# Occupational orientation of student`s independent work as a factor of student`s learning efficiency upgrading

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**Abstract.** The article study the questions of efficiency upgrading of the content of students' independent training with the help of projecting of didactic means of education activity management of the future teachers of professional education in the course of technical disciplines. The problem of upgrading of management of education process organization and learning occupational orientation of students' independent learning is one of the most acute problems of modern Pedagogic. In order to have the opportunity to design the results of a teacher's activity (formation of the all-round personality of a student, highly-qualified specialist) it is necessary to study the process of education from the viewpoint of management ad organisation. "It is unmistakeable that the education is possible without management, but it is like a wandering in the lonely wood with no compass and no road".
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## Introduction

Transfer of education to the new ideal - maximal development of human abilities for self-regulation and self-education, determines the necessity of further improvement of professional-pedagogic orientation in education of the future teachers of professional education in university. The organisation of students' independent cognitive activity (classroom-based and extracurricular) which would provide a personal motivation to the education, motivate creative abilities of a student, activate inner cognitive motives of learning, contribute to development of skills which are necessary for the future teachers of professional education such as skills of self-education, ambition for self-development, ability of reflection, are of special importance (as applied to the higher school).

## Goal

Today the problem of improvement of training of the future teachers of professional education for the work in educational centres, training schools, colleges and technical higher educational establishments is very acute. The main function of teachers of professional education is preparation of working staff for production. Very strict demands are placed on a teacher of professional education, he/she builds new human, technician, new working type. When the educational process is correctly managed, all its chains demand the participation of students and pupils. High degree of activity is achieved in the process of independent work.

## Description of the base material

It is known that the independent students' work (ISW) is a planned work of students which is being done according to the task and by the methodological guidance of a teacher, but without his/her direct participation. Organisation of independent students' task is a multi-purpose system: acts and develops in accordance with its internal and external goals. External goals of ISW are set from beyond, they are reflected in the requirements to upgrading of specialists' training quality. The aim of this task solving is the improvement of education quality, conditioned by the number of factors and first of all by the demands of the national economy to the level of staff training and change of ratio of extensive and intensive factors of education in favour of the last.

The main way of education quality management is the improvement of the quality of the organisation activity of a teacher and independent students' activity performed on the basis of qualification characteristics of specialists. Internal goals of ISW organisation are implemented in goals of teachers and students and that is why the system sets them by itself: on the one hand it breaks the set goals from without into individual sub-goals, makes

them concrete; on the other hand it detaches from the goals achieved from without and from other regulatory directions, while chasing its own goals, as the result the internal goals of the system do not correspond the external ones. However, the provision of unity in implementation of external and internal goals in ISW organisation is not performed automatically; it needs the submission of the whole organisational activity of a teacher to the creation of conditions for achieving goals of a multifunctional specialist's training. In our opinion, the aspect of goals consistency is reflected in the fact that each of them (internal and external) has professional orientation in the content of the education of a higher educational establishment. General cycle disciplines involve students in the sphere of their future activity. These are the disciplines of such subject fields which are an important integral part of the given occupation. The content of the general professional education satisfies the tasks of the special training and provides a high professional mobility of staff inside the given sphere of labour application. The study of general professional disciplines consequently involves student into the range of issues of their occupation. Special course disciplines transfer knowledge and skills that comply with the direct professional functions of the highly qualified staff and allow the graduate to proceed to the practical activity as soon as possible.

Thus, the general scientific training of the future university teachers of professional education in its classical meaning is not directly connected with the study of modern technique and technology, while the general professional and special training means the study of particular technique and technology and is aimed at the particular occupation. Thus we can say that the general scientific disciplines training of the students of a higher educational establishment can be performed as a polytechnic education, and the polytechnic education in the teaching of general cycle disciplines is an integral part of the correctly planned higher professional education. Professional training of the students of a higher educational establishment consists of polytechnic education by general cycle disciplines and self-professional education by general professional and special cycle disciplines. Professional-pedagogic orientation of education in the university is a complex and multi-aspect problem. The ways of improvement of professional-pedagogic, scientific-theoretical and practical training of the future teachers of professional education were studied in the works by V.A. Slastenin, P.I. Pidkasistyi, V.M. Monakhov and other scientists [1,2,3,4,5].

It is clear that the effectiveness of the independent students' work in the process of education depends to the great extent on the conditions of its organisation, content and character of knowledge, narration logic, source of knowledge, interrelation of the current and offered knowledge of the content of the given type of independent work, quality of the acquired results in the process of the work performance. This is conditioned by a number of factors.

Firstly, such modern education tendencies as individualization and differentiation of education, use of investigation results in psychology and physiology of a human, use of best pedagogic practices for improvement of the process of education, search and selection of conditions for optimisation of educational process demand not only teacher's knowledge of his/her subject but also the sufficient readiness for self-education.

Secondly, the independent acquiring of new knowledge is the basis for formation of such personal education as cognitive independence. This quality is necessary for professional socialisation of a teacher which is noted by a number of didacts and resource specialists of professional education [6].

Thirdly, the actualization of the problem is conditioned by the presence of contradiction in the set education system between a rapid pace of increment of knowledge in the today world and limited possibilities of their acquisition by an individual.

Fourthly, the analysis of the investigations conducted in the theory and methods of teaching technology in a university shows that the resolving of this problem is given little attention. However the fact that the successful formation of independent work skills can be achieved only by the systematic approach to this type of education activity, is not always taken into account. The organisation of the independent work system allows activating cognitive activity of the students on all the stages of the educational process.

However, there arises a question: what is the basis that predetermines and strengthens together all the above mentioned conditions, necessary for involvement of students into independent work while determining the structure and essence of this or that specific type of independent work and the character of the task that it contains. There are more or less complicated types of independent work, and the students are to be led upline - from the first ones to the second ones. The suggested procreational-exploratory, partially-exploratory tasks and research tasks were tested in higher educational establishments of the Republic of Kazakhstan. The main goal of our investigation was to activate cognitive independent activity of students and

upgrade the effectiveness of education under the conditions of innovation theory.

Let us consider the following tasks:

a) *independent tasks of procreational character*. Multiple typical tasks and managements according to the example are called procreational independent works. While doing such works the students develop their memory, reinforce theoretical material and apply main theories' provisions for solving tasks. Before setting of independent task one should take into account the level of training of students. For example, there is suggested the following task:

Decode steel grades:; U10; 111; 19A; U10A; U11A; 10;

20H2N4A; 15HGN2TA; V2F; HV4; R12; R9; R6M5.

*Here is the example of task resolving:* 19 - qualitative carbon steel with 0.19% of carbon content; 9H4N2MA - highly qualitative carbon steel with 0.9% of carbon content; 4% of chromium, 2% of nickel, 1% of molybdenum, A- highly qualitative. U-6 - carbon tool steel contains 0.6% of carbon, HVG - alloy tool steel with the content of 1 % of carbon, chromium, tungsten, silicon and manganese up to 1 % .

RI2M8F2K10 - high-speed steel containing 1% of carbon, 120% of tungsten, 8% of molybdenum, 2% of vanadium, 10% of cobalt;

b) *Procreational-exploratory independent works.*

In this case one needs knowledge acquired not only on the previous lessons but the knowledge of other subjects in order to solve ths task. Procreational-exploratory independent works contributes to the development of memory of the students and help to fix inter-subject connections. The tasks for such works are combined having the elements of repetitions. One should use "cards-instructions" ad for less trained students - "cards-consultants". The instructions can contain references for the variants of solving, bibliography references ad formula references.

Here is the task: Define machining time if the following is known: length of the processed surface of the part 1-250 mm, size of chisel cut 1-1mm, size of chisel run - 1-2 mm, number of chisel travellings in the current operation 1-5, other data shall be chosen independently.

*Instruction:* In order to perform this work it is necessary to repeat theoretical material (lectures and material on cutting and processing of metals: text-book by Asanaliev M.K. "Metal cutting, equipment and tools". Almaty, 2013) [7].

*c) partially-exploratory independent works.*

The student shall be given such task, while doing which he/she will take in new material.

Partially-exploratory independent tasks presuppose: search of solutions of a task of cognitive-logic or experimentally-practical character.

Here is the task: how do the cutting compounds influence the process of cutting and the quality of the processed surface? Which coolant can be used for increase of the tool stableness and speed of cutting up to 25-49%?

*d) Research (creative) independent works.* The cognitive activity of students is on the highest level while doing this type of works.

The character of students' activity becomes exploratory. Independent works on design and manufacture of models are creative ones. Fulfilment of such a task can take 10-15 days. The work plan is discussed and made up during the lessons with a teacher. The sections of scientific researches, conducted by the department, can be used as works. Creative independent works develop research abilities and contribute to the increase of professional knowledge level.

Here is the task: Define the cutting mode while processing the parts on the automated lines, if the diameter of a part is 30 mm, its length is 150 mm, supply and speed are to be chosen independently. Construct and study the dependence diagram of the tool stableness and cutting speed. Study the conditions of processing for the two specific conditions. Note the maximum productivity (speed). Data shall be chosen independently. It is suggested to us e Fourier series, offered by G.I. Granovskiy [8,9].

In the process of education content formation the following principles shall be taken into account:

• correspondence of educational content to the specialist's training; content of professional activity while forming educational content;

• provision of forecasting advanced character of educational content;

• interrelation of content, form, methods and means of education;

• regularities of professional establishment and personal development.

According to the results of investigation we have developed the method of the main stages of staff training.

• Sphere of a specialist's use in the professional activity.

• Development of the qualification characteristic (the stage envisages the definition of requirements to the content of education of a specialist).

• Constructive solution of content of a specialist's professional training.

• Curriculum preparation.

• Preparation of subject programmes and on-the-job trainings.

The concept of the second stage is based on the principle of adaptive function of the education for an individual and its existence.

The processes of education development and rise in labour productivity are in instant dependence. That's why the disadvantages of education have negative impact on social productivity, which makes science and education one of the most profitable sectors of national economy. The most industrially developed countries invest into science and education as they understand the practicability of this action.

The choice of educational means is made in accordance with goals, principles and content of education subject as well as form of education (together with teacher or independently). The problem of complex educational means design for the students of professional education, which satisfies all the requirements of the modern Pedagogic, is one of the most acute problems of professional education [10]. According to the choice of educational means the four levels of knowledge acquisition are pointed out:

1. The existence of a general idea of the study material and teaching actions (procreational level of cognition).

2. Performance of long-time activity connected with the implementation of the acquired knowledge and skills (procreational level of understanding).

3. Performance of the productive activity (constructive level).

4. Performance of the elements of creative activity, practice (creative level).

According to the characteristics of these levels there are pointed out the requirements to the skills of the future teacher of professional education:

1. A student shall be able to present a definition, formula, law etc.

2. A student shall be able to understand educational material, explain its content, give examples.

3. A student shall be able to generalize, concretize, analyse and solve non-typical tasks.

4. A student shall be able to transfer existing knowledge into new situations, design the results of educational activity.

According to the above pointed skills the complex of didactic means of management if projected:

1. Educational texts in native and foreign language; pictures; diagrams; graphs; normative documentation in foreign language.

2. Educational texts in native and foreign languages with a complex of questions referring to the content; algorithms of task fulfilment; flow-diagrams.

3. Educational texts in native and foreign languages with a complex of questions for comparison, analysis, conclusion; heuristics; problem tasks.

4. Problematic and creative tasks; projects; research and development tasks.

This complex of management means is intended for use in the course of study of technical disciplines and is aimed at upgrading of effectiveness of independent study and technical creativity.

Several things are necessary for the successful independent education: system of basic knowledge, correct goal and task setting as well as ways of their achievement and individual abilities of the student's personality. Any intellectual process has a creative, originative part, which is connected with the generation of hypotheses, and an executive part, which is connected with their implementation and check [11]. These two parts can be pointed out not only in cogitation but in any process of cognition.

The achieving of a new qualitative level of specialists training is possible while using students' independent work and making constructive changes into the pedagogic process, in particular:

• organisation of individual educational plans involving students into the students' scientific research and, if possible, into the real projecting in accordance with the orders of enterprises;

• including independent students' work in the education plan and class timetable with organisation of individual consultations on chairs;

• forming of complex of educational and study guides for fulfilment of ISW;

• development of integrated inter-chair tasks system;

• lecture courses oriented to the independent work;

• rating method of ISW monitoring;

• collegial relationships of teachers and students;

• development of tasks with non-typical solution;

• individual consultations of a teacher and recalculation of his/her time sheet with regard to ISW;

• lectures in the form of conversations, discussions where the reporters and co-reporters are students themselves, and the teacher is a master. Such tasks suppose preliminary independent work on every specific topic, made by students-reporters, using

study guides, consultations with teachers and use of additional literature.

The essence of teacher activity is the creation of conditions for revealing the whole students' potential, maximum achieving of certain results of independent educational activity of students [12].

Generally the orientation of educational process to the independent work and upgrading of its effectiveness presupposes:

- increase of time for ISW;
- organisation of constant consultations, giving of tasks for SIW;
- creation of educational base in higher educational establishments (text-books, study guides, computer labs, remote education), which allow mastering a discipline independently;
- accessibility of laboratories and workshops (for independent fulfilment of hands-on seminars);
- organisation of constant monitoring which allows increasing time for ISW for the account of shortage of other types of monitoring.

**Conclusion**

General conclusion based on the above said is as follows: the problem of organisation of independent students' work is one of the most acute pedagogic problems; while organising occupation-oriented independent students' work in the system of classroom-based independent classes in the process of study of comprehensive disciplines one can speak about implementation of polytechnic principle on all levels of education process, and the development of different tasks allows upgrading the effectiveness of education in the process of training of the future teachers of professional education in higher educational establishments.

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