PEDAGOGICAL BASIS OF TRAINING INFORMATICS TEACHERS FOR INDEPENDENT RESEARCH ACTIVITY

Alisher Urishov
Chirchik State Pedagogical University

Abstract

This article analyzes the pedagogical foundations of training informatics teachers for independent research activity. Guiding students to independent work and research, increasing their activity in the educational process and developing the ability to think independently are important parts of the modern educational process. Effective organization of independent research activity plays an important role in the application of students' theoretical knowledge in practice. The article discusses methods of involving students in independent work, describes types of independent activity, and the importance of modern pedagogical technologies for the effective organization of this process. It also discusses the difficulties encountered in organizing independent research activity and gives recommendations for their elimination. Through independent activity, students have the opportunity to develop creative thinking, critical thinking, and self-development skills.

Keywords: Computer science education, independent research, pedagogical approaches, modern educational technologies, critical thinking, independent activity, student motivation.

INFORMATIKA O'QITUVCHILARINI MUSTAQIL-IZLANISHLI FAOLIYATGA TAYYORLASHNING PEDAGOGIK ASOSLARI

Annotatsiya: Ushbu maqolada informatika o'qituvchilarini mustaqil-izlanishli faoliyatga tayyorlashning pedagogik asoslari tahlil qilinadi. Talabalarni mustaqil ish va izlanishga yo'naltirish, ularning o'quv jarayonidagi faolligini oshirish va mustaqil fikrlash qobiliyatini rivojlantirish zamonaviy ta'lim jarayonining muhim qismidir. Mustaqil-izlanishli faoliyatning samarali tashkil etilishi o'quvchilarning nazariy bilimlarini amaliyotga tatbiq etishida muhim rol o'ynaydi. Maqolada talabalarni mustaqil ishga jalb qilishning usullari, mustaqil faoliyat turlarining tavsifi va bu jarayonni samarali tashkil etish uchun zamonaviy pedagogik texnologiyalarning ahamiyati yoritiladi. Shuningdek, mustaqil-izlanishli faoliyatni tashkil qilishda duch kelinadigan qiyinchiliklar va ularni bartaraf etish bo'yicha tavsiyalar beriladi. Mustaqil faoliyat orqali talabalar ijodiy tafakkur, tanqidiy fikrlash va o'z-o'zini rivojlantirish ko'nikmalarini shakllantirish imkoniyatiga ega bo'ladilar.

Kalit so'zlar: Informatika ta'limi, mustaqil izlanish, pedagogik yondashuvlar, zamonaviy ta'lim texnologiyalari, tanqidiy fikrlash, mustaqil faoliyat, talaba motivatsiyasi.

Introduction

The quality and intensity of students' learning activities determine the quality of education, and, accordingly, the results of training specialists. Since a student enters the education system as a subject, from the very beginning his ability to act independently, consciously and purposefully is assumed:

- plan his actions
- choose his goals, determine the ways and means of achieving them;
- combine and organize his capabilities to solve the assigned tasks;
- monitor his activities and evaluate them accordingly - monitor his further actions and carry out self-assessment.
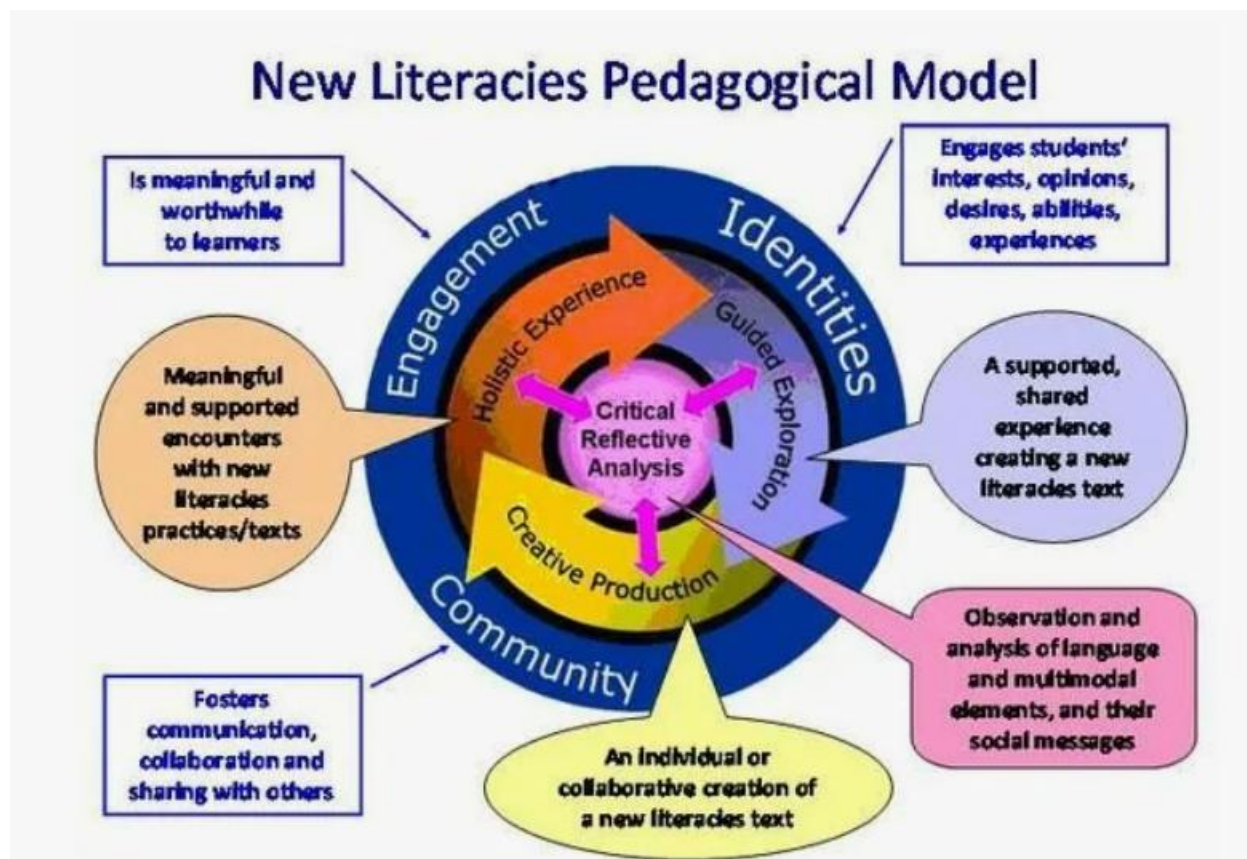
When performing independent work by a student, it is necessary to successfully plan, organize, monitor and evaluate each of the elements indicated in the system of their research activities. After that, the teacher implements the following rules:

- the student must know not only the purpose of the training session, but also what learning outcomes can be achieved at its end;
- when indicating the ways to achieve learning outcomes - it is possible to study and apply a method or technique known to the given task, or to give detailed instructions or instructions on the procedure for work;
- the student must be familiar with the form and type of control: written essay, report, abstract, etc., oral presentation, answering questions, etc., as well as the qualitative and quantitative criteria for assessing each learning task;

- the recommended tasks (tests, questions, tasks and exercises) for each training session for self-assessment provide current pedagogical control and constant self-assessment of the degree of achievement of the intended educational goals by the student;
- Development of a "Student's progress sheet in the subject". It is a means of obtaining quick information about the accumulation of rating points by the student.

Possession of general educational skills and qualifications is the basis for independent research activities of students.
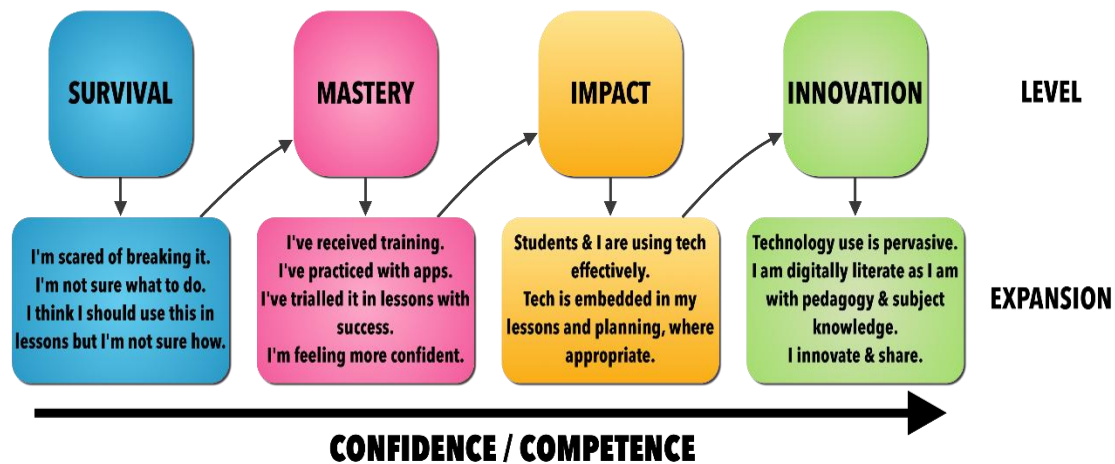
In the context of the implementation of modern educational technologies, the student must have the following general educational (necessary for the successful mastery of any academic subject) skills and qualifications:

1) independent work with information: record the main points clearly, graphically and consistently in the form of a synopsis; find, recognize, understand, critically evaluate the information necessary to solve educational tasks and tasks, collect and present it in the form of an abstract, report, symbols, as well as graphic organizers; create his own scientific text (article, lecture, thesis) in accordance with the given requirements;

2) presentation skills: be confident when speaking about the results of completing an educational task, use various visual aids;

Teacher confidence in use of technology

based upon the work of Mandinach and Cline
(Classroom Dynamics: Implementing a Technology-Based Learning Environment)

| SURVIVAL | MASTERY | IMPACT | INNOVATION | LEVEL |

I'm scared of breaking it. I'm not sure what to do. I think I should use this in lessons but I'm not sure how.

I've received training. I've practiced with apps. I've trialled it in lessons with success. I'm feeling more confident.

Students & I are using tech effectively. Tech is embedded in my lessons and planning, where appropriate.

Technology use is pervasive. I am digitally literate as I am with pedagogy & subject knowledge. I innovate & share.

EXPANSION

CONFIDENCE / COMPETENCE

3) communication skills of initiating educational interaction between a teacher and a student, defending one's point of view and finding a compromise, entering into a conversation, asking questions about the truth, giving evidence-based answers, conducting it in accordance with the rules of the discussion, participating in disputes;

4) readiness and ability for group interaction - skills of working together, manifested in collective planning of cooperative activities to complete an educational task, cooperative communication and mutual action in solving a common task, mutual assistance and mutual assessment;

5) skills of analyzing problem tasks, finding non-standard ways to solve an educational task, developing ideas and drawing conclusions;

6) practical skills in the use of modern computer and information technologies for searching, collecting, processing and storing information.

The establishment of independent research activities of students in higher educational institutions and the development of organizational skills are among the main issues. In this regard, we consider it appropriate to carry out systematic work in the following areas:

Firstly, in order to increase the awareness and activity of students on the basis of the reforms being implemented in the education system today, the educational process should be organized in such a way that students consciously and actively acquire scientific knowledge and methods of its practical application, which serve to develop creative initiative and independence in educational activities, thinking, and speech techniques.

Secondly, to popularize the work of innovative teachers who have achieved success in this area, to organize work on exchanging experience.

Thirdly, to organize the formation and formalization of students' independent research activities based on digital technologies in accordance with the requirements of the time.
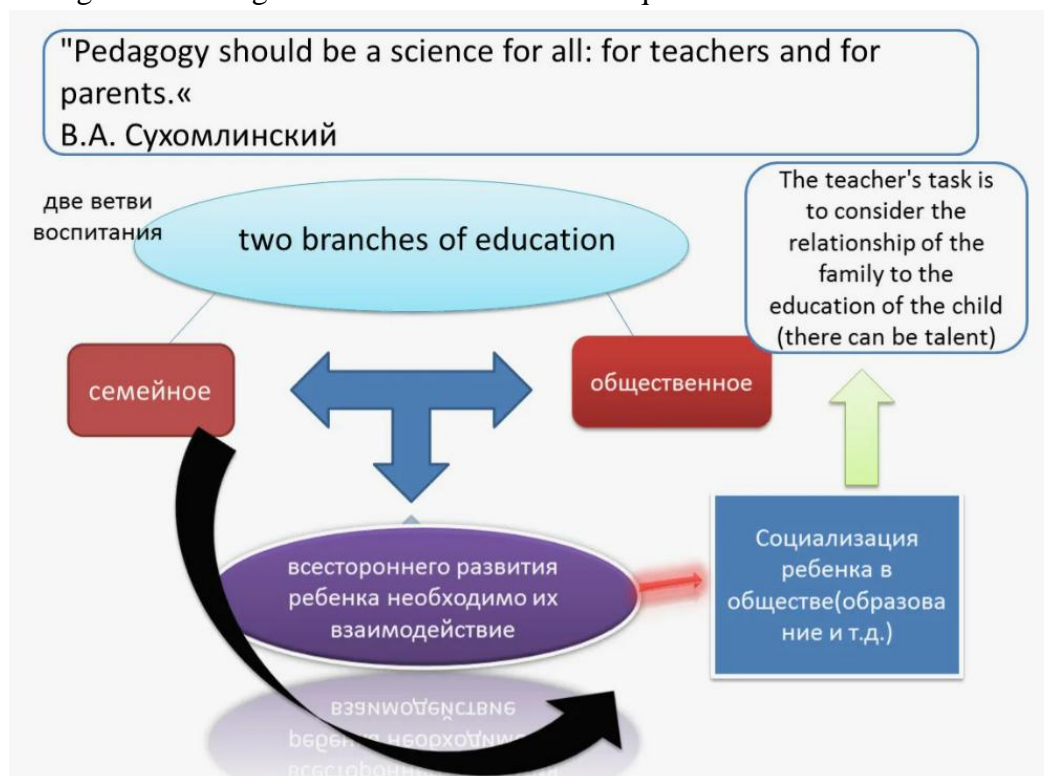
Fourthly, to create opportunities to use foreign experience in developing students' organizational skills in independent research activities.

Based on the above considerations, it can be said that the establishment of systematic work in the implementation of independent research activities in higher educational institutions, training students to work independently, will serve as the basis for the formation of a new generation of creative and socially active, capable of independently finding their place in socio-political life, capable of setting and solving promising tasks.

Based on the results of the study, we can divide independent work into three types.

1. Written independent tasks include: performing tasks assigned for calculation, filling out generalizing and repeating tables, compiling reports on laboratory and practical work, organizing student activities on the basis of various organizers, etc.

2. Graphic independent tasks include: preparing various projects, sketching drawing works, depicting sections and intersections (drawing individual details and nodes, etc.), drawing up schemes, graphs, diagrams, describing the results of observations, and similar tasks.

3. Practical independent tasks include the following tasks: students, based on the teacher's instructions, carry out work such as preparing items and products, repairing equipment and tools, processing products, calculating, designing new devices, preparing models and samples, etc.

Independent research activities are also divided into 4 groups from the point of view of implementing individual-didactic goals:

- tasks that encourage the initial formation and perception of knowledge. In this case, students must know what is required to achieve the goal. Tasks are aimed at assimilating information, data;

- tasks aimed at storing, reviving, and processing information and data for mastering. In this case, tasks are given that are performed on the basis of the correct involvement and activation of previously acquired knowledge and require application in specific conditions;

- tasks that require a new approach to previously mastered, formed, and accumulated knowledge, skills, and competencies from a new perspective. They are given tasks that require searching for the essence of the problem, finding new solutions, and expressing it with new ideas and thoughts;

- tasks that encourage creative activity. In this case, tasks and tasks are given that encourage the study of new or previously known, but previously viewed ideas and thoughts from a different perspective, that is, collecting information, working on them, and expressing one's own opinion.

Today, the process of training a qualified specialist cannot be imagined without independent activity. Because it is as a result of independent research activity that students develop reflexes of critical and creative thinking. However, there are certain difficulties and problems in establishing independent research activities:

- the issue of preparing handouts.

- independent work organized during the lesson sometimes requires the use of cooperative learning methods in small groups. This requires classrooms that are convenient for working in small groups, but such opportunities are not yet available in some universities;

- most teachers do not have the skills to organize independent work;

- to perform independent work, students must be well-equipped with the required knowledge and have thoroughly mastered the subject.

If a student does not understand the lecture, he will not be able to solve the task positively. Therefore, when organizing independent work, it is advisable to activate, remember, correct, and come to a single conclusion first of all.

Independent work performed outside the classroom, using project work and case studies, stimulates the development of creative skills in students.

In the process of organizing independent research activities, the teacher uses more didactic materials.

Didactic materials include problematic, interesting questions, creative tasks, projects, games, crosswords, etc., aimed at developing students' independent and creative work and thinking skills.
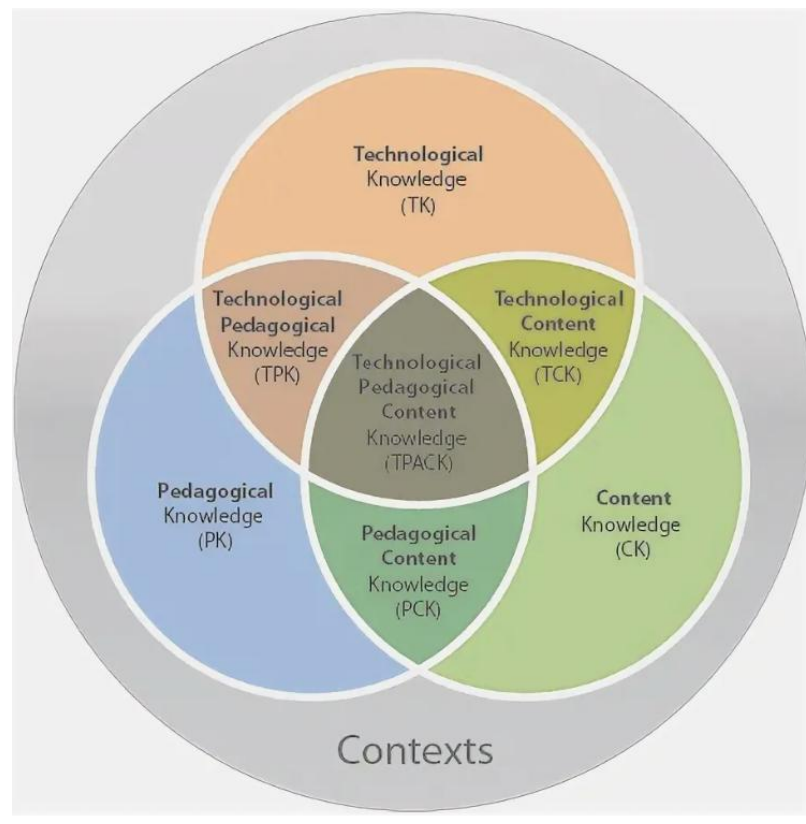
When developing didactic tasks and materials, experts recommend paying attention to the following:

1. Focus on solving problems.
2. Focus on conducting research.
3. Focus on analyzing various situations and circumstances.
4. Focus on conducting experiments and exercises.
5. Focus on searching for and finding news.

When organizing independent work, it is necessary to ensure movement from "simple to complex" and "general to specific", "abstract to concrete".

Having familiarized yourself with the above system of requirements for organizing independent activity in the classroom, the teacher introduces students to didactic games that can be carried out in the classroom (organizers, interactive methods, independent tasks).

Students are divided into several groups and assigned a separate task to each group. Each group prepares a presentation on the task assigned to it.

Students' activities are organized individually, and they are invited to fill out a schedule for organizing independent activities outside the classroom for the course they are taking.

In educational institutions, special attention is paid to independent learning of students, the development of independent thinking and creative thinking in students is one of the urgent tasks of education.

Independent research activities of students are their desire to expand and deepen their knowledge, improve existing skills and abilities, and master new ones.

The main goal of independent research activities is the priority of working on oneself in the formation of personal and professional qualities of students. The main method of independent research activities is individual work on literature. This method forms the ability to find the most necessary information in the flow of information, evaluate it, and use this information in one's professional activities.
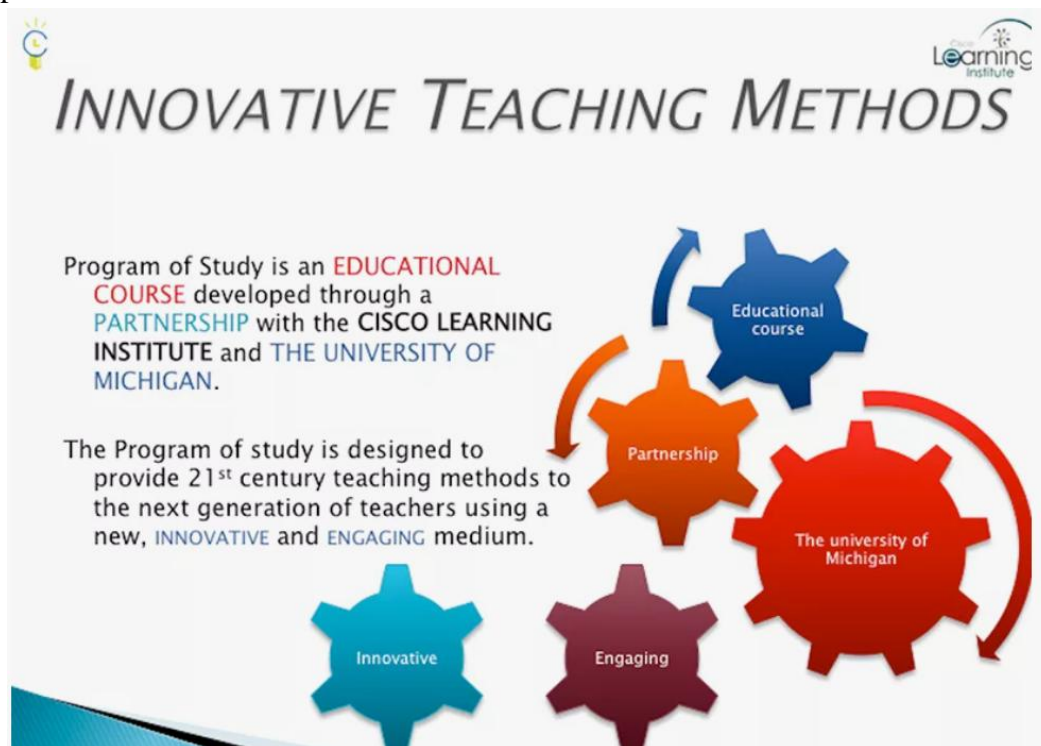
In organizing independent work of students, the following mechanisms are used, taking into account the characteristics of a particular discipline, as well as the level of academic mastery and abilities of each student:

– independent mastery of certain theoretical topics using educational literature;

– summarizing scientific literature devoted to the study of political, cultural, social and economic issues;

– preparation for seminars and practical classes;

– preparation of abstracts on given topics;

– writing abstracts covering the most pressing problems of the discipline being studied;

– finding solutions to problem situations;

– organization of independent activity based on a case study;

– preparation of professional projects.

Independent work includes independent mastering of certain topics in the curriculum, completing homework assignments, preparing for practical and laboratory work, and creative and research-related work outside the classroom.

Independent work is carried out in conjunction with and inextricably linked to the current educational process. Independently expanding the scope of knowledge and acquiring additional theoretical and practical material is closely related to the student's professional qualifications and the ability to work independently in production.

Independent work with literature should be viewed not from the point of view of reading, understanding, and memorizing it, but from the point of view of finding and systematizing and

analyzing the materials necessary to solve specific educational problems (for example, solving a problem, course project and graduation project).

The task of an abstract, course project, and graduation project is to practically consolidate theoretical knowledge obtained in special disciplines through independent knowledge acquisition. When students complete a term paper or thesis, they are necessarily works that are performed simultaneously (simultaneously) with drawing, calculation, analysis, and are carried out independently on the basis of advanced research and forecasting methods. The formation of students' skills in completing term papers and students' creative research in solving economic problems can be carried out in the following ways: a detailed study of the problem, its in-depth theoretical analysis and identification of deviations in the practical situation, search for errors and ways to eliminate them.

The advantage of this activity is that it encourages students to engage in creative research, reasoning, and developing new solutions.

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