Development of a Repository of Digital Theses as an Integrative Activity

Desarrollo de un Repositorio de Tesis Digitales como Actividad Integradora

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Abstract

The purpose of generating a digital theses repository is to organize and store theses in digital format so that users can have access to them in an open manner, resulting in knowledge being disseminated locally, nationally, and internationally. The presentation of this article details the organization of the development of a Digital Theses Repository, carried out during the Integrative Activity that is taken in the fifth, sixth and seventh semesters. For this, it is supported by different subjects, having as guiding subjects the three subjects of Software Engineering, where the full software development cycle and the CMMi dep Level 2 model are used.

Digital theses repository, Software development, programming teaching, CMMi

Resumen

La generación de un repositorio de tesis digitales tiene como finalidad organizar y almacenar tesis en formato digital para que los usuarios puedan tener acceso a ellas de manera abierta, dando como resultado que el conocimiento pueda difundirse de manera local, nacional e internacional. La presentación de este artículo detalla la organización del desarrollo de un Repositorio de Tesis Digitales, llevado a cabo durante la Actividad Integradora que se toma en los semestres quinto, sexto y séptimo. Para ello se apoya de diferentes materias, teniendo como materias rectoras las tres materias de Ingeniería de Software, en donde se usa el ciclo de desarrollo de software completo y el modelo CMMi Nivel 2.

Repositorio de tesis digitales, Desarrollo de software, enseñanza de programación, CMMi

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1.Introduction

Currently technology has led to the generation of knowledge can reach faster from one place to another, one way to share knowledge is through the development of digital theses open to the general public, so this article will show the organization for the development of a Digital Thesis Repository also aligned to the process of thesis development in the career of Computer Engineering at the Autonomous University of Tlaxcala, for them was used an Integrating Activity proposed in three semesters.

2. Repositories

Repositories are information systems whose purpose is to organise, preserve and disseminate in Open Access mode the scientific and academic resources of institutions and scholarly resources of institutions. The aim of the development of these systems is to guarantee easy, controlled and standardised access to certain information resources [1].

3. Traditional teaching and Inclusive activity

Traditionally, the organisation of university courses is a theoretical explanatory lecture, where the teacher transmits to the students the knowledge that they have to develop, followed by a practical implementation of this knowledge, it can be said that this strategy is not very recommendable [2].

That is why the Autonomous University of Tlaxcala decided to integrate Integrating Activities in its degree courses. An integrative activity at UATx implies teamwork between students and teachers, to integrate learning from different subjects in an interdisciplinary work, which generates socially relevant learning [3].

In we can see that the Integrating Activity is a pedagogical strategy that favours active learning through the combination of different disciplines, processes and procedures, and the application of knowledge and learning of students to solve a problem situation in the national context [4].

4. Distributed Systems Academic Body

The Autonomous University of Tlaxcala manages Academic Bodies, in the Bachelor's Degree in Computer Engineering there is the Academic Body of Distributed Systems, which has 2 Lines of Generation and Application of Knowledge (LGAC): Software Technology, as well as Virtual Reality and Educational Software.

The LGAC of Software Technology considers that currently the development of systems, design, re-engineering and maintenance of software requires the application of methodologies and models that allow the development of quality software.

While the LGAC of Virtual Reality and Educational Software considers that technology has evolved and that technologies such as virtual and augmented reality are necessary to enrich software, whether educational or in any other area.

5. Description of the Method

In the Bachelor's Degree in Computer Engineering in the fifth, sixth and seventh semesters, the development of software is carried out with the participation of the 4 members of the academic staff. The Software Engineering subjects are the axis of the Integrating Activity, in this subject the software development life cycle and the CMMi level 2 model are studied. [5], resulting in the production of quality software.

CASD Subjects Involved:

In fifth semester:
- Requirements Engineering and Estimation
- Database Query and Optimisation
- Human Computer Interaction

In sixth semester:

- Software Design and Modelling
- Virtual Environment Design
- Development of Mobile Devices
- In the seventh semester
- Software Testing and Implementation

6. Digital Thesis Repository

6.1 Fifth semester:

In this semester the requirements were established, the planning of the System, the database and the interface for the control and repository of digital thesis, aligned to the activities that Computer Engineering carries out for the elaboration of thesis, prototypes and memories, it includes: elaboration of the document, revision of versions of the document, academic process of titling and repository of digital thesis.

In this Integrating Activity 15 teams participated, belonging to two groups: 5A and 5B, each one developing a different digital thesis repository.

The project started with the survey of functional and non-functional requirements that the system will have to fulfil, as well as a detailed description of the behaviour of the system to be developed. As an example, the use cases of the Digital Thesis Repository project are shown below.

Nº	Nombre del Caso de Uso	Prioridad	Complejidad
1	CU_01 Registrar Usuarios	Esencial	Complejo
2	CU_02 Registrar Docente	Esencial	Complejo
3	CU_03 Iniciar Sesión	Esencial	Medio
4	CU_04 Asignar titular de materia	Esencial	Medio
5	CU_05 Elegir método de Titulación	Esencial	Complejo
5	CU_06 Asesorías	Esencial	Complejo
7	CU_07 Revisar Capítulo 1	Esencial	Medio
8	CU_08 Validar Capítulo 1	Esencial	Medio
9	CU_09 Controlar Tramite de titulación	Esencial	Medio
10	CU_10 Solicitar Aceptación	Esencial	Medio
11	CU_11 Concluir Asesoría	Esencial	Medio
12	CU_12 Validar de los Revisores	Esencial	Complejo
13	CU_13 Descargar Cuartillas	Esencial	Complejo
14	CU_14 Aprobar Cuartillas	Esencial	Complejo
15	CU_15 Informar técnicas de investigación	Esencial	Complejo
16	CU_16 Firmar reportes de técnicas de investigación	Esencial	Complejo
17	CU_17 Evaluar Tesis	Esencial	Complejo
18	CU_18 Cargar evaluación de tesis	Esencial	Complejo
19	CU_19 Cargar Tesis Prototipo o Memoria	Esencial	Complejo
20	CU_20 Actualizar Tesis, Prototipo o Memoria	Esencial	Complejo
21	CU_ 21 Autorizar Tesis, Prototipo o Memoria	Esencial	Medio
22	CU_22 Descargar Tesis, Prototipo o Memoria	Esencial	Medio
23	CU_ 23 Biblioteca	Esencial	Complejo
24	CU_ 24 Notificar	Esencial	Complejo
25	CU_25 Recuperar contraseña	Esencial	Complejo

Table 1 Digital Thesis Repository Use Case

The team realised the standardised E/R model for the Digital Thesis Repository, the database and related smart search queries.
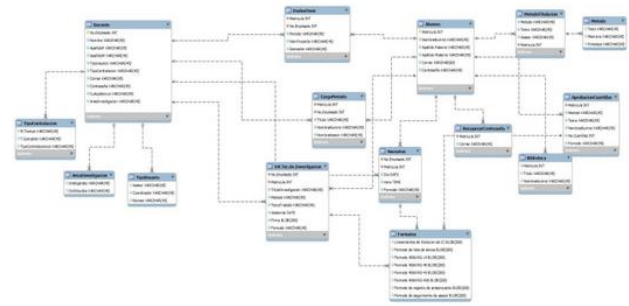

Figure 1 Model E/R

In addition to the fact that an institutionalised interface was made, as well as considering the interface design qualities of [6] which are:

– Reliability
– Multidimensional
– Usability
– Accessibility
– Consistency
– Consistency
– Interactivity
– Hypermediality
– Adaptability

The following are the different interfaces that have been developed.

Figure 2 Digital Theses Repository project main screen

Figure 3 Digital Thesis Repository project login screen

Figure 4 Project Degree Method screen Digital Theses Repository

6.2 Sixth Semester

For the sixth semester it was established to design and develop a Digital Thesis Repository System, to develop a virtual library and to make the system responsive.

Due to the importance of having a well-detailed software the modules of the Thesis Repository System are presented.
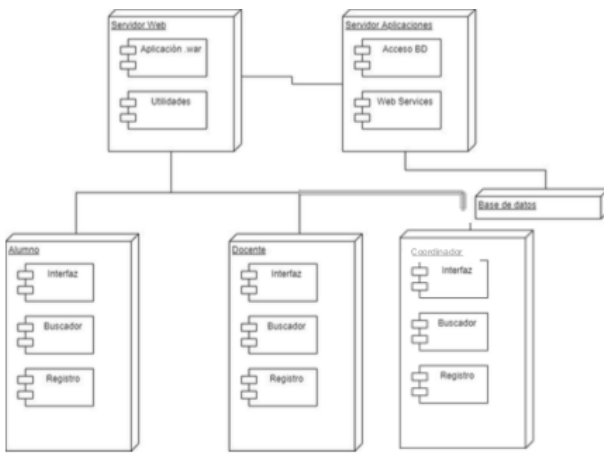

Figure 5 Thesis Repository System Modules

As well as outlining some of the software's functionalities, the following are presented.

Figure 6 Digital Thesis Repository Project Screen

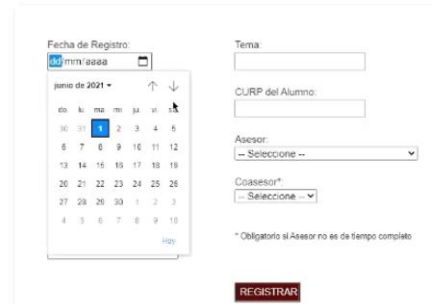**Figure 7** Registering a theme in the repository
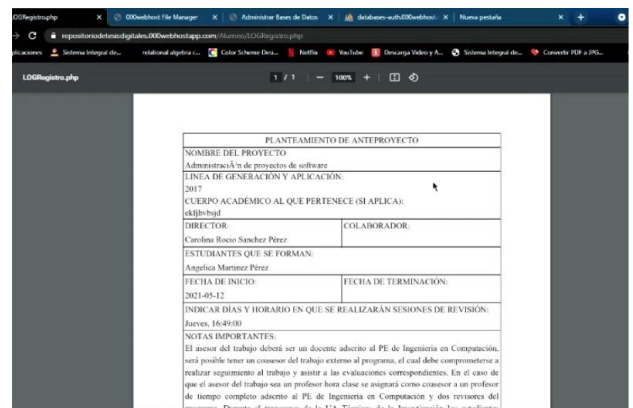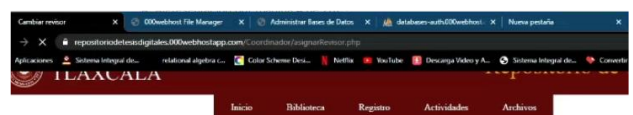

Figure 8 Topic discussed with the advisor

Figure 9 Drafting of the preliminary project

Figure 10 Assign reviewer

Figure 11 Form for the conclusion of a consultancy

Figure 12 Commencement of the titling process

For the construction of the virtual library we used the methodology of [7], which has five phases: Analysis, Modelling, Ambient, Interaction and Testing. Figures 13, 14 and 15 show three of the steps of the methodology.

Figure 13 Sketch of a library

Figure 14 3D Modelling

Figure 15 Virtual library

For the responsive system, an example of a different working team is presented.

Figure 16 Responsive system

6.3 Seventh semester

In the seventh semester, user, operation and maintenance manuals were produced. A letter of completion of the system and a letter of satisfaction and recommendation to the work team.

7. Conclusion

The Digital Thesis Repository streamlines the process of revising a thesis/prototype or report. The completion of a thesis/prototype or report requires constant revisions, before using the technology each revision was given to the advisor in hard copy, nowadays the revision could be done digitally, so printouts are reduced. In addition, when the thesis writer could not attend the advisor, he/she would fall behind, if technology is used, the thesis can be followed up remotely. Nowadays it is possible to find digital theses anywhere in the world, which makes knowledge more accessible and allows students who need to read a thesis to do so from their computer.

8. Funding

9. Acknowledgements

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