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HAZARDS AND RISKS OF MACHINE-TOOLS: AN EXPERIENCE IN THE MECHANICAL TECHNOLOGY AND VEHICLES COURSE

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Abstract

The Higher Professional Technical Courses (HPTCs) consists in a training typology of Higher Education of short course and confers a Higher Professional Technical Diploma. They have a duration of four semesters and the last one is carried out in work context. The HTPC in Mechanical Technology and Vehicles (MTV) of the School of Technology and Management of Polytechnic Institute of Bragança (Portugal), is part of the Technology training area and integrates in its study plan the course unit (CU) "Safety and Environment", which is taught in the 2nd semester of the 1st year. The classes are theoretical-practical (2 hours per week) and the contents covers the theme of safety and hygiene at work and the environment, with greater incidence in the first theme.

Given the specificity of the HPTCs, it is important that in their CUs it promotes, whenever possible, a more student-centered learning, with a greater interconnection between the practice and the respective course. Therefore, during the 2017/2018 school year, in the context of safety thematic, it was proposed to a MTV class (21 Portuguese students and 1 from Cape Verde) to carry out a group work with a focus on the machine-tools (e.g. mechanical lathe, milling machine, drilling machine and saw) existing in the Mechanical Technology laboratory. Each group chose a machine-tool and the proposed work was divided into the following phases: characterization of the machine-tool; risk analysis (identification of hazards and consequent risks associated with the use of the machine-tool); legal and normative framing; risk assessment (application of one of the methods studied in the theoretical part); preventive measures to be implemented; presentation the work done to the class and questioning by the colleagues.

The evaluation and reflection about the pedagogic experience is based on the field notes registered by the teacher/researcher, on the students' productions and on a questionnaire that was applied to them during the last class of the semester. Regarding the contents of the CU, the difficulty most pointed out by the students was "to identify the legislation applicable to the situations in question", since 72.7% reported that they had had some or many difficulties. The distinction between the concept of hazard and risk was also one of the difficulties observed by the teacher during the classes, which was corroborated by the students, since 40.9% assumed

that they had some or many difficulties in the identification of hazards and 45.5% in the identification of risks. According to the students, the difficulties in carrying out the proposed group work were mainly due to the lack of attendance at classes (31.8% agree) and not being able to select the information that is relevant (27% agree). Even so, it can be considered that, in general terms, the experience was positive for the students' learning. It should be noted that the majority of students agree or fully agree that carrying out the group work and its presentation contributed, among other aspects, to clarify some concepts (100%), to feel more confidence in their abilities (95.5%), overcome some of the difficulties (95.5%) and increase their autonomy, not being so dependent on the teacher (100%).

It is also considered that the learning resulted from this contextualized work can be useful for other CUs in which the students have to use the machine-tools, and can also be an added value at the internship that integrates the course study plan.

Keywords: Higher education, learning in context, safety and hygiene at work, machine-tools.