

Implementation of Scrum Methodology in the construction of the intelligent system Acerkte of Academic tutorials

Implementación de Metodología Scrum en la construcción del sistema inteligente Acerkte de tutorías Académicas

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Abstract

This paper describes the automation of processes tutorials based on a feasibility study on the HEIs, just as agile SCRUM methodologies are implemented in the construction of Acerkte system that will strengthen the support of the student during his tutorial session, as well as manage and manage activities to optimize time and resources in the school, tutor-tutored for it, the web system is made up of 10 well defined in the Sprint Backlog and assigned priorities Sprints. For agile methodology which will allow deliveries to functional and developed with cutting-edge technologies applied to development as PHP 5.5 [6] [7], HTML 5, CSS3, jQuery Mobile, Phonegap, Corel Draw, Arrowchat, Bootstrap, Senchatouch.

SCRUM, Acerkate, Tutorship, System, Methodology

Resumen

El presente trabajo describe la automatización de procesos tutoriales a partir de un estudio de factibilidad realizado en la IES, de igual manera se implementan metodologías ágiles SCRUM en la construcción del sistema Acerkte que permitirá fortalecer el acompañamiento del estudiante durante su sesión tutorial, así como como administrar y gestionar las actividades del tutor-tutoría para la optimización de tiempo y recursos en la institución educativa, para ello el sistema web está conformado por 10 Sprints bien definidos en el Sprint Backlog y con prioridades asignadas. Para lo cual la metodología ágil permite entregas funcionales desarrolladas con tecnologías de punta aplicadas al desarrollo web como PHP 5.5[6][7], HTML 5, CSS3, jQuery mobile, Phonegap, Corel Draw, Arrowchat, Bootstrap, Senchatouch.

SCRUM, Arkate, Tutoría, Sistema, Metodología

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Introduction

One of the main emerging trends observed in this field is marked by the use of ICTs, and due to their usefulness, they require the use of development methodologies capable of adapting to the situations of this modern world and constant changes, which do not involve wasted time and excessive costs during development. Hence the use of the agile SCRUM methodology in the development of an intelligent system that allows the automation of various procedures and activities that start from a tutorial process in HEIs.

SCRUM is a process in which they are applied on a regular basis a set of good practices to work collaboratively, as a team, and obtain the best possible result of a project. These practices support each other and their selection originates from a study of the way work in highly productive teams [one].

This allows the application of the SCRUM methodology in the Acerkte project to be very useful, due to the needs that every organization or institution currently has to achieve its objectives in the demand for the construction of large and complex software systems that require of the combination of different technologies and hardware and software platforms to achieve an operation according to said needs. The foregoing requires professionals dedicated to software development to pay special attention and care to the design of the architecture, under which the operation of their systems will be supported and without any doubt of a SCRUM team for the execution of the various tasks.

Process and equipment management is one of the most complicated parts for any company. It's not just about resources. Time optimization, team coordination, protocol definition and task assignment is a weighty issue that requires knowledge, good judgment and a lot of time for its implementation [2].

Although a software architecture is deficient in its concept or design, or in the worst case, we do not have the architecture of the system that we develop, we will have great possibilities of building a system that will not reach the total of the established requirements.

However, in the present project this is no longer a headache, due to the division and categorization of requirements carried out by the SCRUM team and the project representative, who in this case is the representative of an institution appointed as Product Owner.

One of the principles of modern software development methodologies is to prioritize the definition, design, implementation and evaluation of the software architecture, which is what the skeleton or structure of the system is known as. From the point of view of what the software should do, the architecture is defined from a set of critical functional, performance, or quality requirements.

The structure of this work is made up of five sections, firstly in the State of the Art a current panorama of the problem is shown, later the proposed development methodology is shown, then the development of the intelligent system is presented together with a brief description of the layers that make up this prototype is divided into two important parts: architectural design (also known as high-level design) and detailed design, and finally the Conclusions and Future Work of the project are presented.

It should be noted and added that the design of the software architecture occurs immediately after the specification of the software requirements and considers the following as the main elements: software components, properties of said components and the communication between them. Detailed design is done just before coding, and is part of the developer's first tasks; describes logic, hierarchical control, data structure, component soaking, etc.

State of the art

The Acerkte intelligent system is designed to be implemented in all IES, and the Instituto being the Instituto Tecnológico Superior de Comalcalco the Comalcalco being the SITE of this project and in which registered tutors of the registered tutors of the educational institution as well as the institution will have access to it, as well as the tutored students.

In addition, this institution will be the first instance where the implementation and testing of each and testing of each one of the Sprints Backlog. Regarding the Scrum development methodology Scrum development methodology, partial and regular and regular deliveries of the final product will be made, prioritized by the benefit they bring to the recipient of the project.

For this reason, Scrum is especially suitable for projects in complex environments, where results need to be obtained quickly, where the requirements are changing or poorly defined, where innovation, competitiveness, flexibility and productivity are fundamental [3]. It should be noted that the use of a methodology to develop software ensures that a quality product that meets the characteristics of functionality, usability and reliability is produced from its early stages.

On the other hand, it is important to point out that there are traditional or classic methodologies, which are those that are guided by strong planning throughout the development process, where an intense stage of analysis and design is carried out before the construction of the system and these They necessarily require extended documentation and where the final product can be seen until its conclusion after the scheduled time. Regularly these methodologies were applied to large projects [4]. Among them we find:

- **The Waterfall Model** and in which it is necessary to complete a set of tasks in the form of a phase and then continue with the next phase, it can be used when the project requirements are clearly defined and are not forced to future modifications.
- **The Spiral Model** is based on the continuous need to refine the requirements for a given project, it is effective when used for the rapid development of very small projects.

We clearly observe that these methodologies are not adaptable to the change that companies and institutions suffer today, but with the emergence of Agile Methodologies, we stopped worrying about last-minute changes in software development and the cost that this implied in your update.

A process is agile when software development is incremental and most of the projects of our era are of this type, in the case of Acerkte it is defined by 10 Sprints that are delivered within the time established by the SCRUM process which is based on build the highest value functionality for the customer first and on the principles of continuous inspection, adaptation, self-management and innovation.

Proposed development methodology

Fig. 1 shows the proposed development methodology, which aims to be endowed with a standard character to be implemented in different architectures that will allow optimizing the services of availability, connectivity, recognition and monitoring of information to users.

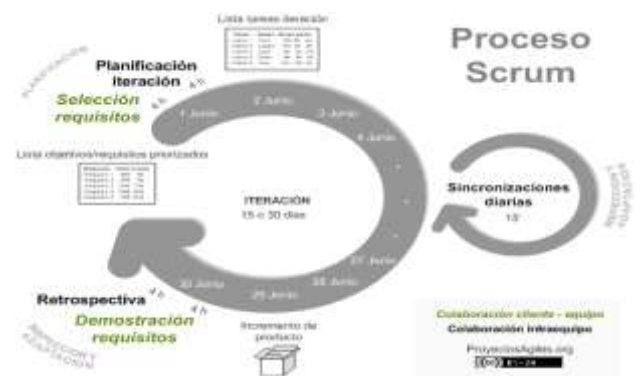


Figure 1 SCRUM Methodology

In Scrum a project is executed in short and fixed time blocks (iterations of one calendar month and up to two weeks, if so required).

Each iteration has to provide a complete result, an increment of the final product that can be delivered with the minimum effort to the client when requested. The advantages of working with this methodology begin with the role play established by it, which are:

- Scrum Master
- Product owner
- Scrum Team

Development times and iterations are defined by the Sprints. A Sprint is the duration of a job itself.

The process starts from list of objectives/requirements prioritized of the product, which acts as the project plan.

In this list the client prioritizes the objectives balancing the value they provide with respect to their cost and they are divided into iterations and deliveries. On a regular basis the client can maximize the utility of what is developed and there investment later before there planning of objectives of the product, which it performs during the iteration with a view to the following iterations.

The activities carried out in Scrum are the following:

- Iteration planning.
- Execution of the iteration.
- Inspection and adaptation.

The Sprints are defined by the work team made up of the teams and stakeholders, in the particular case of the development of the "Acerkte" system, the duration of these is two weeks, after which a Sprint meeting is established with a duration maximum of 15 minutes in which all the difficulties and advances of the system are presented, in this way a group feedback is carried out. At the meeting, each team member answers three questions:

- Do What have I done since the last synchronization meeting?
- Do What am I going to do from this moment?
- Do What impediments do I have or will I have?

During the iteration the Scrum Master ensures that the team can fulfill its commitment and that its productivity is not reduced. It removes obstacles that the team cannot solve on its own and protects the team from external interruptions that could affect their engagement or productivity.

These software development methodologies are, without a doubt, one of the greatest tools that exist in supporting the development of technological applications. With the current advancement of technologies, new techniques and procedures have been demanded and that is where the Scrum development methodology comes into play, which belongs to the classification of agile development methodologies.

As mentioned, this methodology was selected to carry out the development of the "Acerkte" academic tutoring system.

Intelligent System Development

Acerkte is an integral system that allows the tutor to have control of their mentees and a diagnosis of their history in the system that will allow them to follow up and take preventive measures at the right time, likewise, they will be able to make use of tools that contribute to the detection of needs through automated techniques, validated by the psychology area of the Higher Technological Institute of Comalcalco.

It is worth mentioning that more often there are problems in time and attention, taking into consideration that many teachers do not coincide in class schedules during the semester with their tutors and for which they are unaware of their curricular status, therefore, it makes it impossible to know their needs and therefore Consequently, the appropriate detection mechanisms are not applied, in some instances the tutor uses somewhat outdated and inefficient methods by not using ICT tools such as websites, forums, content managers, e-mail, among others, and In the same way, there are new detection methods such as those based on searches and heuristic knowledge. These ways of detecting needs will help the tutor to obtain a more detailed profile of the tutor, thus gaining access to information such as their state of mind, psychological and social in which the tutored is.

In addition to this, another of the problems that the tutor finds is when managing and keeping control of his tutorials since he does not have an information system where he has the data of his tutors and where he can manage the time of attention of each one, and that is the importance for which they will be covered in this research for analysis and subsequent automation. And in this area, attend to the possible decrease as a prevention of the dropout and failure rate, which is perhaps one of the main problems that gave guidelines for the implementation of the ideas of the current tutoring systems as well as school and personal improvement projects in HEI students.

Using the SCRUM methodology, the following 10 fundamental requirements were defined:

- Intelligent system architecture.
- Tutor-Tutorado system registration system.
- Systems from request toAppointment control session.
- Mobile registration and appointment system for tutorial activities.
- 16FP test automation.
- MMPI test automation.
- Test automation 8 colors.
- Automation of identification of profiles through AVATAR.
- Tutored monitoring system.
- Materials and Resources.

In fig. 2 shows the main interface of the system where, when entering the Acerkte system, the user will see the following welcome screen in which they can select the option to enter as a teacher or student validated by username and password.



Figure 2 Main System Interface. Source: Acerkte Mobile Application

In the final product of this research, which will be an online system that allows the management and control of tutorials as well as strengthening communication between the tutor and tutored, a mobile application will be obtained that allows the registration of appointments as well as queries of schedules and availability of the tutors, the platforms on which the app will work are android, IOS and BlackBerry, covering a wide range of users and placing all accessibility to those involved in the tutoring process as seen in figure 3. On this screen, the user will select one of the services that they wish to use. Clicking on any of the options will send to a system module.



Figure 3 Pstart screen

Figure 4 shows the registration process as an example for teachers:



Figure 4 Teachers registry

Figure 5 shows the psychological tests to which the registered student will have access. That is to say, the system will have a module with the capacity to carry out psychological profiles of the tutors autonomously, basing its knowledge base on intelligent agents that allow a heuristic search to be carried out that serves as the main data for the tutors and thus way to have the most important information about their mentee, thus avoiding having to apply any document to obtain this type of information and at the same time knowing what sentimental or psychological condition the mentee is in.



Figure 5 Integration of psychological tests

Conclusions

With the development of the Intelligent Tutoring System, this philosophy of accompanying the student will be contributed to a great extent and at the same time this serves as feedback to the teacher who finds new experiences every day that will later help to reinforce the academic support towards the student.

Applying new technological trends in the tutorial field is for us to contribute with what to do academically, because the student population has grown by leaps and bounds and with it also the problems between them [5].

So it can be said that all kinds of tools that are developed in order to help the student will be seen in a good way as long as it allows combating the main red lights of the student community such as desertion, failure and some more problems which were mentioned in the document. As a final point, we add that the topic of tutoring has grown a lot and has been strengthened in such a way that it is no longer just guiding the student, but also being with him until he resolves or corrects a specific situation, if possible, or in its effect, channels it. corresponding and in the best way applying the use of ICTs in this process. In order to generate less costs related to time and much more productivity in the sense of results, in addition to the communication that would be strengthened more and more.

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