

Modular Technology of Corporate Formation of Blue-Collar Workers' Professional Competency

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ABSTRACT

Topicality of the problem under investigation is conditioned by implementation of competency oriented federal state educational standards and professional standards into the practice of blue-collar workers training, the mentioned standards being intended to disclose the host of functions of various blue-collar occupations and WorldSkills standards reflecting modern world trends in the field of formation and development of blue-collar workers' professional competences. In the meaningful aspect, today's standards identifying requirements to blue-collar workers training will define principles of selection and formation of competency oriented subject matter of training; however, the choice of training technologies quite often remains beyond the training standards. At the same time, the competency oriented training of blue-collar workers shall envisage application of the activity approach to organization and realization of the training and, consequently, of technologies of training based on the activity approach. The modular technology of training based on points of European concept of "Modular employable skills" can be one of such technologies. The purpose of the article is description of the authors' modular technology of forming of workers' professional competency under conditions of corporate training. The modular technology is described herein as exemplified by formation of professional competency of workers of the machine-building industry in field of lathe part machining. The article also includes results of an experimental approbation of a developed modular technology in conditions of plants' training centers. The investigation's leading method shall be a pedagogical educational experiment in process whereof the modular technology of forming of workers' professional competency which has been developed by the authors shall be approbated, the mentioned workers belonging to the machine-building industry in field of lathe part machining, whereas a worker's professional competency is regarded as an integrated aggregate of core competencies and occupational personal properties which lie in the base of the selection and structuring of the subject matter of training. Materials and methods: the pedagogical educational experiment allows exposing the efficiency of complex formation of the professional competency in trainees by means of applying of the modular technique of training and methodological support, that is, educational elements developed in line with requirements of Modular employable skills concept and supplemented with a set of production tasks performed directly on the job under the tutor's guidance. The following methods were used in process of the research: theoretical (analysis, synthesis, deduction and induction); diagnostic (methods of analysis and systemizing of scientific pedagogical literature; generalization and classification); empirical (modelling). The key results described in the article: the professional competency model of the machine-building industry workers; the modular technology of forming of professional competency of the machine-building industry workers; the methodological support elaborated in line with requirements of

Modular employable skills concept, plus results of the experimental approbation of the developed modular technology. The modular approach, possessing systemic properties, allows integrating the substantive basis of training formed in the competency-based format, processes of selection and structuring of the content of blue-collar workers' training reflected in the program documentation fixed forms, educational-methodological documentation represented by training elements, organization- methodological aspects of training, organization and realization of training which are also recorded in documentary form in line with requirements of Modular employable skills concept.

Keywords: blue-collar workers, corporate training, modular technology of training, training elements

INTRODUCTION

Under conditions of implementing of various competency-oriented standards into the field of education, emerging full blown is the issue of selecting technologies of professional competency of trainees, in particular, of blue-collar workers under training.

Analysis of theoretical approaches and of the developing practice of blue-collar workers training in industrial environment showed that the most efficient method of its organisation will be creation of corporate training centres as educational institutions of a new type the goal whereof is arrangement of the process of formation of blue-collar workers' professional competency with focusing on specific features and requirements of the corporate customer and accounting for the trainee's available level of training. A corporate training centre is a new type of an educational institution the goal whereof is organisation of training of blue-collar workers with focusing on specific features of the enterprise, on requirements of a developing production and on the trainee's available level of training [38]. Training centres are involved into training of persons without worker's qualification, re-training of blue-collar workers and their advanced training.

Basic approaches to intensification, improving of quality and efficiency of the process of training of under conditions of corporate training centres will condition necessity to apply the activity-oriented paradigm of education, that is, they will possess the following basic features: individualization of the training process; concentration of the subject matter of training into self-contained units; activity-oriented nature of the training process and performing thereof in the context of occupational activity; technologisation of the training process which allows ensuring of repeatability of the training process and re-training for a required number of times and with an equally high result [1, 2, 3].

The modular technology of training is one of the modern pedagogical technologies applied for educating for activities under conditions close to a production environment. Researches by P.A. Juceviciene, N.V. Borodina and N.E. Erganova, M.A. Choshanov N.G. Kalashnikova and M.V. Borzov, V.A. Degterev et al. are a great contribution into development of the theory and practice of modular training in Russia [4, 5, 6, 7, 8]; however, we cannot tell that by now there is any unified approach to understanding of the essence of modular technologies of training which would be agreed upon among authors of the pedagogical studies.

While analysing the process of projecting, organisation and applying of the modular training, P.A. Juceviciene, E. Crochet, P.F. Kubrushko and D.E. Nazarov, N.V. Borodina, D.G. Miroshin and TV. Shestakova, S.A. Kaynova state its systemic nature [3, 9, 10, 11, 12]. The authors of the studies believe that the modular training is a system which includes a specific organisation of the learning environment, selection of methods of knowledge transfer, methods of control and management of the process of training. N.V. Borodina & N.E. Erganova, E. Crochet emphasize the activity basis of the modular training and disclose its essence as a consequential step-by-step process of educating for an activity structured into completed professional actions, where for algorithms of performing the activity are developed which definitely result in achieving of the preset objectives of training controlled step-by-step [4, 9]. Objectives of training and algorithms of achieving thereof are presented as contents in special learning aids - "Training elements" - which can be used an infinite number of times with the same result of assimilation of their content, which conditions high produceability of the modular training.

The abovementioned features shall be disclosed in the training practice by applying of specially developed modules.

This article describes the modular approach to formation of workers' professional competency in process of their training in a training centre of the machine-building industry which allows complex accounting of both

today's trends of development of education and specific features of corporate customers of the trained labour power.

MATERIALS AND METHODS

Literature Review

At present most of training centres for blue-collar workers use informative forms and explanatory-illustrative and reproductive methods of learning (theory learning lesson, practical training lesson, lecture, narration, briefing, exercise, etc. Many researchers proved impossibility of efficient assimilation of professional skills and abilities forming the basis of the professional activity while using conventional informative forms and methods of teaching, as they possess a qualitative nature, envisage a focused specialisation, are oriented on an average trainee and do not allow achieving one and the same result for all trainees [13, 14, 15, 16, 17].

Low degree of efficiency in application of conventional forms and methods of learning for blue-collar workers corporate training is conditioned by the following reasons: individualisation of the training activity (a trainee does not acquire abilities to make collective decisions, agree and subordinate his/her interests to those of the collective in achieving of common purposes, abilities of occupational communication); lack of accounting for the company's specific features when forming subject matters of training; training apart from the professional activity (a content-related disruption between the academic and occupational activities); lack of accounting for an initial level of students' training and their individual features conditioning a different duration of assimilation of occupational knowledge, skills and abilities.

The reasons presented above allow stating that arrangement of training in conventional forms with use of use informative forms and explanatory-illustrative and reproductive methods of training of workers is not able to provide the required maturity level of professional skills and abilities and personal properties of workers in conditions of corporate training centres for a short period of time and with accounting for the modern production requirements.

In case of an individual form of training and re-training of blue-collar workers, training shall be performed directly on job, without discontinuing work and under a tutor's guidance. The "tutorship system" is in fact an individual training, as tutors work with one trainee only, and we must admit that the maturity level of professional knowledge, skills and abilities in a worker trained within this tutorship system is sufficiently high. Periods of individual training are versatile, so here we can speak about a high maturity level of professional knowledge, skills and abilities. On-job training is arranged in the context of a specialist's occupational activity, which raises the level of motivation for training, as a worker is able to practically master a useful art in the best possible way [18, 19, 20]. In case of an individual form of training and re-training directly on job, most of attention shall be paid at development of the organisational and psychomotor potential, but not to formation and development of professional mobility, creativeness, communicativeness, general professional and general technical knowledge, skills and abilities, which ultimately will increase a period of assimilation of a new technology familiarisation.

Thus, an inference should be drawn that the conventional training of blue-collar workers under conditions of corporate training centres, along with positive aspects, also possesses negative ones which cause a low level of training and low maturity of professional knowledge, skills and abilities required by the company. The problem of intensification and raising levels of quality in efficiency of training of workers in conditions of corporate training centres may be solved due to the activity-based, context-dependent, competency and modular approaches.

The activity approach is based on a man's training in process of an appropriate activity. When training workers within an enterprise, the activity approach is manifested in aiming of the training process at assimilation of professional actions within actual production situations, the nature and methods of arrangement of the training and professional activities, and in the goal set. The purpose of professional training within the activity approach is forming of a structure of a specialist's professional activity; however, there are certain differences between training and professional activities, the main wherefrom consists of results of its assimilating [21, 22].

A result of the professional activity is a definite product and professional skills and abilities in manufacturing thereof, while a result of the training activity shall be the ability to perceive and assimilate a training content. That is, formation of a trainee as a subject of the professional activity in case of the conventional training shall take place within the training activity which differs in its subject matter, nature, motives and objectives. Consequently, to form the professional competency in complex, it is necessary to arrange the process of training in such a way that the training activity would transit into the professional one. Transformation of the training activity into professional shall be performed in framework of the context-dependent approach.

The context-dependent approach, A. A. Verbickij, allows realizing the training in the context of a future professional activity by means of creating of actual production conditions within forms and methods of the training activity and solving definite professional tasks [17]. Within the context-dependent approach, not only the content

of the professional activity is modelled but also the professional and social environment it is realized in. A sequential transformation of the training activity into quasi-professional and thereafter into training-professional and professional shall occur, which is the basic condition for the promptest adaptation and professionalisation of a worker in the company. Thus, training within the context-dependent approach will be realized in the double context, that is, professional and social situations of the activity, which allows, by developing analysing abilities and orienting in production situations, to form communicative skills, creative thinking, self-discipline, and independent and active attitudes.

The competency approach presented in works by A.E. Okuneva, A.K. Markova, S. Shishov et al. resides in projecting of the subject matter of training on basis of composing and analysis of core qualifications assemblies which lie at the root of a worker's competency in this or that professional area [23, 24, 25]. Key qualifications will be selected from the core qualification bank on basis of analysis of the professional-oriented personality of an employee of a certain professional profile and have the form of two blocked structures: professional-qualification characteristics and professional-significant personal properties. The subject matter of training selected within core qualifications will be detailed on basis of analysis of the professional activity of an employee of a certain speciality within the preset profile. Methods of training shall be selected on basis of analysis of their abilities for complex formation of the singled-out core qualifications.

The modular approach described in works by P.A. Juceviciene, N.V. Borodina & N.E. Erganova, E. Crochet, N.V. Borodina, D.G. Miroshin, T.V. Shestakova, S.A. Kaynova, V.A. Degterev integrates ideas of the personality, individual, activity-based and context-dependent approaches [3, 4, 9, 11, 12, 7]. The modular approach implies arrangement of learning material as completed didactic units which are referred to as "a module" in the Modular employable skills concept developed by The international labour organisation and reflecting the systemic-activity approach to arrangement and realization of training. The essence is that the subject matter of training is structured into self-contained units which were referred to as modules whose volume and content are selected on basis of the systemic analysis of a worker's professional activity allowing for structuring of basic working operations and accounting for differentiation of trainees on their initial and final levels of abilities and skills, which allows creating an individual educational path for each trainee.

The modular approach, while excluding subject diversity of the subject matter of training, allows realizing the systemic process of training in a professional activity under conditions of a specially arranged spatial environment. The modular approach implies independent studying of learning material blocks in an individual rate and the prognostic (at a trainee's wish) incremental feedback, thus providing a self-governed reflexive educational process.

In framework of our research, two approaches – competency and modular – were selected as a scientific base for creating of a system of training of blue-collar workers in corporate conditions. Correlating of the essence and abilities of the selected approaches shows that they mutually supplement each other: the competency approach implies projecting of the subject matter of training on basis of creating of block-wise competency models consisting of core qualifications selected on basis of analysis of the professional activity. At the same time, not only the special-professional but also the social-personal aspect of a worker's activity will be taken into consideration.

The modular approach implies projecting of the subject matter in form of self-contained modular units selected and developed on basis of analysis of the professional activity by means whereof one or multiple core qualification units may be formed which service a special aspect of a worker's professional activity.

Within the modular approach, possibility of formation of a worker's personality professional qualities is foreseen which may be conducted in process of fulfilling of intermediate tasks on each modular unit. Integrating ideas of all the above mentioned approaches, the modular approach allows forming and developing a trainee's professional competency in the aggregate of all core qualifications and with accounting for requirements of the trainees and specific features of the company, i.e. formation of the integral professional competency of a future blue-collar worker.

Experimental Research Base

The research was conducted on the base of Personnel Training Centre of NMLK-Ural JSC, the city of Revda, the centre of supplementary vocational education of Kalinin Machine-Building Plant PJSC, Centre of personnel training in Ekaterinburg.

Investigation Stages

The research was conducted in 4 steps:

1. Determination of a problem area of the research and singling-out of the research problem.
2. Review and analysis of sources of information on the research problem and forming of the research methods complex in accordance with the set-up research problem.

3. Development of the modular technology model of forming of blue-collar workers' professional competency.
4. Development of the modular technology of forming professional competency of blue-collar workers in the machine-building industry in the area of turning works.

RESULTS

Task Assignment

The task of the research was the development and experimental approbation of the modular technology of machine-building workers training under conditions of a corporate training centre, with focusing on the specific features, material and technical equipping and the company's corporate traditions. In course of the experimental approbation, the model of professional competency of machine-building industry's workers and the model of the modular technology of training of machine-building workers in field of turning works were developed and realized in practice.

The Model of Modular Technology of Forming Professional Competency of Blue-collar Workers in Corporate Training Centres

The modular technology model of training of workers in corporate conditions consists of the following stages: the entrance test, the study of training elements of module, the current control of mastering of the content of training elements, the intermediate control and the qualifying job. The modular technology model of blue-collar workers training under conditions of corporate training centres is shown in [Figure 1](#). The modular technology is featured with a unit-wise structure: The entrance test unit, The study of training elements unit (TE) and The current control unit (CcU), The intermediate control unit (IcU) and The qualifying job unit. The study of training elements unit (TE) and the current control unit (CcU) will be a part the Module which is a logically completed unit of the training subject matter.

In *The entrance test* unit, when the answer is wrong, "No" option will imply necessity of studying of instruction sheets. In *The qualifying job* unit, "No" option will imply returning to one or multiple unassimilated Modules.

The entrance test is conducted in order to reveal the initial level of knowledge, skills and abilities of a trainee and individualization of modular programs. The entrance test shall be performed in form of testing with 100% performing of all test assignments.

In the case when a trainee does not pass the entrance test, he is offered to study instruction sheets containing basics of requirements to an admitted person in form of the reference signal system, that is, abridged diagrams and tables. Studying of instruction sheets shall be performed by the trainee independently; thereafter the entrance testing is made again if the result is positive.

Studying of training elements within each modular unit shall be performed by trainees independently in their individual tempos. The consequence of studying of training elements may include training elements of all categories and have one or multiple inputs and one output only – the training element of category 02 – activity, as in result of studying of the modular unit the trainee will have his skills of fulfilling their professional activity formed which are scheduled in the modular unit. Each training element includes, apart from the coordinating and informational components, the controlling component which serves for current testing. This current testing shall be performed by the trainee's initiative. In the case of the positive 100% fulfilling of all test assignments, the trainee will transit to studying of the next training element; in the opposite case, the trainee will return to studying of an unassimilated training element. Upon studying of all training elements within the modular unit, intermediate control on the modular unit shall be performed in general. The intermediate control shall be performed as testing and fulfilling of a practical task (Pr.task); if 100% of answers to all test assignments are correct and the practical task is performed satisfactorily, the trainee will transit to studying of the next modular unit; in the opposite case, he will return to studying of the modular unit content.

Practical tasks shall be performed after studying of each modular unit, in process whereof a trainee shall master a system of non-standard knowledge, skills and abilities for fulfilling thereof and successive passing of intermediate control of assimilation of the material learned.

When fulfilling practical tasks, a problem situation of selection of the technique to produce a part or a unit will emerge, which will condition formation of the personality's professional qualities, more specifically, creativeness, professional activity, professional mobility and professional communicativeness.

Trainees in process of fulfilling practical tasks, while interacting with each other, their instructor, engaging the available experience and knowledge, will find various methods of performing activity on basis of general data about them, arrange their own ways to act on basis of those assimilated when studying the modular unit. The trainees' activity in searching of solving certain problem tasks presented in framework of the practical tasks is a

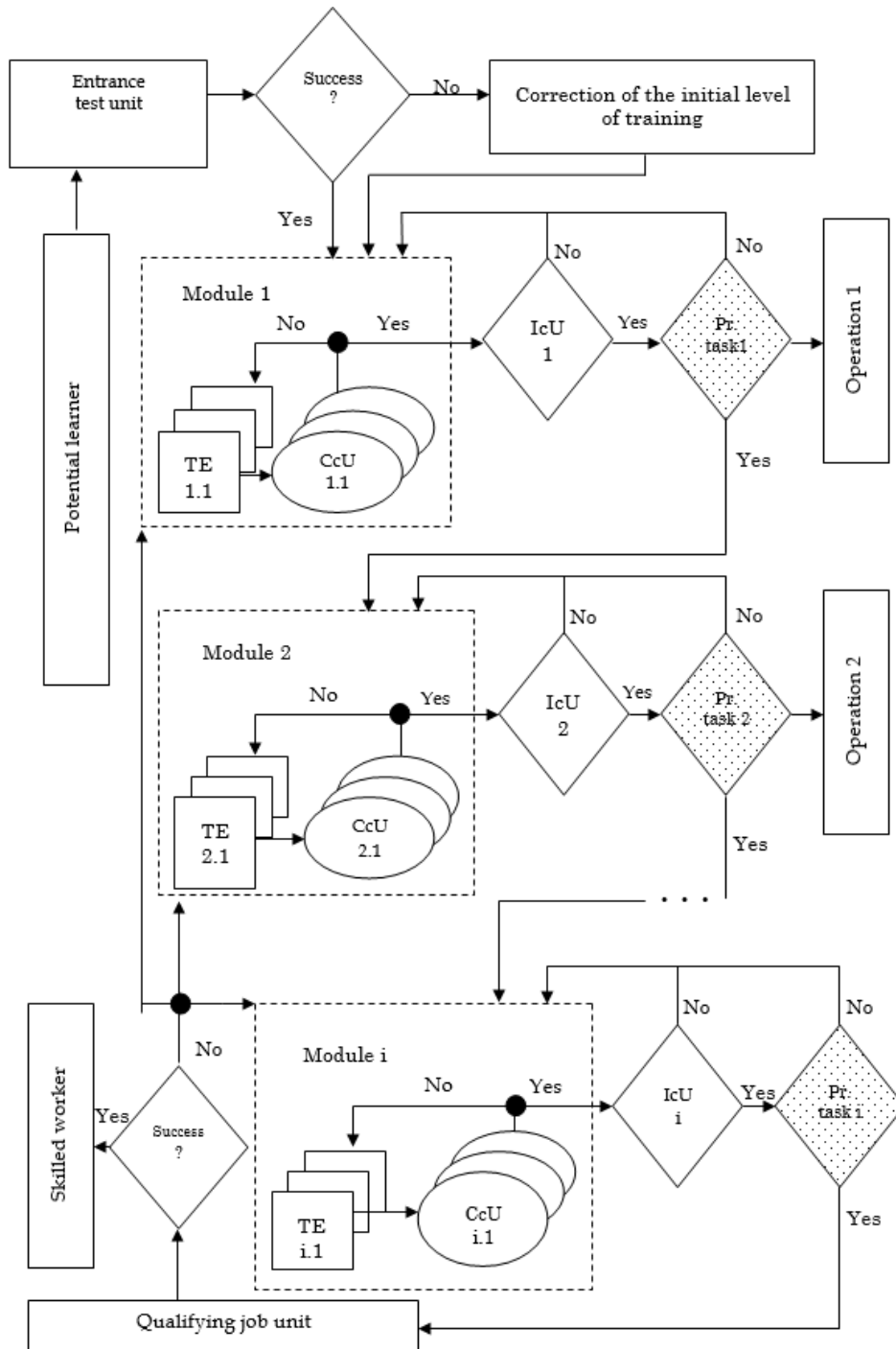


Figure 1. The modular technology model of blue-collar workers training in the machine-building industry

condition of achieving the third level of maturity of a personality's professional qualities which corresponds to the ability to develop methods of solving for non-standard tasks presented within core competences, i.e. the transfer level. On basis of the process and the result of fulfilling of practical tasks, the level of maturity of the trainee's professional competency will be monitored.

Modular technology of corporate formation of workers' professional competency in the machine-building industry in the area of turning works

In framework of our research, the modular technology was developed on basis of the modular approach in accordance with requirements of European concept of Modular employable skills; it included selection of the content of training (the content-related level) and development of the training technology (the technological level). On the content-related level, the modular program of training of the machine-building industry workers in field of

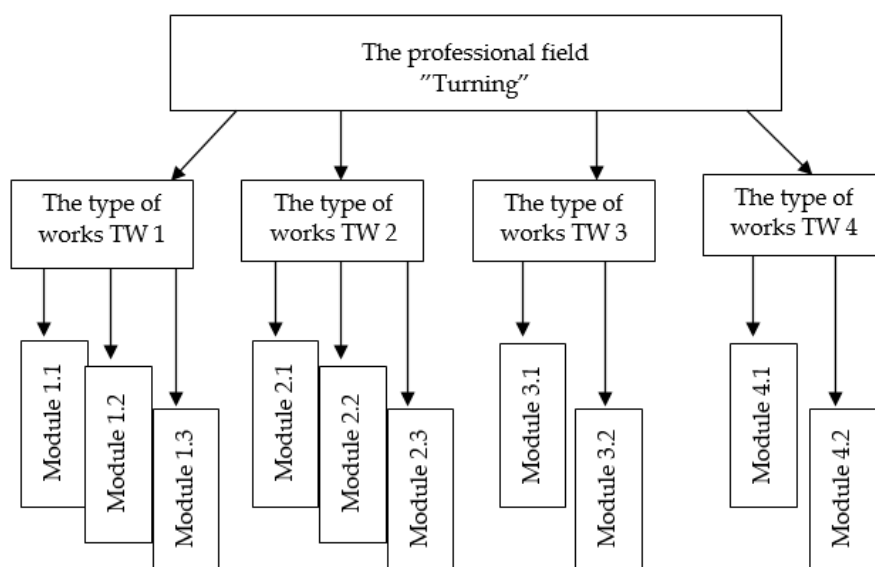


Figure 2. Structure of the modular program of training in turning works of the machine-building industry workers

turning works was developed, while the modular technology of forming their professional competency was developed on the technological level.

We developed the modular program in the sequence accepted in Modular employable skills concept which includes the following basic stages:

1. Analysis of the worker's professional activity in corporate conditions;
2. Singling out of modular units;
3. Analysis of modular units;
4. Development of training elements;
5. Development of MES-selection matrices of training elements and consequence of learning thereof.

While analyzing the professional activity of the machine-building industry worker, we identified the professional field and the scope of works he operates in.

The professional activity of the machine-building industry worker will be works on fabricating parts by machining.

Under the scope of work within Modular employable skills concept a specified kind of activity will be understood. We consider the industry level of identifying the scope of works in our research. Scopes of works may be singled out basing on analysis of the package of skills and abilities to be formed in relation to machining various surfaces of parts, or basing on analysis of the package of skills and abilities to be formed in relation to machining various machine parts. Singling out of scopes of work on basis of the type of fabricated parts shall correspond to formation of a worker's professional competency in the context of the company's specific nature.

For example, the following scopes of works may be singled out for turning works: the turning of shafts; the turning of holes; the turning of disks and the turning of thread. Fabrication of a finished part in consonance of diversified surfaces thereof allows speaking about formation of skills and abilities to process different surfaces within a single operation, which conditions the complex formation of the machine-building industry worker's professional competency. The fragmentary nature of the modular program will be excluded which could be possible when using it as a basis for selection of the scope of works of the type of processed part surfaces.

On basis of the analysis of selected scopes of work we singled out working conditions of the machine-building industry worker, a list of requirements to an admitted person and a list of requirements to arrangement of a turner's working place which are presented in the document "Description of Work".

At the second stage, on basis of "Description of Work" document, selection and description of modular units shall be performed which are given in the document "List and Description of Modular Units". We singled out the following modular units in framework of the modular program of training of the machine-building industry worker (Figure 2).

In framework of the type of works TW 1 (The turning of shafts): the turning of stepped shaft (Module 1.1); the turning of smooth shafts (Module 1.2); the turning of the eccentric shaft (Module 1.3).

In framework of the type of works TW 2 (The turning of holes): the turning of smooth sleeves by boring an axial tool (Module 2.1); the turning of stepped bushings by boring (Module 2.2); the turning of bushes with offset centres (Module 2.3).

In framework of the type of works TW 3 (The turning of disks): the turning of disk with hole (Module 3.1); the turning a solid disc of smooth and stepped (Module 3.2).

In framework of the type of works TW 4 (The turning of thread): the turning of screws (Module 4.1); the turning of nuts (Module 4.2). Thus, it is possible to state that the modular program of training of the machine-building industry worker includes the following elements: professional field, scope of work, modular unit, which corresponds to the structure of the machine-building worker's professional activity.

In frameworks of the third stage of the modular program development, we analysed the content of modular units by singling out steps of the work which consequently disclose the structure of the machine-building industry worker, within the modular unit, and by singling out skills which should be formed in the trainee for successful assimilation of these steps, and training elements of various categories formation thereof.

Training elements developed within the fourth stage of the modular program formation can be regarded as teaching aids which directly come to the trainee and contribute to formation of the singled-out skills.

In framework of modular units included into "The turning of shafts" scope of works, 52 training elements of the following categories were developed: 01 - occupational safety and health, 02 - activity, 03 - classical theory, 04 - graphs and diagrams, 05 - technical information, materials, methods, 06 - equipment, tools, machinery.

At the fifth stage of projecting we developed "Step -Training Element" reference tables for each modular unit, wherein in accordance with each step of work the training elements are mentioned which are necessary for fulfilment thereof, and "Modular Unit - Training Element" reference table wherein all modular units and training elements corresponding thereto are given, and which in fact are a MES program in tabloid form. Thus, the developed modular training program in its basic version includes all modular units and all training elements being a part thereof. Depending on the trainee's level of learning, the modular program will be customized (the modular units the subject matter whereof is known to the trainee (which is confirmed by results of testing) will be removed, or additional modular units, training elements or instruction sheets will be introduced).

On the technological level, the modular technology of formation of the machine-building industry workers' professional competency is being developed which includes procedures of step-by-step formation of professional skills, abilities and knowledge, and incoming, current, intermediary and final control. Within the modular technology of training, development of the teaching environment, packages of methodological support and correction procedures is being fulfilled.

Formation of core competences shall be performed in process of step-by-step studying of training elements included into the singled-out modular units. Upon studying of each training element, current testing shall be conducted; after assimilation of each modular unit intermediate testing shall be made, in results whereof the appropriate maturity level of the worker's core competencies in the studied modular unit is acknowledged.

From this stand, we developed the modular technology of training of a machine-building industry worker to produce shafts, the mentioned technology consisting of five basic stages: incoming control; studying of training elements within the modular unit; current control of assimilation of the training elements subject matter; intermediate control per the modular unit; qualification tests.

Incoming control is performed with purpose to determine the initial level of the trainee's knowledge, skills and abilities and to customize the basic modular program. Incoming control is performed as testing which implies 100% completion of all test assignments, and as a questionnaire survey which allows revealing of the set of training elements or modular units known to the trainee.

In case of negative results of testing, the trainee is offered to study instruction sheets which contain basics of requirements to the admitted person in form of the reference signal system, that is, abridged diagrams and tables. Thereafter the testing is made again, and if the result is positive the trainee will pass to studying of the modular program.

Studying of training elements within each modular unit is performed by trainees independently, in an individual tempo and in the sequence defined by the teacher. The trainee shall choose on his own a path of studying of training elements within the sequence offered by the teacher. The sequence of training elements studying includes 30 training elements per each modular unit and contains invariant training elements which may be excluded when studying further modular units and training elements of variable-based nature, mostly belonging to category 02 - activity.

Each training element contains, apart from the coordinating and informational component, the controlling component which serves for current testing. The current testing shall be performed at the trainee's initiative. Trainees will receive training elements without the testing part which is kept by the instructor. In case of the positive

100% fulfilment of all test assignments, the trainee will pass to studying of the next training element; on the contrary, he will return to studying of the unassimilated training element.

After studying of all training elements within the modular unit, two-step intermediate control shall be performed on the modular unit in a whole. The first step includes testing and the second step will include fulfilment of a practical task. If every answer to all test assignments is correct and the practical task is fulfilled with a proper quality, the trainee will pass to studying of the next modular unit or finish his training on the level of an operation analyst; on the contrary, he will return to studying of the modular unit content.

At the fifth stage, upon studying of all modular units of the modular program, qualification tests will be performed, the essence whereof lies in analysis of operating drawings of parts, development of the technology or reading of operational process charts for producing parts, equipment adjusting and balancing, producing and control of various parts on assignment of the expert commission. Qualification assignments are performed under conditions close to practical tasks, which allows speaking about formation of the machine-building industry worker's professional competency in the context of the company's specific nature.

In framework of developing of the teaching environment, selection of the material and technical infrastructure for training of the machine-building industry workers, scheduling of training and working places, and formalising forms of accounting of trainees' academic progress and specific nature shall be made.

To formalise results of control in Modular employable skills concept, forms of academic progress accounting are envisaged for each trainee which include all training elements and modular units of the program, and a number of attempts to pass tests.

To control the level of core competencies maturity, we developed a special form of academic progress accounting which includes, apart from standard points, a diagram of professional competency maturity developed on basis of a model of a machine-building industry worker's competency. The diagram is filled in on basis of expert evaluations of core competencies maturity levels. As a result, a diagram of the core competencies maturity of the machine-building industry worker is generated in form of a flat polygonal figure on basis whereof the trainee is assigned with a labour grade.

The structure of the methodological support of training of machine-building industry workers developed in the course of work shall include the modular program, package of training elements for forming of knowledge and abilities lying in basis of distinguished core competences and professional qualities of the personality, packages of control tests, practical tasks and tasks for qualification tests.

DISCUSSIONS

Peculiarities of arrangement and realization of training of blue-collar workers under conditions of educational entities, as well as historical aspects of training of blue-collar workers in Russia were examined in works by A. Shelten G.M. Romantsev, B.S. Gershunskij, V.A. Bolotov and E.L. Isaev, S. Ja. Batyshev et al. [23, 27, 28, 29, 18, 30, 31, 1, 32, 33, 34, 2].

Issues of arrangement and realization of teaching of blue-collar workers under conditions of corporate training on basis of centres for training of industrial plants' personnel were examined in works by S.Ja. Batyshev, B.C. Badmaev, A.M Novikov, A. Shelten et al. [18, 15, 35, 26, 36].

Issues of arrangement and realization of context-dependent training were examined in works by A.A. Verbickij, while peculiarities of teaching of adults were considered in works by S.I. Zmeev [17, 16].

Development trends of processes of training of blue-collar workers in vocational education entities, the structure of their training and applied techniques and technologies were examined in works by B.S. Gershunskij, A.P. Gorshkov, V.A. Korytov, A.M. Novikov et al. [28, 37, 38, 35, 39, 30, 40, 41].

Certain aspects of arrangement of training on basis of the activity-based approach, as well as issues of evaluation of professional competencies and qualifications of blue-collar workers were examined in works by P.Ja. Galperin & N.F. Talyzina, A. Ja. Najn, A.N. Kochetov, E.M. Lokotnikova et al. [21, 13, 42, 19, 22, 20, 34, 44].

The essence of professional competency, the structure thereof, peculiarities of formation and evaluation of core competencies and professional qualities of a personality were examined in works by A.E. Okuneva, A.K. Markova et al. [23, 24, 45].

Peculiar aspects of applying of modular technologies of training based on the systemic-activity approach, principles of arrangement of educational activity, the content and structure of methodological support envisaged by Modular employable skills concept were examined in works by P.A. Juceviciene, N.V. Borodina and N.E. Erganova, E. Crochet et al. [3, 4, 9, 35, 10, 6, 7].

At the same time, let us note that any complex consideration of the issue of development and application of modular technologies of training for formation of blue-collar workers' professional competency for the machine-building industry in conditions of the corporate training system organized on basis of industrial plants' training

centres, as well as that of development and methodical support – of training elements created on the modular approach basis revealed in the modular training concept “Modular employable skills” developed by International Labour Organization, was not carried out in the previous researches.

The present article presents a model description of the modular technology of corporate forming of blue-collar workers' professional competency, plus the step-by-step development of the modular program of formation of professional competency of machine-building industry workers in the field of turning works is described and the complex of structured modular units developed in line with requirements of Modular employable skills concept. The article also describes the structure and documentation support of the modular technology of formation of machine-building industry workers' professional competency in the field of turning works developed on basis of Modular employable skills concept.

CONCLUSION

The process of formation of professional competency of blue-collar workers under conditions of corporate training is characterized with the integrative approach. The modular approach, possessing systemic properties, allows integrating the substantive basis of training formed in the competency-based format, processes of selection and structuring of the content of blue-collar workers' training reflected in the program documentation fixed forms, educational-methodological documentation represented by training elements, organization- methodological aspects of training, organization and realization of training which are also recorded in documentary form in line with requirements of Modular employable skills concept.

The complex of methodological support of formation of professional competency of the machine-building industry workers in field of turning works includes the modular program, the package of training elements for formation of knowledge and abilities lying in basis of singled-out core competencies, packages of control tests, complicated practical tasks and assignments for qualification tests.

Thus, it is believed that use of the developed modular technology reflected in the methods of academic classes and in the methodological support of corporate formation of blue-collar workers' professional competency allows orienting the learning process on the company' peculiar features and to teach workers able to immediately entering into their professional activity at the plant (with a zero professional adaptation period).

Materials of this article may be of use for teachers of organizations for secondary vocational education, supplementary vocational education, higher education, and for employees of HR departments and technical training departments of industrial enterprises.

In process of the research, new questions and issues occur which have to be solved: formation of the universal model of professional competency of a production-technological worker which can become a basis for development of particular models of professional competency of workers from various industries.

The authors think rational to systemize processes of corporate training of blue-collar workers of various industries on basis of the modular approach, as peculiarities of labour of basic workers of any production reflect the generalized functional-operational nature of a worker's professional activity which is deployed as a spectrum of identical competences and professional properties of the worker's personality. Systematization of corporate training of blue-collar workers on basis of the modular approach may significantly contribute to the development of modern industrial enterprises' human resources.

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