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E-training in mechatronics using innovative remote laboratory

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Abstract

This paper describes a novel E-training developed for teaching mechatronics. The training has been developed as part of the Leonardo da Vinci lifelong learning programs and MeRLab project (Innovative Remote Laboratory in the E-training of Mechatronics). The primary target group are engineers or technicians who have already completed formal education in the field of mechanical, electrical engineering or other technical fields, but have no knowledge of mechatronics, although their job requires it. For the training, special E-learning platform has been built in the user friendly environment, which is based on combination of commercial eCampus platform and open-source Moodle platform. The complete materials with the animations, graphical presentations, tests and the utilities such as discussion forums are offered. In addition to E-learning materials, the remote laboratory experiments are also available. The training has been executed with a group of 70 participants from Slovenia and second group of 6 participants from Austria. 90% of participants have successfully finished this quite extensive training. Results of anonymous survey show that they have evaluated the training as excellent and think that the gained knowledge will be useful in their further career.

Keywords: Remote laboratories; Distance learning; E-training; Adult education; Mechatronics

1. Introduction

In the European countries, the number of jobs that require the knowledge of the skilled professionals in mechatronics is increasing. Mostly, there are not enough officially educated mechatronics professionals in the job market, since mechatronics educational programs have been introduced quite recently and not many have finished it yet. The consequence of the lack of trained mechatronics professionals is that electrical and mechanical engineers often occupy those jobs. Since, mostly, they do not possess the required expertise, this can lead to dissatisfaction of both the employees and employers. Additional education could solve this problem, however for the most employed professionals, it is hard to engage in any kind of formal education, which requires their physical presence at specific place and time without sacrificing their family time and social life. E-training in mechatronics can at least partially solve both problems.

However, introduction of the distance learning in the engineering education brings some additional educational challenges. Namely, for the engineering education, it is especially important to give the participants a possibility to gain some practical skills by working on the real devices. In distance learning, this can be achieved only by implementing remote laboratories where the user operates real devices trough the Web [1–5]. In the field of mechatronics and automatic

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