

CONCEÇÃO DE UM PLANO DIGITAL DE ATIVIDADES PARA A ESCOLA SUPERIOR DE CIÊNCIA E TECNOLOGIA

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Resumo: Este artigo apresenta uma plataforma web construída para o diretor e respetiva equipa de coordenadores da Escola Superior de Ciências e Tecnologia. Esta plataforma é o resultado do processo usado anteriormente na gestão do plano de atividades, tendo por base um documento Word que passa para um novo processo que permite aos utilizadores consultar, inserir e editar o plano de atividades de um ano letivo, através de uma plataforma digital. Este estudo apresenta ainda os métodos e escolhas tomadas ao longo do processo de desenvolvimento, e a respetiva arquitetura do sistema.

Palavras-chave: Plano Digital; Gestão de Atividades; HTML5; CSS; PHP; MySQL; LDAP.

THE CONCEPTION OF DIGITAL PLAN ACTIVITIES FOR ESCT

Abstract: This paper aims to present a web platform developed for the director and team coordinators of School of Science and Technology. This platform is a development of the process used before in management activity plan, drawn up in a Word document to a new process that allows users to query, insert and edit the planned activities for the school year, through a digital platform. This study also presents methods and choices in the course of the development process, and its system architecture.

Keywords: Digital Plan; Management Activities; HTML5; CSS; PHP; MySQL; LDAP.

1 INTRODUCTION

The plan of the School of Science and Technology (ESCT) activities is currently being prepared in MSWord document known only by the director and the coordinators responsible for each course. The problems of this current process go through registration activities in a single

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document and then sent to all coordinators of each course, where at every change, becomes necessary to resend an updated version of this document.

This project provides a migration of the current plan to a digital platform, where every coordinator can record the activity for which it is responsible and in addition, consult all other activities entered by other coordinators or director.

The purpose of this solution is not only record the activities for each school year, but also monitor the state of each activity. Each activity inserted by a coordinator required to be approved by the administrator, which in this case is the director of the ESCT. However, the decision of make any activity doesn't depends only of ESCT director but also ISPGaya and CEP directors that provides logistical and monetary means to the realization of activity.

In general, the application is able to getting a list of activities presented in a data grid for the current school year, indicating the state in which each of them is. For each activity is displayed the name of the responsible coordinator. All this complemented by the usability panorama of the application for data entry, by the team coordinators and director.

For the director of ESCT this application will have a high impact since, as a system administrator, he can controls each activity entered by the team coordinators. Being inserted, he also has the following major features: the acceptance activities, elimination activities, bulletin notices of activities modified by the coordinators and query the state of development of each of the activities.

This document is structured as follows: The next section presents the theoretical foundations that support this study. In the following section a contextualization is made and described the architecture of the digital plan activities, as well as its graphical environment. Next, we present the results and then presented the conclusions.

2 THEORETICAL FOUNDATIONS

2.1 Analysis and Requirements Gathering

Carvalho (2010) says that a good requirements analysis is the basis for a successful development project. The factor measure of success of a project is reflected in obedience to the greatest number of requirements and objectives for which it is built. Therefore, it is necessary to understand the area where the system will be applied, thus requiring some general information on the application to develop.

Moraes (2013) numbered some techniques for gathering requirements which are complementary and can be used within each requirement:

- Interviews: traditional simple to use and produces good results in obtaining technical data;
- Quiz: technique used when there is a large number of people to whom we intend to extract the same information;
- Workshop: in which are found a team of analysts and a selection of stakeholders defining the purpose for which the system will be used, obtaining more specific requirements;
- Brainstorming: used in workshops, presenting the problem to a specific group in order to get other perspectives and new solutions;
- Group dynamics: informal discussion with the purpose of obtaining in-depth qualitative information.

To collect this information, and ideally project the desired application, UML is used to specify requirements. With it, it becomes possible to draw several diagrams of use cases, classes, activities, sequence, objects and components. The UML modeling language will assist in broader system view through the elaborate design, representing the communication between various objects. Booch (1998) refers the goals of the UML are: specification, documentation, structuring to view its sub-problems, which is somehow greater logical view of the complete development of the whole information system.

2.2 Workflow Systems

The workflow processes is usually presented in graphical form and translates as the entire process of work is done. Toledo (2010) presents some disadvantages in the use the natural language like the difficulty of representing alternative paths and incorrect understanding of people involved in the process, given the subjectivity of the text interpretation.

Leandro Campos (2005) says the workflow concerns the automation of the work process, where information or tasks are transferred from one participant to another to perform an action, following a set of rules and procedures.

2.3 PHP

PHP is a programming language with the main purpose to build pages that will be generated dynamically and quickly. It also allows interconnection with a large number of databases like PostgreSQL, Oracle, MSSQL, among others, and with MySQL. The platform is free and open source, and has the power to run on any internet browser and server. Niederauder (2011) mentions its main features:

- The speed and robustness comparing to other alternatives like Python, Perl and Ruby;

- Security because the codes are not precompiled unlike other applications like HTML5, the code is working in a hidden mode where user can't see or collect connecting process to database;
- Portability in way that can be executed in any place, independent of chosen web browser and platform like: Linux, Windows and Unix.

2.4 MySQL

MySQL is a management system database that uses the SQL language. Its success is measured by the result of an easy integration with PHP. It was created by David Axmark, Alan Larsson and Michael "Monty" Widenious with innumerable advantages most notably the following:

- Free Software based on the GPL license where program that does the access to MySQL has to be based on the GPL license too, otherwise, a commercial license should be acquired;
- Easy to use in level of usability, its becomes easy to create a database instantly;
- Requires a few of computer hardware;
- Compatibility with various platforms like: Perl, Delphi, Java, C#, C++, Python, ASP, beyond the PHP;
- Performance and very good stability in relation to other solutions.

2.5 HTML5 and CSS

HTML5 appeared in 2012, which widened the role of language thus reversing based on the idea that the programmer having to adapt to the language, showing precisely the opposite of the language begin to adapt to the programmer emerged. With HTML5 validation, the CSS and JS files become automatic, reversing the rule of compulsory validation by the user. Trembl (2013) refers some of the advantages are as follows:

- Direct Relationship with content (search facilitated by search engines);
- Accessibility that allows keyboard shortcuts to access be more easy to deficient people;
- Usability access either through a mobile application or from your computer.

Mucheroni (2011) says that there is a major disadvantage to the use of other applications, such as Adobe Flash that requires the installation of a plugin to work and presents the page. HTML5 does not needs any plugin and ends up to be a more standardized language that favors the creation of free software.

2.6 LDAP

The LDAP system is an established protocol to bypass the storage of information about the users and addresses. Moreover, it is able to function more effectively as compared to the storage of information in a common database as Jeffrey Weiss (2002) says. The major advantage of using this protocol is to facilitate the user access to the system, preventing exist different usernames and passwords and it is later implied a cost to reset the accounts. Thus, the user uses his credentials in centralized system.

3 DIGITAL PLAN ACTIVITIES

3.1 Actors and Functional Requirements

Actors in the system are the responsible people for the activities to be performed by ISPGaya. The coordinators of each course are the users of the system which will put the activities to perform and to organize for themselves. As for administrators, and to make the application dynamics least propitious for errors, there is a single administrator who is only the ESCT director. That means as actors in the system are:

- Director: function is to administer the system, having the kind of privileges required to administer the platform in its fullness;
- Coordinator: has a sort of lower privileges, ie, you can only edit, cancel or delete your inserts activities only after the activity has been accepted by the director, and in the second case, the elimination of the activity director needs confirmation.

The functional requirements represents the functionalities offered by the application. There is a common authentication tool that performs the user login and logoff. This modules is also responsible for the implementation of permissions management, which limits the application access type only for directors and coordinators of ESCT. The activity query allows the filtering of all activities by its user and state (cancelled activities, realized activities and work performed activities). The activity management functionality can be accessed by system administrator, where the director can modify and update, cancel or delete any inserted activity by one coordinator or himself. It is important to refer that the coordination can only perform management operations in his own activities. Finally, the system administrator receives notifications when an activities changes its state.

The director has access to a box notifications as indicated above where he can accept inserted activities, confirm the view of some change and eliminate them definitely, being inserted activities by any coordinator. The coordinator already has a more limited access to the

application, which you can only enter and edit activities or eliminate those for which it is responsible. In managing users and permissions is possible that the director appoints a coordinator to access the platform by entering its name. It is also possible that the director blocks or allows access to certain coordinators, without having to remove them.

3.2 Architecture

HTML5 and CSS served to design the layout of the pages through the implemented code. With PHP was possible to program the proper functioning of the commands used by the user and the database in MySQL that stores all the information related to the activities. So whenever information is required database pages of the application, we resort to PHP, even this ending up functioning as a bridge between HTML5 and MySQL. The physical architecture is presented in Fig. 1.

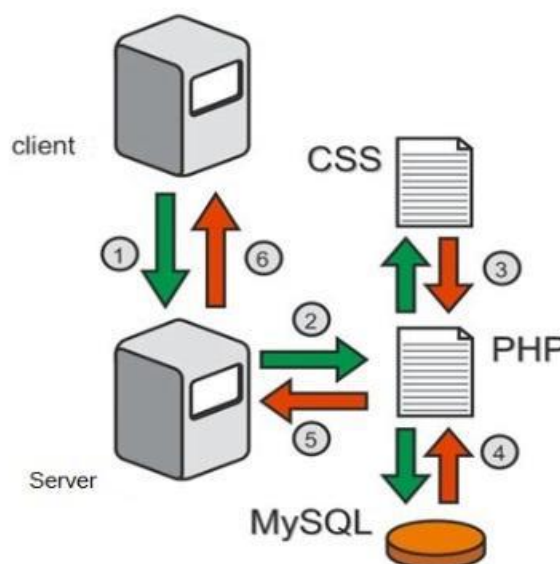


Figure 1: Physical architecture

The following technologies represent the construction of platform: the html5, css, php and mysql. Associated with these technological components are the accesses to the application by logging and management activities which are included in the insert, edit, cancel or delete, as it is represented in Fig. 2.

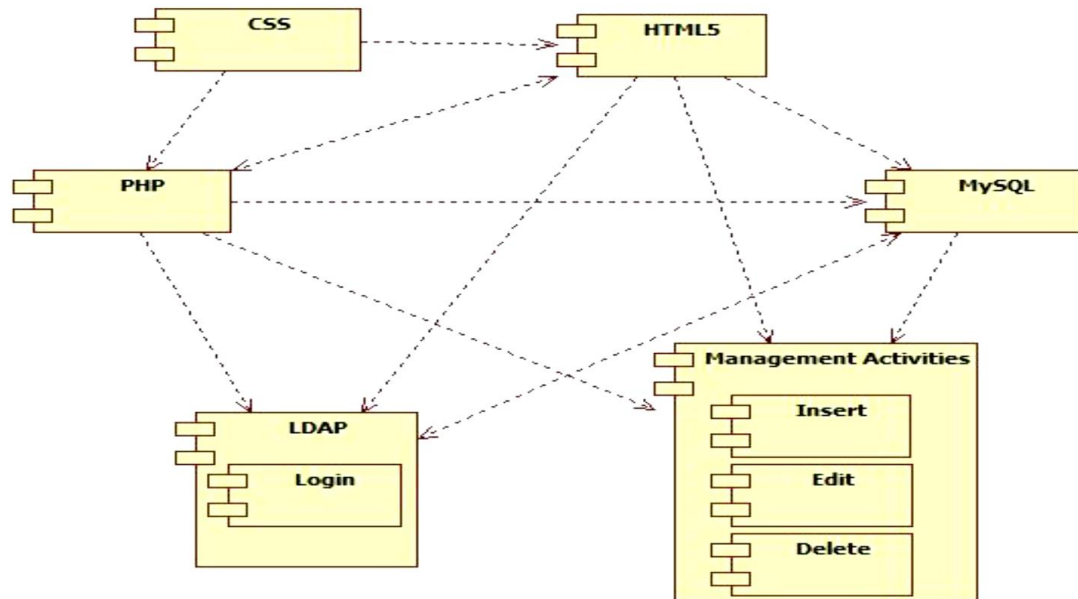


Figure 2: Logical architecture (high level)

Moreover, it is also important to define the basic architecture of the system. To us, the Fig. 3 represents the physical layer of the system and how it interacts with each other. This has the pages that make the web platform to present to the user, the next level is about to represent the functions that are performed, and then is shown the database and access via LDAP, performed only the first time that Login is done.

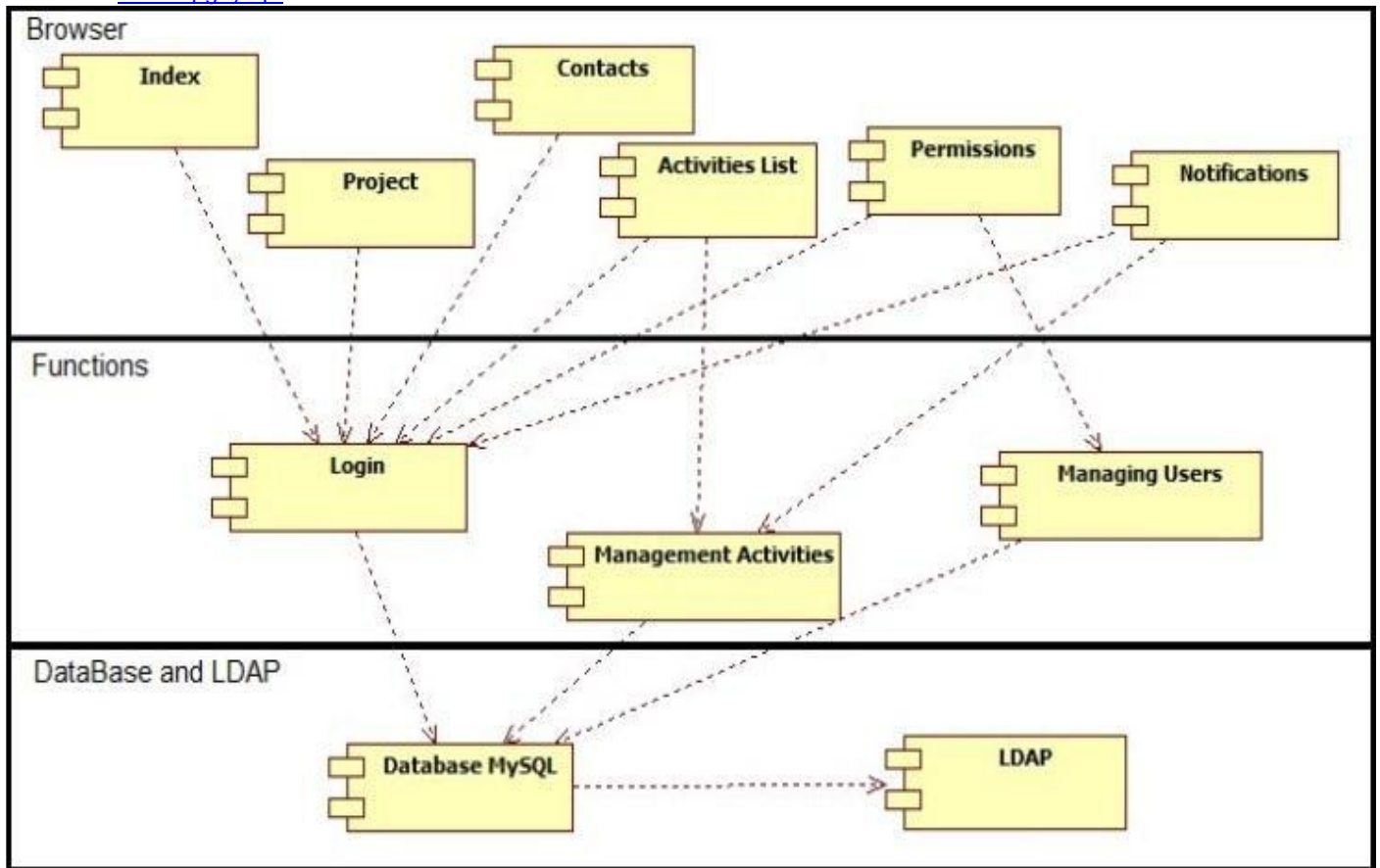


Figure 3: Logical architecture (low level)

In general, we can divide the functions that the application is in three types: management activities, managing users and permissions. The management of all activities related features this module like insert, edit and removal, are inserted.

3.3 Non-functional Requirements

Non-functional requirements intended to show quality application developed and the functions that are provided by the system. There are several types of non-functional requirements are that the following are provided in accordance with the project objectives:

- Usability: measured in the ease with which users can access and use the platform to carry out the management of the activities, enhancing the deposition where the menus are and consequently a lower cost of user time;
- Portability: Application must be accessed through different browsers such as IE5, Mozilla Firefox and Google Chrome, without compromising its performance and design;

- Interoperability: the ability of a system to communicate seamlessly with other systems. This requirement stands out communication between MySQL and PHP and LDAP protocol used to authenticate users;
- Documentation: User's manual of the application must accompany the application in order to make it really enjoyable, in which any user to be able to use it even though the first time;
- Efficiency: is the ability of the administrator to get more immediate results with the new technology, comparing them with previously developed technology.

3.4 Work Performed

The list of activities presented in application platform allows the coordinator to check the activities entered by all users, besides this feature, the user can select different filters like: selecting activities, unfulfilled activities, their activities (for which he is responsible) or all of them (Fig. 4). Only the activities for which a coordinator is responsible can be modified or deleted by him. A coordinator may also enter an activity, having to wait for confirmation of the director to come along with her other activities.

Data	Atividade	Organizadores	Destinatários	Cursos	Execução	Opções
2014-05-31	aaaaa	werearte	wergter	EB;	<div><div></div></div>	
2014-06-30	seminario 1	docentes e alunos de IG	alunos das licenciaturas	AP, CG, EB, EER,	<div><div></div></div>	
2015-01-10	Olimpiadas de Tecnologias de Informação	Fernando Almeida; José Monteiro;	Alunos e docentes de engenharia informática e de informática de gestão; alunos de escolas secundárias e profissionais; público em geral.	EI; IG;	<div><div></div></div>	

INSTRUÇÕES: Consulte as atividades na tabela apresentada. Quando aplicável, utilize as opções para eliminar, editar ou ver mais detalhes. Se pretender verificar as atividades inseridas por si, realizadas, por realizar ou até mesmo inserir uma nova, utilize o menu do canto superior direito.

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Figure 4: Activities list

Director can also insert a new activity and modify or delete any activity inserted by another coordinator without confirmation. The module permissions allow the director to control access to his team of coordinators platform (Fig. 5). Thus, the director may add a new coordinator his team of engineers, block access to an existing coordinator in the list, or even remove it.

ISPGAYA

Bem-vindo, dfjorge!
Está ligado como: diretor.
Sair

INÍCIO PROJETO LISTA ATIVIDADES **PERMISSÕES** NOTIFICAÇÕES CONTACTOS

PERMISSÕES

Utilizador: Tipo: **Permitir**

INSTRUÇÕES: Se pretender que um utilizador tenha acesso ao plano digital de atividades, insira o seu nome de utilizador do ISPGAYA na caixa de texto que se encontra em cima. Caso pretenda bloquear/desbloquear o acesso a um utilizador, recorra ao botão vermelho/verde da coluna de 'Opções'. Pressione o botão apagar caso pretenda remover o utilizador.

Utilizador	Tipo	Data Inserção	Estado	Opção
dfjorge	diretor	2014-06-02	Ativo	N/A
adiogo	coordenador	2014-06-10	Ativo	
pmarques	coordenador	2014-06-10	Ativo	

Figure 5: Activities permission management

Another module for the proper functioning of the application is the notifications box presented to the director. With this box, the director manages can be aware of changes made to activities, new inserts and eliminate them. So the director through the notification box can see the details of the entered and changed activities, accepting them or making any further amendment required. Across the board, the director can also accept a removal activity requested by the responsible coordinator of the same. The Fig. 6 illustrates the notification box.



Figure 6: Notification box

4 RESULTS

To measure the results of implemented platform of digital plan activities is necessary to analyze three types of tests made to platform: usability, portability and performance.

Usability is a quality attribute that allows assessing whether a user interface is easy to use. Sets up in 5 dimensions:

- Learning: How easy is it for users to accomplish basic tasks the first contact they have with the interface;
- Efficiency: Once users become experienced in the use of the interface, how fast can accomplish the tasks;
- Memorization: After a long absence, how easily users can restore their level of proficiency;
- Robustness: How many mistakes users make, how severe are these errors, and how easily can recover from errors;
- Satisfaction: How pleasant is using the system.

This test of usability was made analyzing alignment of tables, text areas, paragraphs and buttons presenting agreeable for user, dynamic, efficient and simple to use, without existing unusual gaps.

The portability analyses compatibility between the platform and desktops, personal computers, mobile devices and others. There was possible to see that tab menus remained in the same place, between the different operative systems and device dimensions like android, ios, linux and windows. There is not guarantee that platform runs successfully on mobile devices because it was conceded only for desktops and laptops. In devices could cause problems in user visualization and application handling, making it in a portability and usability problem.

The performance is analyzed by time of response of platform webpage. During the tests, the webpage was uploading in the Firefox, IE7 and Chrome web browser on average of 3.253sec for Firefox, 3.454sec for IE7 and 3.045sec for Chrome. The test occurs on webpagetest.org and in PageSpeed Insights of Google, having passed with result of 68points in 100. This is important because Google tool compares the digital plan platform with other platforms existing in business.

5 CONCLUSIONS

At general level can be noted that the project developed is very positive for the coordinators and director of ESCT, and consequently, to the community of ISPGaya in general, not only by exists of one platform that saves data information about activities, but also by the migration of paper to digital format. Digital platform has a greater advantage in that the information is recorded in digital format, it can be changed and presented to users immediately.

The objectives of this work fall within the proposed work presented before the start of this project, including all the proposed features and presenting to be effective. Despite the advantage that the application brings to the ISPGaya's coordinators team and director of the ESCT, there are some improvements that can be made and implemented in the near future:

- Account Setup with email each ISPGaya user of ESCT coordinators team and director may exchange messages about changes to make in the activities;
- Access to the platform website from any internet network without requiring the user to be authenticated internal network ISPGaya, where it is necessary to migrate to another server;
- Implementation of a dynamic graph on the platform, in order to inform coordinators of number of activities inserted and which coordinator has the greater number of activities;
- Improvement of some graphic aspects in the design of the website, including the entering and editing data;

- Development of budget plan concerning each activity.

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