THE WEBLABS- DESIGNED FOR ENGINEERING DATABASE EXCHANGES

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Abstract: *The engineering developments implicates interdisciplinary efforts. On the other hand, experiments costs become too high, even the scientific idea is brilliant. It means that the engineering network research become a possible way of sustained research. The web databases for different techniques offers the networked contribution to the reengineering and change management. The paper offer the designed logistic via XML- PHP technique. The paper offers the related connection to the virtual lab, as thermometer, wind measurement system, remote optical measurement system, for demonstrating the possibility of change methods in the frame of reengineering task.*

Keywords: *webdatabase, SCADA, measurements, virtual labs, data exchanges, reengineering, XML, php*

I. INTRODUCTION

1.1 Concepts

WebLabs is creating new ways of representing and expressing mathematical and scientific knowledge in communities of young learners (10-14 years). The focus is on collaborative construction, description and interpretation of how things work. Our aim is to transform the web into a medium in which European students collaboratively construct and critique each others' evolving knowledge and working models.

WebLab is investigating mathematical and scientific concept in three knowledge domains: numbers, big numbers and infinity, kinematics and dynamics, and complex systems. A further component will be tangibles: we are building an interface with physical devices together with the set of sensors and actuators capable of instantiating a two-way mapping between experiments in the real and virtual worlds.

Some of the most important reasons of “virtual learning and research” are summarized:

- Engineering Education Needs
- More involvement of off-campus faculty in teaching students
- More planned outreach instruction from campus
- Distance & time are the main constraints.
- Knowledge based databank
- Remote Real-Time Control & Collaboration

1.2 Educational Point Of View

In addition to providing vastly superior educational environment and material, the solutions are extremely cost effective making its adoption easily affordable by any educational institution. Up till now, the hardware needed to implement a meaningful lab for students suffer from the following factors:

$ High acquisition costs, costly repairs and maintenance costs
$ Difficult and sometimes unsafe to operate by young students
$ Need expensive lab bench space
$ Incompatible with internet technology

The educational software or paper texts used to deliver education to students often suffer from the following:

$ No interactivity to guide and encourage student learning, lack of multimedia enhancements to make material more interesting or easier to comprehend.
$ Costly to students with texts often approaching $100.
$ Poor response to feedback. Content improvements occur slowly. The convenience of online graphing and calculation aids not available.

A revolutionary new instrument e-LAB fully integrated into on line lab content WEBlabs provide the solutions to overcome all the above stated problems.

1.3 Research Point Of View

All too often it was the technologists leading the charge with scant regard for pedagogical aspects. There is a growing realization that the time has come to take a step back, reflect and proceed in a manner that respects learning processes whilst realizing the full potential that ICTs can offer eLearning. WebLabs tackles the field of science and mathematics and looks at new means of representing and expressing this knowledge in European communities of young learners.

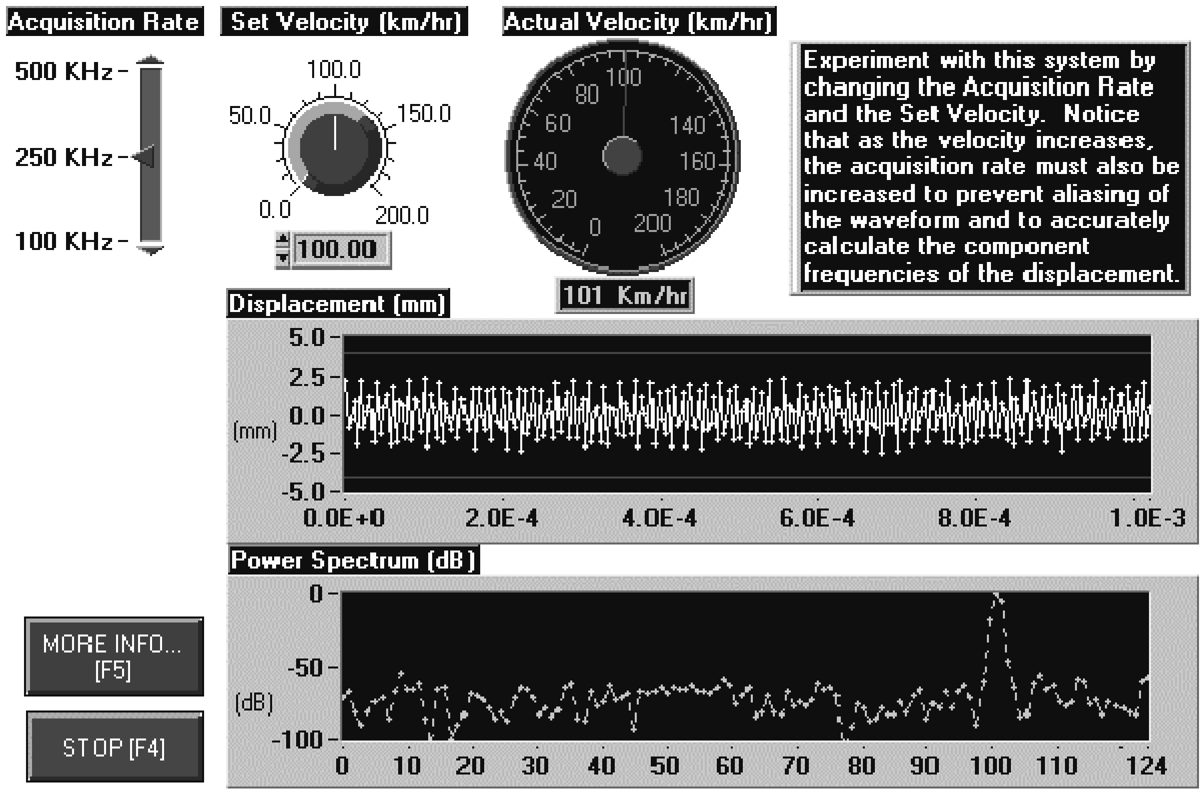

Fig.1. *Web- based vibration measurement system- lab setup*

The central tenet of WebLabs' research is to design and create new ways of representing scientific knowledge in communities of learning which exploit state-of-the-art technologies to enhance learn ability and accessibility across Europe. The team will focus on collaborative construction, description and interpretation of working models of mechanisms and the sharing of knowledge across cultures and countries.

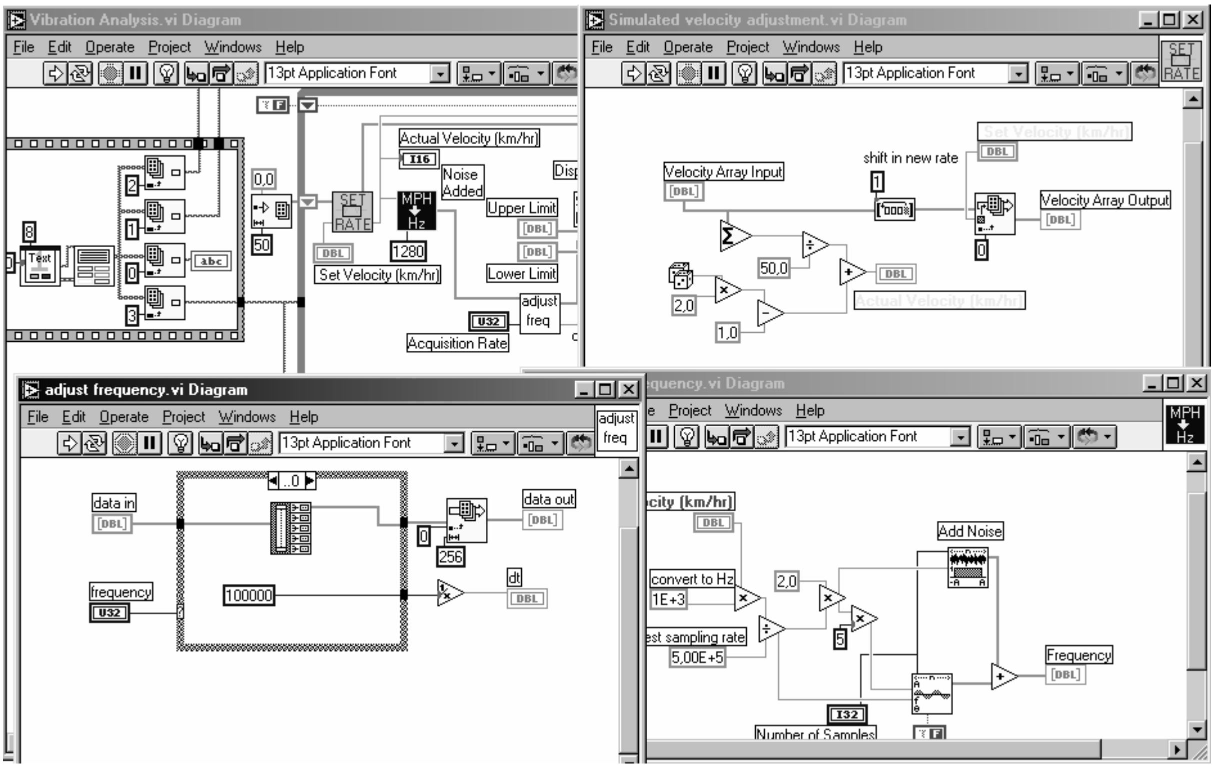

Fig.2. *Data flow model of the front panel lab setup- digital signal processing phase*

Changes in representational infrastructure (the ways in which knowledge is represented) are intimately linked both to learn ability and to the democratization of intellectual power i.e. the extent to which less privileged groups in Europe can gain access to knowledge. Systems depend on the particularities and interconnectedness of the representational infrastructure in which they are expressed for their learn ability. They are also dependent on the extent to which they productively exploit multimedia tools.

II. REUSABLE ARCHITECTURES

Therefore to rise to this, a system which is at once open and accessible, that offers students/educators/researchers a functional portal into operating within new, formal worlds, yet simultaneously allows them to see what works and how it works, is called for.

The main condition related to these is the development process of reusable architectures, like frameworks or products lines, in order to provide support for different development activities.

There are different starting points for building reusable architectures, each with emphasis on other activities: based on the generalization of several similar applications, on the reengineering of legacy software, on pattern language, or completely new systems, or models. All approaches require a smooth cooperation of stakeholders, whose roles vary in different development phases.

There are three kind of competences what are implicated in the continue process of development: domain expert, developer of reusable architecture, developer of the application.

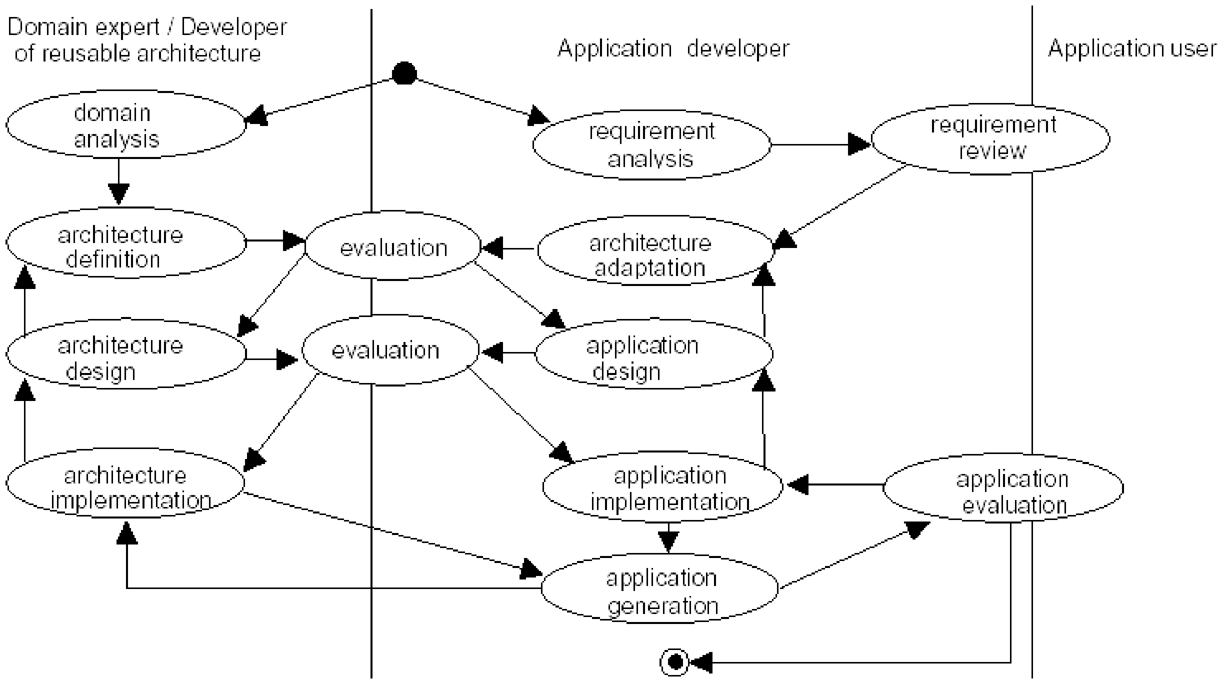

Fig.3. *Some of the identified activities in a reusable architecture [3]*

III. PROBLEM SOLVING

Usually, specific field solution offers a solving pattern. By applying PHP- XML techniques, the main benefit is open –source facility, open- platform tool, data mining solution.

For the first stage of the development process, requirements for a particular domain need to be acquired. To reach good results, a close cooperation between domain experts and developers is necessary. The domain experts specify the variable and common parts of the architect- developers and application users during the evaluation of an application. The architecture developer may request new or missing properties as a result of the evaluation. Every evaluation development results in extensions and changes. Each changes affects the maintainability of the particular reusable architecture.

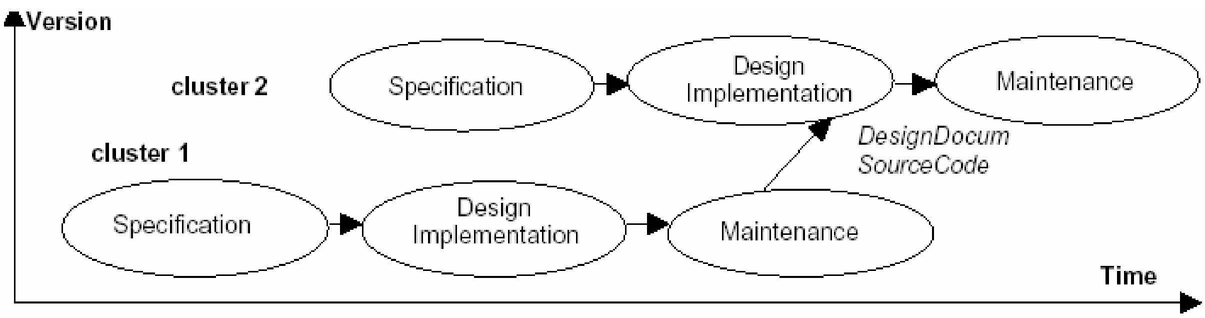

Fig. 4. *PHP- XML opportunity of software maintainability in reusable architecture*

The process structure shown in figure 4 explains the information management for a reusable architecture by PHP- XML cluster structuring. Benchmarking activity uses the three competences for dynamic evolution. Based on object-oriented methods, K. Khang and K.Cohen [2] introduced Feature Oriented Method as a domain design strategy, as a product line management.

Once an organization has defined its maintenance process, software reengineering tools provide support for the migration of legacy software systems into the new maintenance environment; in particular, they provide support for:

- *to capture design information and to comply with standards*
- *to restructure the system, even if unstructured*
- *to retarget and resource the code and to support and encourage reuse*
- *to assess the system*
- *to elicit business information embedded in the application, and to use them in performing a more general reengineering of the overall company's business process.*

Based on the fact that software systems evolve during and after development, but requirements for evolution is hardly ever addressed at the start, Application Evolution aims at providing software built specifically to facilitate evolution.

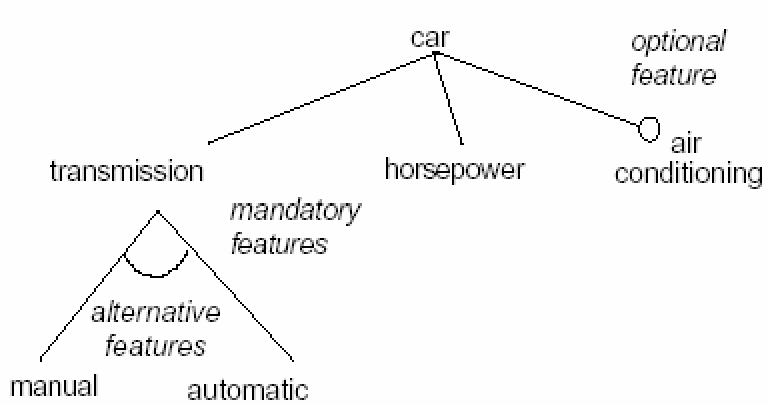

Fig. 5 *Feature diagram example- as a Feature Oriented Method*

IV. SOLUTIONS

IV.1 e-Lab

By building together the three experts parts, the developing activity become more difficult, more complicated, and require new information management techniques. The e-LAB, is a real instrument that has dual channel high-speed data acquisition, signal generation and multiple user controlled devices. Capabilities of e-LAB are equivalent to a complete suite of laboratory equipment. Its operational face (computer based control panel) can look as simple as a battery or as complex as a bench-full of engineering instruments with the following real capabilities:

$ **Functions Features Dual channel - digital storage oscilloscope**
Strip chart recorder
Dual digital voltmeter
Digital frequency meter
Waveform segment analyzer
Continuous spectrum analyzer
Triple power supply

$ **Function generator Rear connection to PC Parallel Port**
Triggered with AC or DC Coupling
Scope or Real-time Record Mode
16 frequency ranges in scope mode
Triple Power Supply 5v 500ma & dual tracking 0- 8v 250ma
Store results to disk or print
Built-in DC, RMS, PK to PK and Frequency Meter (10Hz to 2MHz)

10 gain ranges: 5v/dv to 5mv/dv
TTL level square wave generator 0- 2MHz, crystal controlled
0-5v peak sine wave generator 0- 2MHz, crystal controlled
3 bit Output for Control Purposes

IV.2 WEBlabs

Because e-LAB is a computer-controlled instrument, it permits a totally integrated approach to delivering lab experiments on line. By embedding custom instrument control panels for each lab, doing lab experiments is made safer and easier. The advantages of this integrated WEBlab delivery system include the following:

- Built in interactivity ensures comprehension and prevents mindless data taking; easily provides colorful supporting multimedia to clearly illustrate theory or procedure
- Permits immediate and easy access to unlimited internet resources for research; provides timely helpful tutorials
- Built in graphing aids and report templates rewards students with clear and useful reports, allows instant student feedback to permit rapid continuing improvements to overall lab presentation
- Web based material can be quickly revised and updated; good material is easily disseminated to a worldwide audience
- Makes teamwork and collaboration easier

IV.3 TRANSPARENT MODULES ACT AS BUILDING BLOCKS

Students will construct models [1, 4] of knowledge domains in terms of a representational infrastructure that will be built using software designed in the form of transparent modules. These have three defining characteristics:

$ *they are simultaneously re-usable and transferable for building more complex functionalities;*
$ *they are shareable;*
$ *they can take on multiple grain sizes according to diverse learner needs.*

To do this requires transparency in the sense that the mechanisms (how and why the modules work) can be easily inspected and modified. To maximize the inspectability and appreciation of a module's functionality, WebLabs will adopt multimedia and multimodal means. To be able to be modified, implies that in the development of TMs, WebLabs must go beyond the ability to combine Web component technology [4]. They must explore how modules can be adapted according to the needs of a range of educational activities, which again depend on the requirements of diverse European curricula and classrooms.

V. REFERENCES

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