REV2016

13th International Conference on Remote Engineering and Virtual Instrumentation

Impressions of the Conference

- Recorded Sessions
- Recorded Special Session eMadrid
- REV2016 Photos on Flickr

Presentations

Keynotes

- Javier García-Zubía
- Johann M. Marquez-Barja
- Russ Meier

Invited Presentations

- Miguel R. Artacho
- Baltasar Fernandez-Manjon
- Elena González-Blanco
- Reinhard Langmann
- Teresa Maria Restivo

Date and Venue

24-26 February 2016, UNED, Madrid, Spain

Overview

The REV conference is the annual conference of the International Association of Online Engineering (IAOE) and the Global Online Laboratory Consortium (GOLC).

REV 2016 is the thirteenth in a series of annual events concerning the area of remote engineering and virtual instrumentation. The general objective of this conference is to contribute and discuss fundamentals, applications and experiences in the field of remote engineering and virtual instrumentation. With the increasing of the interest of new scientific and engineering applications of remote services, education applications and collaborative environment as well as the projects being developed in this area, and the Institution and Organizations (public and privates) interest in new developments like Internet of Things, Industry 4.0, cyber security, M2M and smart objects. Another objective of the symposium is to discuss guidelines for education in University level for those topics including new technology applications, MOOCs, Open resources and STEM pre-University attraction. REV 2016 offers an exciting technical program as well as academic networking opportunities during the social events in Madrid.

Co-Organizers

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Competency-based learning management systems

Practices using remote laboratories to improve the use of the subjects and get required competences

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***Abstract* — In the study of technical matters the realization of practices keep a relevant importance to improve the use of the subjects since allows to students to carry out processes, measures, experiments, etc.**

Moreover, students in Master degree level require a high level of specialization which helps them to get required competences.

With this research work on competency-based learning management systems we are determining user's needs as well as technological applications in order to get to students the required competences, specifically the case of the use of remote laboratories to improve the academic progress in different subjects.

Keywords— remote labs; lms; rlms; competency-based learning

I. INTRODUCTION

The competency-based education model aims to provide to students the competences [1] and/or abilities required by labor market [2], [3]. In the branch of knowledge that includes the study of Engineering and Architecture, the practical realization of processes, measurements, experiments, etc. is presented as a fundamental activity for the acquisition of the required skills [4].

As a part of educational resources, remote labs are being implemented by a large number of educational institutions. The use of these laboratories has clear advantages for both institutions and students. The advantages for institutions could be didactics and organizational [5], [6], [7], [8]. Among these advantages for institutions they are:

1. Reduction of the space needed to implement the laboratory, since students do not have to be present in it.

2. Reduction of equipment, as only the necessary instrumentation for the experiment is needed, not one for each student or group of students, while full equipment for remote laboratory would be more complex.

3. Better exploitation of the laboratory, as could be used throughout the day, rather than only during the hours of presence of teachers in the center.

4. Allows the implementation of comprehensive and truly at distance/on line studies.

5. Costs reduction on maintenance and breakdowns by misuse.

6. Improves the image of the institution

The main advantages for students would be:

1. The possibility to perform practices in longer hours, better harmonizing the studies and working life of students.

2. More time for experimentation, depending on number of students and laboratory availability.

3. The possibility of repeating the practices in different date in case of doubt or not understanding a concept.

4. Carrying out of practices from home, avoiding travel to the center and wasting time travelling.

5. Promotes independent and collaborative learning according to EEES requirements.

Obviously certain disadvantages are also present from an educational point of view which must be assessed in each case:

1. The students can have a sense of unreality, as they are conducting the experiment without their own hands.

2. The experiments could be performed by different person than logged, what could not guarantee that students have really performed the experiment.

A priori, the competency-based learning management systems should contain, enable or facilitate the access to remote labs with those to perform the needed practices.

With this research work we have tried to know the opinion of potential users (teachers and students) about remote laboratories, from the point of view of how to improve the use of different subjects if remote practices were held in them.

II. USER'S OPINION

To know the opinion of users of remote labs we have raised few questions to teachers of engineering studies and to students on the Master degree level, always in the field of use of the subjects to acquire the desired competences. The survey has been proposed to a sample composed by 135 teachers (ETSII-UNED) and 56 students of Master of Information and Communication Electronic Systems, offered as distance studies by UNED. The responses were measured considering

its conformity and/or accordance with the question raised, by assigning to 1 a valuation "strongly disagree", and to 5 a valuation "strongly agree".

A. *Use of the subject with practices*

Clearly, each subject should be raised based on its contents. In the present case, students in Master degree level on studies related to technical matters, where a high level of expertise is required, and teachers on engineering matters, practices acquire a relevant value.

The opinion of teachers about whether the use of the subject would improve if it included practices has reached an average value of 4.7/5, with a rating close to "strongly agree". Students believe the use of subjects would improve with a rating of 4.1/5, rating close to “agree”, which differs a bit from the evaluation of teachers, so means that teachers have more confidence on including practices to improve the use of subjects.

30% of students chose values 3 and 4, while the value 5 (strongly agree) was chosen by 40% of them. In the case of teachers, the value 4 was chosen by 30% and the value 5 was chosen by the 70%.

B. *Performing practices remotely*

Once known that users (students and teachers) consider the use of the subject would improve with making practices, also would be important to know if they consider appropriate to perform practices remotely. This question is more important, if possible, because respondent students are studying in an university at distance and, the most of them, working alongside studying.

To this question teachers have responded with a rating of 4.5/5, while students have valued this issue with 4.1/5. Thus students' confidence in the remote practices is slightly smaller than that of the teachers, while still having a positive value between "agree" and "strongly agree".

A 10% of students chose the value 2. Values 3 and 4 were chosen by 20% of them. 50% of teachers chose the value 4. The value 5 (strongly agree) was chosen by 50% of teachers and students.

C. *Use of the subjects with remote practices*

Knowing the opinions of users on the inclusion of practices in the subjects and on performing remote practices, it is questionable whether the use of the subjects could improve if they are including practices carried out remotely. In this case, the average valuation of teachers and students has been 4.3/5, which means “agree”, (but it continues to be between "agree" and "strongly agree”).

Although the average value of both opinions is equal, however the answers were different in terms of values, but more similar between students and teachers. The value 2 was chosen by 10% of students and teachers; the value 3 by the 10% of students. The value 4 was chosen by 30% of students and 40% of teachers. The value 5 (strongly agree) was chosen by 50% of teachers and students.

The opinions of users are represented in figure 1 (teachers) and 2 (students).

III. CONCLUSIONS

As noted, from the answers provided by users of learning platforms, the realization of practices improves the use of the subjects allowing to students to have a better academic progress and get the required competences.

Furthermore, these users considering that remote practices are adequate for this purpose.

As a final response, users consider that the realization of remote practices, by using remote laboratories, improves the use of the subjects to obtain the desired competences. This aspect is more important on Master degree level where a higher level of specialization is requested by students.

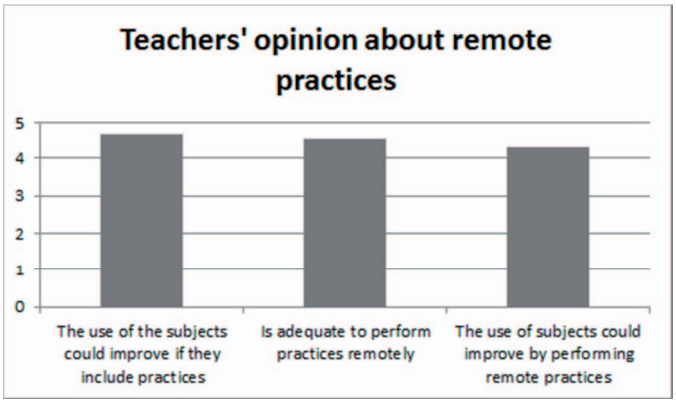

Figure 1

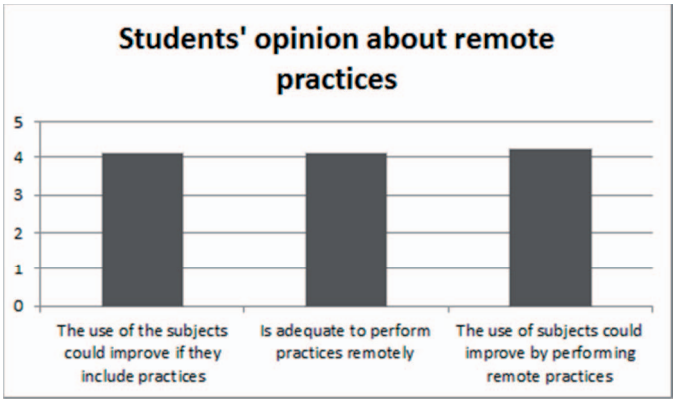

Figure 2

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