Public folders: Public folders will be virtual on-line folders that will contain documents, deliverables and all other information that intend to be available for the public. Availability of these folders may be a

specific service of SIG-GLUE or it can be provided as part of each workgroup area (one public folder per workgroup). Access to the data of these folders will be provided without any constraint.

Private folders: Private folders will contain information and documents that will be provided to specific users. These users may be all registered users or specific members of a workgroup. Access to these folders is controlled by access rights management system. A special case of these private shared folders is each WG's shared folder.

Databases: Databases contain structured information of various kinds. E.g. an educational games database, a provider's database, a member's database, a links database etc. In these shared databases each member of the community (subject to having rights to do so) can submit, edit, delete and view information.

News database: A special kind of such a database is a news database. As the main purpose of a community is the easy access to news, articles, results and the exchange of knowledge, a well organized news database where every member of the community can submit links, articles of public interest is necessary.

3.2 Basic platform

In order to build the online community in a matter that would provide all the above communication and collaboration tools in a unique platform and besides allow efficient administration and customization by the administrator we had to decide on the basic platform to deploy and use. As many available web tools exist for implementing many of the collaboration and communication tools the fundamental issue is to unify all these in a matter that would result in a complete environment with unified look-and-feel as well as functionality.

PhpNuke is an opensource content management system for the web that allows the easy creation of web portals that support web-communities. What really makes it suitable for use is the big opensource community that stands behind it by providing additional modules and fixing possible existing bugs in the code. Despite this expanding community PhpNuke is considered to be not a proper choice for a web portal as it lucks security.

Taking into account these, we decided only to use the core mechanism of PhpNuke that makes all the "dirty" work of the content management and implement new or modify the existing modules so as to provide the demanded functionality as well as the necessary security level. We describe this core mechanism of PhpNuke that we used to construct the web community of SIGGLUE and later in this paper we give a methodology of using it in order to transform any static web site with communicational needs into a fully functional online community.

4. IMPLEMENTATION ISSUES

In order to provide SIGGLUE users with the above described services using the platform that PhpNuke offers, we had to develop specific new modules and edit the existing so as to meet our specific needs. What we actually used of PHPNUKE is its core content management mechanism.

4.1 Inside PHPNUKE

PHPNUKE has a main module that is responsible for the management of the site content. The functional characteristics of such a module depend on the definition of the content that it must manage and its key features as well as the fulfillment of specific goals concerning the administration of the system and its easy expansion. In order to understand how phpnuke's core works we need to describe these parameters.

General page layout: The system that PhpNuke generates consists of web pages with the layout shown in Figure 2. Every page consists of five main elements, the header, the footer, the left section of blocks, the right section of blocks and the main module.

Expansion capability: The architecture of PhpNuke supports easy addition of new blocks and modules. System is responsible for identifying a new insertion and automatically takes on the responsibility to initialize properly all relevant database data. From a developer's point of view, code guidelines are provided in order to successfully integrate an individual web application into a module or a block and it is possible to embody specific phphnuke's entities (such as registered users or site administrators) into any module using

the provided function library. In addition, specific instructions are provided in order to integrate module's administration functions into phpnuke's administration panel.
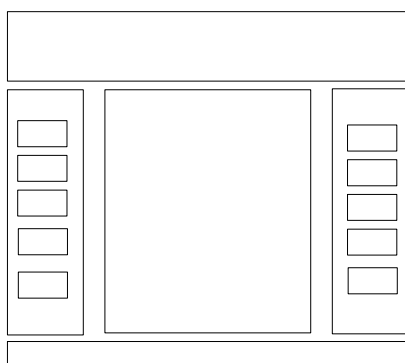

Figure 2: Page layout

Site's Administrator Role: The entire system is being administrated through an administration panel where specific users (called site administrators) have access. Administration permits customization of general attributes of the site (name, description etc), specification of the visible blocks and modules, their position and the users groups that have access on as well as per-module and per-block administration utilities.

4.2 SIG-GLUE services and implementation

The SIG-GLUE final platform that we implemented started from a simple template and through a specific procedure (Figure 3) resulted in the creation of the services. This procedure included the integration of the Web Template that corresponded to the SIG-GLUE Community Site into PhpNuke's general page layout schema. That means that the site's Logo and Header Information were transformed into PhpNuke's Header files, the left (right) menu elements were implemented as PhpNuke blocks that were explicitly placed to the left (right) side of the page, all communication and collaboration tools were implemented as PhpNuke's modules using the specific code guidelines and the static html pages with text information were implemented as new PhpNuke modules.
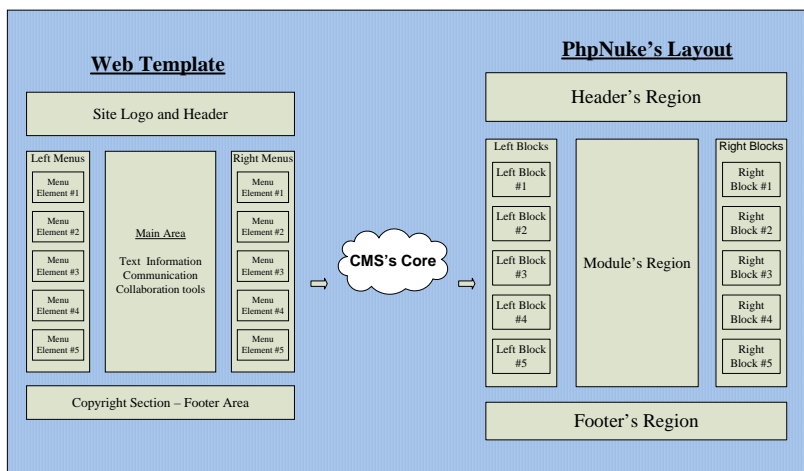

Figure 3: Basic Platform

It is clearly shown, from the above procedure, that any menu-driven web template can easily be converted into a full functional web community. Implemented modules supply services for Forums, Chats, (communication tools), Calendars and on-line libraries (Collaboration Tools), news database and public-private folder (shared spaces).

5. FUNCTIONALITY

Concerning the functionalities of the web-based community it is important to analyze and give attention to the interactive features. Advanced features and innovative services attract the members of the community to participate and collaborate. The collaboration of more members has another positive point. More people are concerned about the issue of Game-Based Learning; more people express their ideas, opinions and experience.

An important issue of an on-line community is the Graphic User Interface. It should be simple enough so as not to complicate the users but also intelligent enough in order to guide the users through the advanced features. SIG-GLUE is a web-based community aiming to bring together people whose interests are focused on game based learning. Consequently, the graphic user interface should be game like. The interface should have an unequivocal hierarchy to help the users guide in the community. As a result of all the above mentioned, the community has menu based navigation, with main menus, some of which have a submenu.

The Home button guides the user to the first page of the community. Some extra information can be found in the second section which is the Information of SIG-GLUE. Following is the News (letter). In this section the users will be guided to news concerning the community and technology advances in the fields of their interests. Besides, there is the Newsletter of the community. The interaction through this section of the community is focused on the articles of the news or the newsletter, as the members can send their own articles. The Forum button guides to the place of interactive communication. There are the forums of the community which are separated into the general discussion forums and the workgroups' forums. After this section there is the library. It contains a submenu, which has a link to the shared space, to the glossary and the link "Links" which guides the members to some useful links concerning game-based learning in Universities and Lifelong Learning. Its red color indicates the power of interaction which is produced by uploading and downloading files. Contact button is at the end of the main menu of the community website and just has some information needed for the users who want to contact the administrators of the community.

In the following paragraphs we will describe the interaction of each group of users with the community web-site. Firstly, we should consider the types of users that will be members of the community. There are three types of users: anonymous users, registered users (members), and the administrators.

Anonymous users have access only to information which refers to community itself. In addition they have limited access to sections of the community that are interactive, such as the forum. The community is aiming at challenging anonymous users to become members of the community.

An anonymous user can become member of the community be registering at the community web-site. Little information is required for the registration such as the name and a valid mail of the user. After submission of the registration form the user becomes a member of the community. This membership allows user to interact with the collaboration and communication tools. From the "Forum" section a member has access to the forum. A member is able to view all the conversations in the forum and post his answer to any topic. Entering the "Newsletter" section, a member can view all the news and the newsletters of the community. The members are subscribers of the newsletter of the community after the submission of the registration form. Moreover, they may send their own articles for publication to the news (letter) section. The Library of the community gives to the members the freedom to have their own shared space where they can upload files concerning game-based learning and lifelong learning or download other users' files.

The administrators of the site are actually members, who supervise the whole community. Some administrators are responsible for specific sections of the community. An administrator is responsible for the preservation of the consistency of the community's sections. He/She has special access to any service without any restriction and in addition to the administrator section of the site which is an extended version of the administration section of PHP-NUKE. From these pages the administrator can manage the content of the community, the services and the members. The administrator is also responsible for the shared spaces.

The hierarchy is an extremely important issue for the blossom of the community. The users can interact with the system but without exceeding the limits and restrictions which are necessary for any type of community. The users should act as they do in their real life where they have obligations and rights, which are implied through the restrictions to the services of the community.

6. CONCLUSIONS – FUTURE WORK

This paper presented the technological functionality and architectural issues of a web-based collaborative environment. The features of this environment include Shared Spaces, Communication tools and Collaboration tools. These features are implemented by creating an extended platform based on PHP-NUKE. PHP-NUKE and generally the use of PHP-MySQL technology was chosen because we believe its opensource style harmonizes to the style and tone of the open web-based community we intend to create. This platform includes all the necessary tools that are needed by the members of a community. In addition to the standar tools, some integration of them is compulsory in order to produce the adequate features for the members. Besides the basic tools, many more modules and blocks are created in order to accomplish with the static pages or some features that are not implemented in PHP-NUKE. We analyzed the demands of the community and specified the needs of communication and collaboration of the members. Together with the above we described the role model of the members in the community thoroughly, because we believe that the success of a community is based on the cognition of the target group rather than the use of advanced and perfect features. This means that firstly we focus on establishing the target group and its special needs and after that modify the basic architecture.

In the future we will focalize on the needs that will come up through the use of the community, trying to cover the needs of the members in communication and collaboration issues. In addition, following new technology architectures we could upgrade all the features and the services aiming to faster communication system and more productive collaboration features. Features, concerning video conference, voice conference, application sharing and smart notes tools could be added as advanced modules of our platform or as stand alone parts which will use the same database with the platform. Concluding, it is essential that a web-based community should follow new technology issues in order to become, not only a huge community in numbers of members, but also to promote the collaboration and the remote communication of Internet users in an optimum way.

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