

# OBJECTFLOW: A WORKFLOW ENGINE TO CERTIFY CONTENTS IN HIGHER EDUCATION COMMUNITIES

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*Consequently of the analysis and design of the propose platform, it has been decided to construct a workflow engine to certify content in the Higher Education Communities. The present article shows the development of the construction of this tool.*

## 1. INTRODUCTION

Emptiness in the certification of content for the virtual communities of higher education has been detected; the content of this site is uploaded generally by different users without taking standard of revision and a pertinent evaluation.

Several open source workflow tools were observed, in the previous article it had been selected as core tool CuteFlow, nevertheless actually, this tool does not fulfill standard of the community and integration to be will see affected.

Therefore, the alternative was analyzed to construct a workflow engine that fulfills the expectations.

## 2. OBJECTFLOW DESCRIPTION

ObjectFlow is a tool that looks for the efficiency in the revision of content, is described like a workflow engine, was elaborated with programming language PHP and uses MySQL as data base.

The different options that tool contains are:

- User authentication.
- Management of users, including roles and states.
- Workflow management.
- Management of instances of workflows.
- General information of workflows.

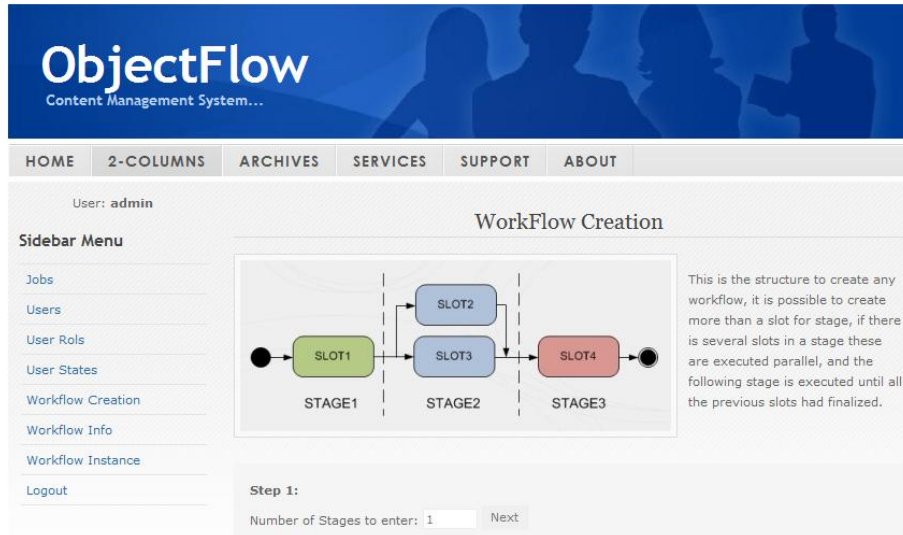


Figure 1 - ObjectFlow Prototype.

### 3. REQUIREMENTS ANALYSIS

This Use Case diagram describes the general and most commonly used end-user functionalities that will be development in the system.

Initiating with actors, the system includes these four kinds:

- User: They are the people who belong to the virtual community; they look for information to acquire new knowledge.
- System Administrator: The administrator is the person dedicated to system management, guaranteeing of certain way the availability of the system.
- Mediator: The mediator is the person who belongs to the professional community; they are the ones in charge to certify the information through a process of workflow.
- Professional: The professional is the person what add new information in a workflow, for the further revision.

In addition, the four actors are generalized in one only, like human resource, since these four actors to carry out the same task of doing login and logout in the system

Then, we have the activities for each actor, the user has the knowledge acquisition through search in the site; the System Administrator is the responsible of the management of the system; the professional can add new information; the mediator must certify of some way the information what the professional submit.

In addition the use case of mediating the information is extended through four cases of use as follows: to check the information, to fix the information, to approve or to deny the information.

Also the professional community is in charge to enter documents to the system that later will be reviewed by the committee, that is to say, the mediator.

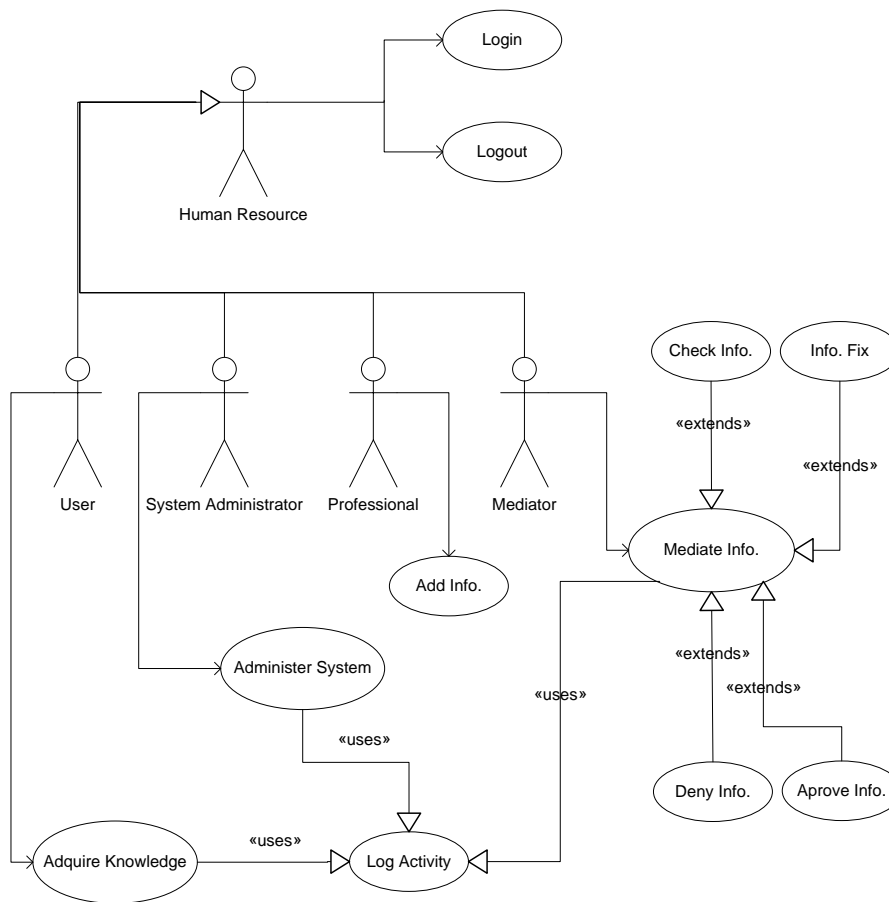


Figure 2 - Use Case Diagram

Also, it is necessary to diagram the way of interaction of the users, in diagram of collaboration, of a simple way, any user it produces document, soon reviews it to a mediator, if it considers document correct publishes then it in dataset.

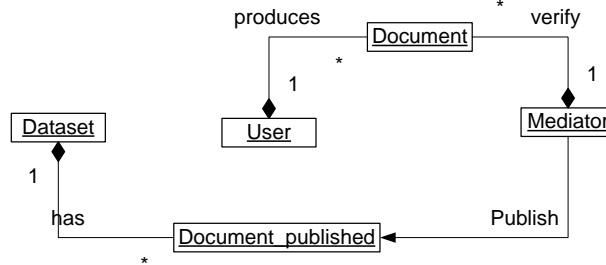


Figure 3 - Collaboration Diagram

The certification process will elaborate through workflow, this workflow can correspond to a state diagram, in which, a document is submitted to the system and a mediator will verify that document to approve it or to deny it.

Table 1 – Roles of Virtual Community

Administrator	To administer the servant of the virtual community and must update repository.
Professional community	To update and to verify the data integrity in the contents on which the system will be based.
Professor	To teach courses on line and must provide information to the server with video.
Student	To learn the content of the assigned course.
General Community	To review, to read, to suggest and to criticize everything about the subjects of the virtual community.

Another very important diagram is the entity relationship diagram, in which, the model relates entities and attributes.

The fundamental part of this diagram is the registry of users, to be able to manage the access of the community. In addition, depend of the role that a user carries out, this user will be able to access to certain tasks, for example, a professional user can submit documents for the further revision, also there is a document entity, and therefore it is created a document\_flow entity that will represent the stages by which it will advance the process.

Another important entity is log; log is an element that keeps all the activities realized by a specific user, this will be used for verifying in a future some problem that takes place.

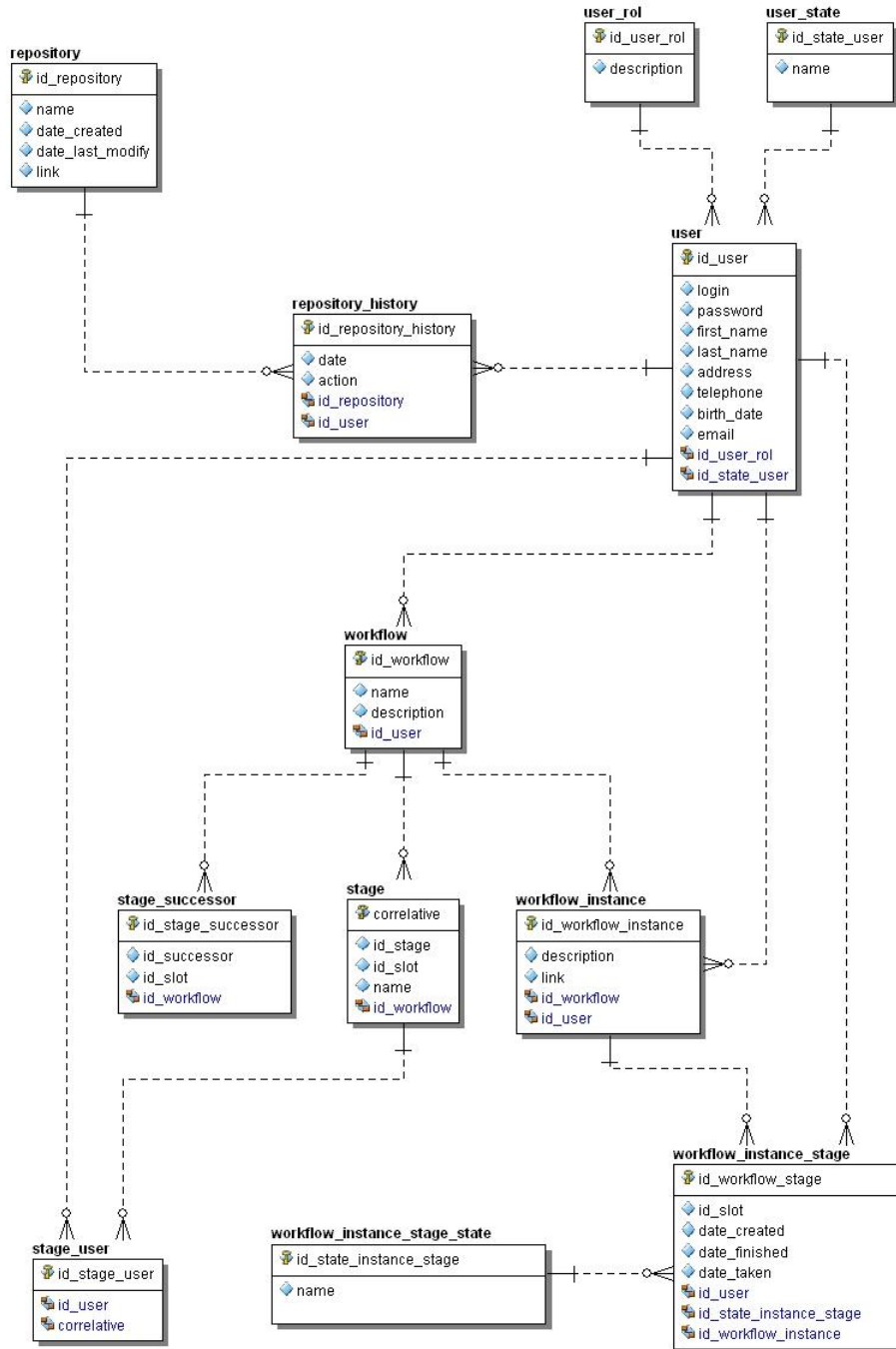


Figure 4 - Entity Relationship Diagram

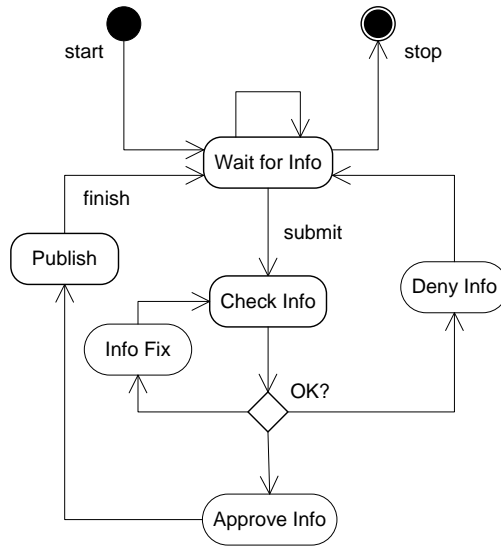


Figure 5 - State Diagram for Certification Process

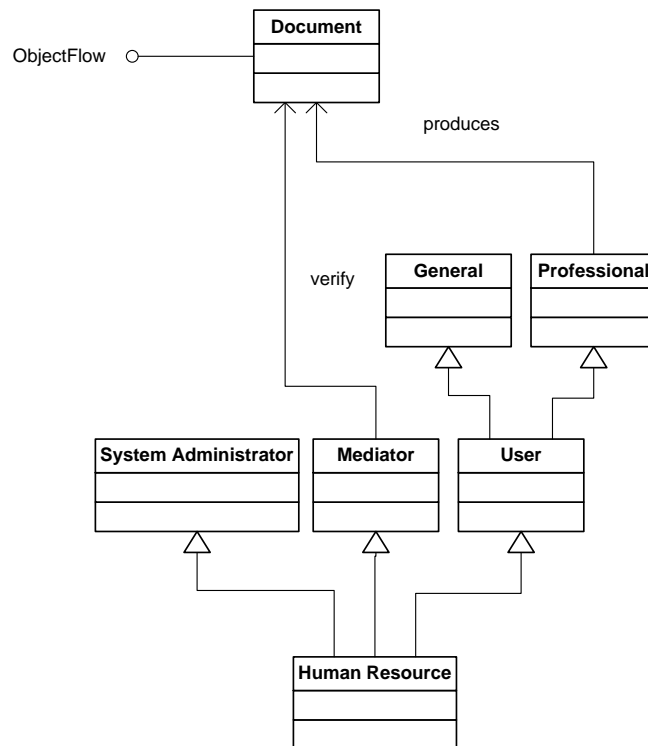


Figure 6 - Class Diagram

Here is the flow of information of a basic way, only is for illustrating the communication between the elements.

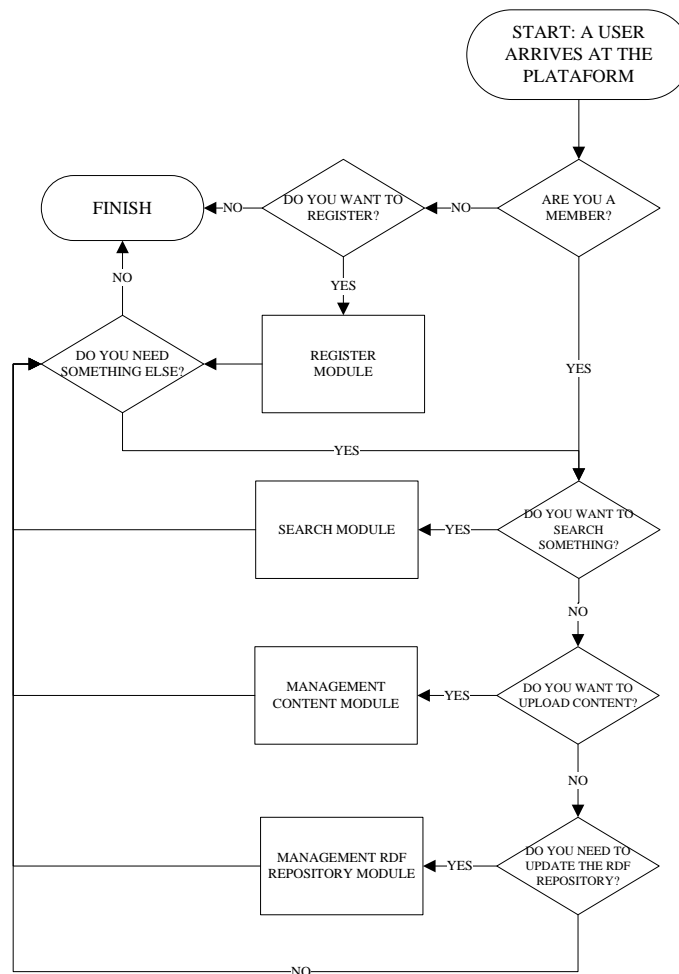


Figure 7 - Information flow

### 3. SYSTEM ARCHITECTURE OVERVIEW

The system architecture contains 3 layers, an architecture very simple, the architecture is Web-based.

The first layer is composed by the applications servers and data bases, in addition the interaction with external packages is contemplated, and that will help to improve the system.

The second layer is composed by the Web application, in which, the administrator of the site and the mediator of the information interacts, the mediator is in charge of the certification of contents.

The third layer is composed by the users of the system, generally, would be the virtual community.

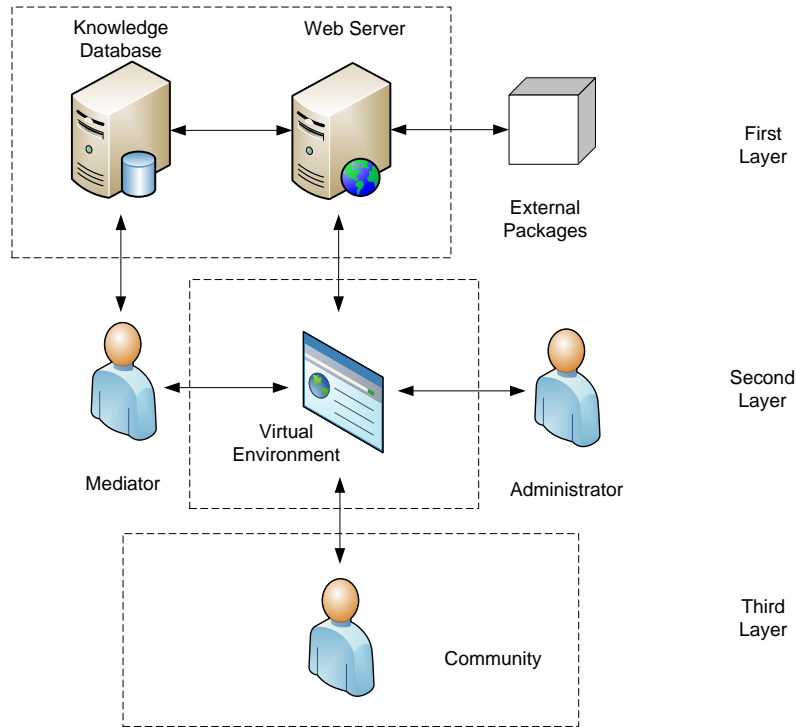


Figure 8 – System Architecture

The life cycle of the virtual community is hoped that it doesn't dissolve, and then will stay in the stages of evolution and operation.

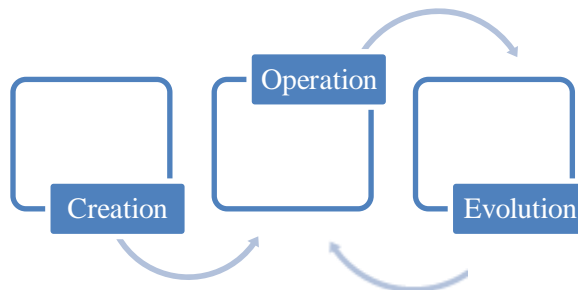


Figure 9 - Life Cycle of Virtual Environment.

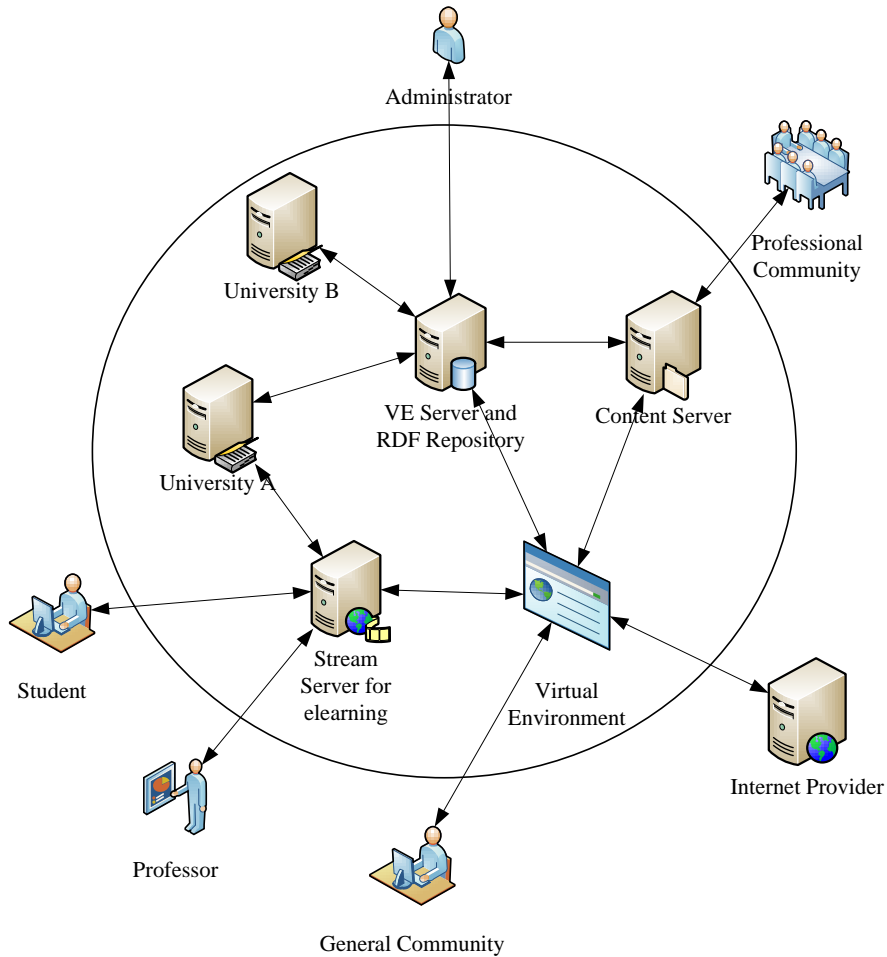


Figure 10 - Reference Scenario of Virtual Environment

#### 4. INFORMATION TECHNOLOGIES STANDARDS OVERVIEW

The technological tools that were used are:

- PHP DataGrid: it is an open source tool, programmed in PHP. At the moment it is the version 4.2.2. PHP DataGrid is operating system independent. You get it works on both Linux and Windows. You need following components are installed: PHP 4.4.4 script engine or later, Apache 1.3 or above and mySQL 3.23 or above

Some characteristics of the tool are: PHP DataGrid counts with CSS embedded templates; Column's Sorting; Column's Filtering; Paging; Automatic validation; Client side; View mode; Tabular layout; Columnar layout; Template layout; Add new mode; Edit mode; Tabular layout; Columnar layout; Template layout; Details mode; Columnar layout; Template layout; Delete mode; Printing; Exporting; Multi-Database support; Multi-Language support; Multi-Browser support; W3C CSS validation; WYSIWYG editor; Columns summarizing; Multi-row operations; Delete (embedded); Details (embedded); custom

- GraphViz: It is an open source library that from a textual graph makes an approximated graph of graphic way. The DOT language assumes at least the ASCII character set. Quoted strings, both ordinary and HTML-like, may contain non-ascii characters. In most cases, these strings are uninterpreted: they simply serve as unique identifiers or values passed through untouched. Labels, however, are meant to be displayed, which requires that the software be able to compute the size of the text and determine the appropriate glyphs. For this, it needs to know what character encoding is used.

All Graphviz programs have a similar invocation: `cmd [flags] [input files]`  
If no input files are supplied, the program reads from stdin.

The application will be a Web solution; the application will contain elements of management of users, document management, as well as workflows for the certification process.

The information technologies to use are as follows:

- Operating system: The operating system that will be used Windows XP as platform bases.
- Web server: APACHE.
- Data Base Server: The database server who will be used is MySQL.
- Programming language: PHP.

## 5. RESULTS

The only realized tests were those of verification of operation of the tool. Which totally were satisfied with respect to the objectives drawn up.

In the future work it is hoped to realize time tests, efficiency, errors to evaluate the performance of the tool in a real environment.

## 6. FUTURE WORK

The future work for this tool consists of several points:

- The unit of reports and statistics.
- Correctness and improvement of some aspects in performance and graphic environment.
- The complete unit of workflow management, thus like statistics of times averages and evaluations of performance.

- The Unit of intelligent searches through the ontology will be pending, for further developments.

## 7. CONCLUSIONS

The value added to this investigation is the application of concepts of VE to obtain that the community develop the knowledge management of the area.

ObjectFlow is a web-based contents circulation and workflow tool. Users are able to define "objects" which are sending step by step to every slot or user in a list. It is an electronically way for doing document circulations.

It is important to develop new educative methodologies, which must be oriented towards the facilitation of virtual resources and in the diminution of costs in mobilization concepts. Therefore, this project motivates the professional community to create a collaborative environment, where knowledge management is promoted, and in this way to increase the level educative. These objectives can be reached through a virtual community.

## 7. RECOMMENDATIONS

- To stimulate the educative communities to propose or to use a standard for the management of contents with base to a previous analysis of the needs of the community.
- To promote the creation of educative virtual communities to increase the level educative of the region.

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