Chapter 10
Concept of Automated Support to Problem: Modular Vocational Training

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ABSTRACT

The chapter deals with the concept of training for technicians, able to adjust to ongoing changes in the manufacturing environment. It is proposed to apply the systematic approach with a targeted use of collected methods and acmeological planning in a learning process when extra time is found owing to interdisciplinary integration and increased self-learning. Such planning is done with crosscutting design and problem-modular training with cross-rated instruction materials and learning outcomes. Education information systems are recommended as tools (like those based on modular object-oriented dynamic learning environment according to shareable content object reference model standard) together with automated information systems for self-learning, business and role plays with methods to rate career guidance and multimedia aids as learning tools.

INTRODUCTION

Technician training requires developed skills, abilities in project activities, teamwork, quick decision-making, and strict adherence to made decisions. This chapter introduces acmeological planning in the learning process to trigger hidden reserves. The authors search for reserves of training time at the expense of interdisciplinary integration (introducing the concept of the consolidated integrated interdisciplinary task) and increased self-learning (Zhuravleva, 2012). Planning is achieved through crosscutting designs and problem-modular trainings using cross-rated teaching aids and learning outcomes (Kolesnikova, 2009).

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To intensify the learning process within the same class, teams are formed during workshops, laboratory classes, and business games. Research and development (R&D) teams, which include students from different years and groups, allow undergraduates and junior students to share experiences from scientific and practical activities (Choshanov, 1996). At creative workshop sessions, teams are made within a brainstormed production task depending on student skill level. A level of solved tasks varies from local learning tasks to development of engineering systems following competitive tasks. The project-based preparation to competitions (for example, EUROBOT) has proven an advantage. Within an academic year, project teams use knowledge from different engineering courses to design robotics system under EUROBOT competition terms and conditions. Then, they defend their solution at college, regional, and international competitions (Vlasov& Yudin, 2011).

PROBLEM-MODULAR ENGINEERING TRAINING

Analysis of Processes and Methods of Transfer of Knowledge

Against the background of profound social change, the education system in Russia is in search of new ways to improve the learning process through fundamental and holistic student training. The learning process takes place during sessions in classrooms, laboratories, workshops, and extramural self-learning. Professors act as trainers, tutors, and supervisors students are active subjects within the learning process. Training facilities (or instruction materials) require different tools to present and visualize knowledge and information (Yudin, Kolesnikov, Vlasov, & Salmina, 2017). For the generalized scheme of encapsulated objects in training and education, see Figure 1).

Figure 1. Relationship between types of training and education