

# Internet Application for Flexible Learning of Control Engineering and Robotics

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## Session Type

Oral presentation

## Strand

The future is connected

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## Short abstract

This talk presents the development of a set of tele-robotic systems, funded by HEA Departmental TDG, to support control engineering and robotic courses. Technical details of the development will be presented. Experience working on this development will be shared, and outcome and impact of this development will also be discussed.

## Outline

In this oral presentation, the presenters will share their experience of developing a set of tele-robotic laboratory facilities in the University of Southampton. This development is done under the project “Flexible Learning of Control and Automation using Remote Laboratory” funded by the HEA Departmental Teaching Development Grant that has been running from January 2013 to March 2014. The tele-robotic system, applying the Internet technology, allowing students to run experiment from anywhere they are, as long as they are connected to the Internet. It carries the flexible learning theme, and in this conference, fits in the strand of The Future is Connected.

The presentation will start with standard power point presentation to inform audience the background of the project. Some technological and technical details about the facilities from the control engineering and software engineering point of view will be presented. The system design and the curriculum that support it will also be discussed to show how this development complements the existing learning and teaching activities. Beside the technical information, the activities that are involved during the duration of the project, including student engagement, team building, the outreach activities, publication and the impact of this project to the learning and teaching practice in the Faculty of Engineering and Environment where the outcome of the project is applied will also be shared to audience.

The benefit of this development, which is a type of a research induced learning and teaching practice, to the researchers, the students and the institution will also be discussed. Finally, some videos showing how the developed system works and also showing the activities in which students are involved will also be shared to audience in this presentation.

## Keywords

Flexible learning; Technology enhance learning; Tele-robotics; Remote laboratory; Hands-on training; Students as partner.

## Audience

This session is aimed at those who are involved in engineering education field, especially mechanical engineering, electrical engineering, computer engineering and computer sciences. It also aims at those who are interested in the development of technology to support learning and teaching process. It is particularly relevant to those interested in laboratory and hands-on training activities.

## Impact

This presentation is to show how to make control engineering education, which is often considered dry and difficult due to its mathematical nature, be more interesting, intuitive and engaging. From the trial that has been run within the presenters institution, the remote control facilities that has been developed improve students enthusiasm and interest to the control engineering module where these facilities are embedded. Student projects that are offered to students related to this development have also been oversubscribed.

This presentation is expected to also give ideas that hands-on practice is not bound in the laboratory, but it can be extended to outside the laboratory wall. The impact that this project has made in the University of Southampton, are expected to become an encouragement for others to follow this step. It is expected that this session will be an example of practice that can reduce the cost of real physical laboratory facilities, while giving an alternative for students to still do their practical training. This session will also show that teaching and research can go together, through this type of research induced learning and teaching practice.

## Key messages

1. A difficult subject can be made easier and more interesting if the right teaching technique is used
2. Engaging students in learning and teaching process will speed up their progress and motivate them to do even more
3. Hands-on practice is still the best way of teaching practical subject
4. Technology can really be useful to improve learning and teaching experience
5. Research induced teaching will benefit both students and tutors

## Links to HEA work

This development reported in this presentation is done under the project “Flexible Learning of Control and Automation using Remote Laboratory” funded by the HEA

Departmental Teaching Development Grant that has been running from January 2013 to March 2014.

Please check the box if the work to be presented has been funded by the HEA.

If yes, which funding scheme has the work been funded through:

Teaching Development Grant

Ron Cooke International Scholarship

Doctoral Programme

National Teaching Fellowship

Other (please click here to specify the type of funding)

Please check the box if you are a HEA National Teaching Fellow.

### Special equipment

Click here to provide details of any special equipment, space, etc. that you require. A laptop, projector and screen will be provided as standard.

### Live filming

Please check the box if you agree to your session being filmed and made available via the web.

### Chairing

Please check the box if you would be willing to chair another session.