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## **SCIENTIFIC ARTICLE**

### **THEME**

“BENCHMARKING HYBRID SOFTWARE DEVELOPMENT  
METHODOLOGIES. PROTOTYPE TRAINING SYSTEM”

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# BENCHMARKING HYBRID SOFTWARE DEVELOPMENT METHODOLOGIES. PROTOTYPE TRAINING SYSTEM

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**Abstract.** This article presents the results obtained in Benchmarking to compare software quality of life between two hybrid methodologies: EssUPs (Essentials Unified Process), a combination of Scrum, RUP and Scrum / XP a mixture of best practices between these two methodologies ; Based on ISO / IEC 12207, which has at its disposal 17 processes which are subdivided into main processes, support processes, organizational processes, which in turn are subdivided into 73 parameters of comparison, which from Of the analysis is determined to one of the two methodologies as the best option in software development, after having investigated the types of traditional, agile and hybrid methodologies the norm is applied to perform the comparative, with the purpose of applying it in the Design of the system for teaching English for children, which describes each of the stages of development of the web system, which aims to make a system based on basic lessons about English for school children assessing their knowledge acquired in each lesson , With an evaluation test.

## Keywords

Benchmarking, ESSUP Methodology, Scrum / XP Methodology, ISO / IEC Standard.

## INTRODUCTION

The majority of companies in software development using traditional methodologies and agile, is unknown to the application of the hybrid methodologies in the development, documentation about this type of methodologies is scarce, as there is for a hybrid that mixed the traditional together, same agile them and also mix the traditional with agile them After having reviewed each one of them proceeded to make a comparison between two methods of hybrid, EssUP and Scrum/XP using the ISO/IEC 12207 standard that evaluates the lifecycle of software, this standard provides processes that will help in the improvement in the life cycle; the same people who are divided in leading, supporting and organizational processes, each one of these processes derived parameters that were taken from reference to apply benchmarking, then of having made the comparison proceeded apply Scrum/XP methodology in the design of the system of

teaching English to children which consists of basic lessons and the application of a test for each lesson learned..

## GENERAL OBJECTIVE

Conduct a comparative study of hybrid methodologies in order to know its utility, functionality, and employment in software development.

## JUSTIFICATION

With the use of the hybrid methodologies are expected to make a recognition of the importance to all sectors of the software industry by providing more information about this type of methodologies, knowing the advantages and disadvantages of it and its potential for development of software.

Documentation for the orientation of students and teachers who do not know about this new trend in the area of software engineering, students can further research on different types of hybrid methodologies and their application to real cases for its development was obtained.

## SCOPE

The present study analyzed characteristics, advantages and disadvantages of each of the methodologies that we studied in the development of software making a comparison to determine which of the methodologies is more feasible for its development this was compared to the following methodologies:

EssUP and Scrum / XP

Hybrid methodology benefits

*Tabla 1: Metodologías a comparar*

ESSUP	Hybrid agile method Scrum/XP
Quick response to changes	Construction based on features
Flexibility	Agile documentation
Less time	Short Work cycles
Low costs	

Roles that should be handled	
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*Fuente: Propia*

For their respective application subsequently developed the training system of English teaching for children by applying one of the methodologies that come from the comparison.

The prototype corresponds to a system of education for schools aimed at children in an age of 7 years, allowing interaction between the computer tool, teachers and children who need to learn English through this kind of tools that help improve the quality of education.

## NORMA ISO/IEC 12207

ISO/IEC 12207 is the standard for the ISO organization software life cycle processes.(Huancho Arroyo, 2011)

This standard was designed for those interested in acquisition of software, as well as developers and suppliers. The standard indicates a series of processes from requirements gathering until the completion of the software.(Huancho Arroyo, 2011)

Standard comprises 17 processes the which are grouped into three:

- Main
- Support
- The Organisation

This standard organization groups together the activities which can be performed during the software life cycle in five main processes, eight in support and four organizational processes. Each life cycle process is divided into a set of activities; each activity is sub - divided in turn into a set of tasks.(Huancho Arroyo, 2011)

ISO/IEC 12207 standard was used for benchmarking of hybrid methodologies in the development of software, which evaluates each parameter provided by the standard.

## DESCRIPTION OF THE COMPARISON

In this comparative study, parameters will be established to determine which methodology will be the best option for software development, where the methodologies to be addressed are the Essentials Unified Process methodology and the SCRUM / XP hybrid methodology (eXtreme Programming). Which will be adjusted to the ISO / IEC 12207 standard that refers to the software life cycle processes, where the comparison parameter is found, after comparing the results obtained will be reflected in the

application Didactic system for Teaching English for children.

The standard is used to define, control, and improve software lifecycle processes. **As the picture shows 1.**



*Figura 1: Software Lifecycle Processes Own Source*

Each of these processes are subdivided into tasks that must be taken into account as comparison parameters when comparing the two hybrid methodologies

It is concluded as the best option for the development of the application to the Scrum / XP methodology due to the combination of the two methodologies making good practices for software development, that at present this hybrid methodology is being used, more than traditional and agile methodologies, Will be evaluated in the scale of Likert type, with this will arrive to the accounting to obtain the values of the comparison.

In which it was evaluated parameter by parameter so as to obtain a result in favor to be able to apply it in the comparative. Evaluation model for benchmarking.

Acquisition process:

*Figura 2: Acquisition process*

Methodologies	EssUP		Scrum/XP	
	YES	NO	YES	NO
• Inicio	S		S	
• Preparación de la solicitud de propuestas	S		S	
• Preparación y actualización del contrato	S		S	
• Seguimiento del proveedor		N		N

• Aceptación y finalización		N		N
<b>Assessment</b>	<b>3</b>	<b>2</b>	<b>3</b>	<b>2</b>

Fuente Propia

Each evaluation process has the same format which specifies the parameters and the type of methodology to compare.

After completing the comparison was obtained the following results.

To remove the percentage was a rule of three with the data obtained in the analysis. According to the percentage obtained in the analysis is the following for each methodology as shown in the figure 2

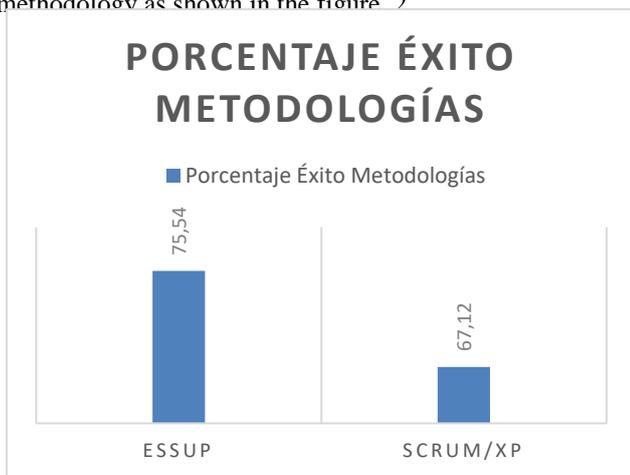


Figura 3: Porcentaje análisis metodologías  
Fuente Propia

The percentage obtained EssUP methodology is superior to that obtained with Scrum/XP the difference is that EssUP has not lost the essence of the RUP methodology in regards to the documentation which made it is when it is used, EssUP focuses on practices that are necessary to use them all them, but those that conform to the needs to be covered This methodology is used in large projects which take teams of more than 50 persons responsible for carrying out the project.

### SCRUM/XP CONCLUSIÓN

Study on hybrid methodologies for software development, Scrum/XP methodology that conforms more projects going to last in a time of between 2 to 6 months, it is a feasible option to work in the environment that fosters this methodology, to be in constant communication with the client, which is an important part within the team which produces a feedback between the customer and the team.

### RESULTS

The results that emerged after completing the evaluation of the parameters, is the use of a framework called Scrum/XP.

Framework in which is the union of the best practices of Scrum and XP, said marco may vary according to the needs of the project in which it will develop.

The training system of teaching of English for kids was developed using Scrum/XP methodology that conforms more to web development-oriented projects and time not to exceed more than 6 months for which proceeded to the use of the stages of development

Stages of development of the Scrum/XP methodology:

- Phase 1-definition of the project
- Phase 2-shaping machine
- Phase 3-kick Off
- Phase 4-Sprint 0
- Phase 5-starting of the processes

Phase 5 breaks down the steps to be taken to comply with the framework

- Step 1-Sprint Planning
- Step 2.-Sprint
- Step 3.-Scrum
- Step 4.-Sprint Review
- Step 5.-retrospective
- Step 6.-planning the next iteration
- Step 7.-lessons learned by iteration or sprint.

### CONCLUSIONS

- The lack of information on hybrid methodologies made complex research, because there is not enough documentation that helps deepen extensive content relating to this topic.
- According to statistics carried out in recent years, hybrid methodologies is are positioning slowly in the software development market, due to its quick adaptation to changes and get much more quick and efficient frameworks complying with the requirements of the customer.
- Through the study of two hybrid software development methodologies, it is concluded that EssUP is a methodology that follows the guidelines of the traditional methodology RUP; i.e., that still has as a main point the documentation of artifacts and Scrum/XP follows the guidelines of the Scrum methodology, in which the documentation is not so important , but helps to solve problems through daily meetings with the task force.
- The application of the methodology allowed to develop the system for teaching English to children, following the framework proposed by

the Scrum/XP methodology, making development more efficient and documented only what is necessary.

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A Northern technical college by the facility that gives us access to information from the library with all his books, magazines, articles and thesis projects produced, supporting information which serves as a guide for the development of the degree.

## RECOMENDATIONS

- Is especially recommended to the library of the technique North University purchasing documentation about hybrid methodologies, so that students who need to deepen knowledge on this subject, have access to accurate information.
- Is recommended that in the career of engineering in systems computing of the University Technology North, inserted as a subject in the curricula of study hybrid methodologies, so that students acquire knowledge from the first levels and deepen research on this type of topics.
- Recommended the use of the methodology of software development Scrum/XP in the design of software products, since the mixture of the practices of these two methodologies that are a hybrid constitute a framework for efficient and fast work with values that keeps the development team on a good working environment.
- It is recommended to use the standard ISO/IEC 12207 as needed evaluate and collate work comparative in software development area, since they contain specific parameters of the software life cycle.
- Recommended using the Scrum/XP methodology for the development of software, a good choice, because the best communication which has the team is using the kind of meetings that proposed this methodology, in which resolve problems emerging during the implementation of tasks assigned by each Member of the team.

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