METHODEN DER TRAININGSORGANISATION MIT HILFE EINES INTELLIGENTEN TRAININGSSYSTEMS

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Anmerkung. Das Bildungssystem findet in zwei Formen Anwendung: als zusätzliches klassisches Lerninstrument und als spezielles Fernstudium. In der ersten Version wendet der Lehrer das System als Werkzeug zur Lösung von Problemaufgaben in der normalen Praxis an. Im zweiten Fall erfolgt die Interaktion des Lehrers und des Auszubildenden nur mit Hilfe des Ausbildungssystems.

Schlüsselwörter: Technik, Organisation, Lernen, Intellektuell, Systeme.

METHODS OF ORGANIZING TRAINING WITH THE HELP OF AN INTELLIGENT TRAINING SYSTEM

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Annotation. The educational system finds use in two forms: as an additional classical learning tool and as a special distance learning system. In the first version, the teacher applies the system as a tool for solving problem tasks in ordinary practice. In the second case, the interaction of the teacher and the trainee occurs only with the help of the training system.

Keywords: *technique, organization, learning, intellectual, systems.*

Introduction. It is necessary to develop a methodology for organizing training with the help of an intellectual learning system. Effective use of any new or for a long time of the existing tool directly depends on the correct and optimal use of this tool.

Also required to establish in what cases and how the use of the training system gives the greatest advantage. In addition, try to establish a possible negative impact and ways to eliminate it.

General principles. Initially, the training system was designed as an additional tool for implementing problem learning techniques, which operates both on the basis of the classical form of learning and on the database. Therefore, it is not assumed to be replaced by a given system of any other forms, funds or instruments for organizing training.

Purpose. The skillful and competent use of various techniques, tools and training forms makes it possible to achieve higher pedagogical purposes [6]:

“It is insistently overcoming formalism in pedagogical activities, to expand the capabilities of teachers in the choice of optimal methods, forms and learning tools, bolder to implement the achievement of pedagogical science into practice, prevent small regulation of pedagogical activities.

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Methodological work with teachers should be activated, to develop their initiative in every possible way, creative searches, to study the advanced pedagogical experience deeper".

The training system is designed to implement and support problem learning and is a means of new information technologies implemented on the basis of means of information and communication technologies. However, the complete replacement of the manual organization of problem learning and the practice of resolving problem situations in real objects is not approved. The system allows you to make learning to resolve problem situations and the acquisition of experience more intense, expand the possibilities of information technologies in educational activities, provide a new tool for pedagogical activities.

Scientific novelty of the article. The teacher should be followed by how the professional experience of experts is assisted, which should be transmitted to students through the training system and check using alternative methods. It is necessary to monitor that instead of the skills of resolving problem situations, students did not receive the skills of mechanical solving problems with the help of mouse clicks. Although mechanical skills indicate some results in low-speed groups. Therefore, it seems that it remains only to teach students the same inspection of hypotheses in real life with real objects. However, it is still important that the students acted consciously, and did not move the sets of keywords, trying to find the right.

There is no doubt that the training system based on problem situations can and should be applied as a system for diagnosing action skills in problem situations and in training solving these problems. But, in addition, considering the methodological aspects of the application of the training system, it is important to provide a reaction to the student to a new learning tool and its form by virtue of the individual mental characteristics of the student.

Thus, in a guidance, it is necessary to consider the conditions for organizing training with the help of this intellectual system to achieve the effective acquisition of professional skills to solve problem situations and the implementation of the goals set. In the development and testing of the training system, the most vivid characteristics have been studied that affect the effectiveness of the implementation of the problem learning techniques using the training system, since this topic can be a separate study.

Terms of effective application. All conditions for the sphere of influence are divided into the following types:

1. External organizational factors (conditions for conducting training, duration, etc.).

2. Conditions implemented by the teacher (ownership of system operation functions, selection of problem tasks, etc.).

3. Requirements made by the student to achieve an effective organization of training (age, psychological features, level of professional experience, etc.).

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External organizational factors primarily affect the student in the process of learning and performing tasks in the training system. These include the following factors:

- The comfort of the educational process is primarily compliance with all the necessary norms and standards for organizing the educational process in the computer science office (if training is made in this room in classical form), as well as compliance with the relevant rules and norms in the event of training in other places (at home, In the office, etc.).

- The ability to use the various duration of the study process and the process of solving problem problems. By virtue of the characteristics of each trainee, it is necessary to remember that a wide range of time is spent on solving each task, depending on its complexity and depth. According to the main experimental estimates, the most likely time is 5 - 20 minutes. Therefore, it is necessary to take into account this and give a learned time to fully solve problems in the course of learning.

This limitation does not concern the control of knowledge and skills when the trainee should be a predetermined period of time to demonstrate its professional skills. It should be understood that it is necessary to take an adequate time for the task. Usually recommended to 3-12 minutes.

- The necessary skills of work in the training system are important when using the system for transmitting experience and development of problem resolution skills. Although approaches to the organization of problem situations and the resolution search tools are as close as possible to real conditions, each trainee must adapt to a new tool and understand its features. Therefore, it is recommended for learning to resolve problem situations in this system in advance training in subject areas in which the group of students has a rich experience. For example, it is recommended to conduct training work with the system on household problems (the task, the purpose of which successfully boil the teapot with water) or on the mathematical tasks of high school (solving the problem associated with the solution of some equation for grades 7-8).

It must be instructed to instruct the students about how hypotheses are built and their check is carried out, as well as that under them is meant. Familiarize students with various types of checks and returned results, as well as familiarize yourself with the branch and algorithm for finding a solution. In addition, it is important to demonstrate independently the principle of resolving problem situations in the training system. An approximate recommended plan and dating content with solving tasks in the training system contains.

The conditions performed by the teacher to implement the effective use of the training system are based on the possession of the necessary level of training both in the subject area and in the ICT field to maintain the work of students in the system and execution of teaching actions.

Results and practical applications. The teacher must have skills to work with information training systems and be prepared for various situations during training with this system (with the exception of technical problems, as this is the task of the

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system administrator), to realize the likelihood of difficulties at the beginning of the use of any new tool and tolerant (tolerant) treat them.

When preparing for a lesson (with classical training) or session (in case of distance learning), it is necessary to clearly determine what conditions of action requires to work out and / or what knowledge about problems to summarize. Therefore, it is advisable for each theoretical unit, along with practical classes, develop a number of problematic situations that should be able to resolve at a given level of knowledge.

For example, studying the "Computer Network" subject in the "Physical and Channel Data Level" section, usually in practical classes show only the rules for the cable layout, the scheme of their compression and connection. It is very often about possible problems says casual, although teachers who have experience in this subject area often describe situations that happened to them. In addition, it is important to try myself in solving the problem that really existed. Therefore, when studying the described partition, it is fairly effectively set to set a set of tasks with various unfulfilled conditions required to perform the goal of "transmission of data on communication channel".

Here it is necessary to take into account the tasks when the unfulfilled conditions are: a break in the cable system, the improper layout of the cable, electromagnetic interference, interference with the organization of a wireless network, etc.

That is, even conditions that are not scientific and are not stipulated in textbooks on subjects. When switching to the following, higher network levels, in the "Computer Network" item, you need to use tasks including conditions from both previous sections and from the current to fix the understanding of their relationship. The same thing happens when moving to higher-level knowledge in other subjects and courses. To do this, it is recommended to create options for tasks based on the identity of the following elements in several tasks:

a) Identity of the goal - the new task has the same goal as the previous one, but the condition or problem is different. In this case, an understanding of new dependencies and awareness of the relationship between known goals and has just studied the terms of action is formed. This communication strategy with each other of several tasks is recommended to be used when studying material with a deepening, that is, when the material is studied from more general concepts to more detailed. For example, studying the structure of the computer and possible breakdowns, first consider individual devices, then their components, then an electronic device. So you can detail to individual integrated circuits. Thus, it is possible to associate problem situations on the target, and more frequently change the conditions of action in them.

b) the identity of the condition - there is another goal in the new task, but there is a condition / conditions from previous tasks among unfulfilled conditions. This option implies the study of communication between different subject areas. So, for example, to demonstrate and summarize students to understand the relationship between the areas, the tasks are created in which the goal is characteristic of this area,

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and the condition for one of the regions studied earlier. A similar relationship between tasks is characterized when the adjacent areas are being studied in a certain order, which have the same items in their base. For example, both electrical equipment and microelectronics are characterized by general physical principles.

c) Identity of the problem - the same problem is manifested in the new task as in the previous one, although the conditions (or even the goal) may differ. Such binding tasks is advisable to generalize causal relations in subject areas. Therefore, the strategy is convenient to apply in the final stages of working out professional skills in the subject area. If there are many different tasks in the knowledge tree of a specific area, in which the same problem is caused by various unfulfilled conditions, this indicates the high difficulty of problem situations. Therefore, they require several developed skills in the problematic situations of this direction. For example, in the course "Computer networks" a set of target to "contact a shared resource" and the "Node not found" problem captures a wide variety of conditions at different levels for suspect. Also, the other purpose of "passing the Ping request" when a large number of conditions is not fulfilled, the "node not found" problem causes exactly the same problem.

Using the described task organization strategies, the teacher also receives a tool for checking knowledge chance. By specifying a series of tasks with identical elements (targets, conditions or problems) on the results, it is easy to determine the rate of skills, while the optimality of solving the problem will vary greatly. It should be noted that it is necessary to distinguish between the chance of a successful solution and the point of experience. In the first case, when repetition, the task or task is similar to the high probability that the student will not cope with it. In the second case, the practice shows that the trained successfully decide it, as they have appropriate experience and skills. Therefore, it is necessary to expand the experience with related task series.

Requirements for students to achieve an effective learning organization using intelligent training systems.

One of the main important features of the trainees is age. The training system is designed for the development of professional skills that are beginning to develop in high school age and in the early years of study at the highest school, and then continue to develop throughout their professional activities. Therefore, it is not intended to use a system with more younger learners. Typically, children at this age require the most visual learning, various developing complexes, clearly simulating phenomena and processes. Here, the main thing is to develop a general presentation of the study on the world around. In addition, most of them may have insufficient development of figurative and logical thinking.

As a result, the mass use of this system in large groups has not been investigated. In addition, at school age, the task of developing professional skills and experience in narrow subject areas is not worthwhile.

Psychological features of trainees can cause resistance in the implementation of the use of a learning system based on problem situations. When testing the learning

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system, there were problems with students, with conservative ways of thinking, in which new diagnostic tools cause negative emotions and reduce the level of activity.

A similar effect occurs in humanitarian students and with the humanitarian warehouse of the mind. The first group of persons learning on this system does not concern, as it is originally intended for substantive learning computer science. It is more difficult with the second group, since the learners with the humanitarian warehouse of the mind are also among students enrolled in computer science. Here, adequate psychological and pedagogical methods should be applied to clarify the need to apply this intellectual learning system. The activity of thinking is also required, an analytical mindset, a sufficient level of logic-inductive abilities.

Given that the resolution of problem situations requires the presence of formalized knowledge of students, theoretical acquaintance with the subject area, objects and processes of problem situations is very important. If some students confidently solve certain tasks, it testifies to the presence of life experience and / or intuition. Naturally, these data is necessary and will be very useful with further training.

Nevertheless, the teacher should pay attention to the data of groups of persons and teach them by individual methods.

Training system as an additional tool. There are several features in the event of a system as an additional instrument of the learning process. The use of the training system in this form is very recommended and no special rearrangements of the system requires. With the help of the developed intelligent training system, the teacher receives a new tool for organizing an additional type of task. It seems that the tool can enter the practice of use, as well as in practice several years ago various test shells. We agree that due to the complexity of the training system, the implementation may not be so fast, but still more intense compared to simulation simulators.

Taking into account the necessary time costs, it is worth noting that when organizing problem tasks in the real educational process, it is necessary to take into account the complexity of the task itself. Since the solution of the task in the training system requires a certain range of time, then very simple tasks and situations should not be applied, except for training. Otherwise, trainee will more spend time on the necessary actions in the system to resolve the problem situation than actually the intellectual work on its search. In this case, the teacher may more solve such simple situations using manual methods than taking students, as it is necessary for this time for organizing access to the system, log in, solving the problem, analyzing the results by the teacher.

When using this learning system, as an additional tool for organizing problem learning, it is recommended to apply it according to the following scheme. Use within the framework of individual large topics that include a variety of problem situations. After familiarization with theoretical material and a certain number of practical classes, it is advisable to offer trainee simultaneously with the acquisition of practical skills to individually develop problems solving the skills. The restriction is caused by

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the desire not to overlap the real practice by artificial methods. If, in case of distance learning, such a realization of problem learning is almost the only opportunity to try their strength, and, as a result, it is recommended to regularly solve problems after studying the theory, then it is necessary to use a more efficient scheme with classical learning. Thus, with ordinary, not remote, learning, it is recommended to use training in solving problem problems in the discrete moments of time in the course of practical training sufficient time. Depending on the level of trainees, it can be comparable to the number of practical training.

The diagram displays an exemplary application of the training system based on problem situations in classical training.

The basic recommendation concerns that the period of using the system does not begin before practical training, as well as to be as shorter time intervals, when the students simultaneously have three types of classes (lecture, practical and problem).

Demonstration of problem learning techniques with intelligent training systems.

Consider the operation of the system on the example of one problematic situation of the "Computer Network" course on the lesson "DNS service". The purpose of the lesson is to include the purpose and principles of the functioning of the DNS service, work out the skills of the permission of problematic situations associated with the operation of the DNS service. At first, the teacher tells and demonstrates students to work the principles of the domain name service (DNS), it shows that the service is necessary for transformation (permission) of the symbolic names of the nodes in their IP addresses. After studying the theoretical material, it is proposed to work out the skills of solving problem tasks on this topic using the ITIS Learning System. We describe the actions of each system user.

Expert actions. Formalized knowledge in the system is stored as a tree. This structure is a graphical representation of product rules. In the proposed example in the database there is already a fragment of the knowledge tree.

Each top-level node is a target that requires for its achievement the condition denoted by the low-level nodes. To achieve the target "Computer is available on an IP", you need to perform three conditions - "Enabled file and printer access service", "Availability of access rights to a computer for a user" and "Powder Ping query between nodes". Each condition can be formalized in more detail.

Suppose the expert collided with the following problematic situation - when the goal "Access to the node on a symbolic name" reaches the purpose, the "Node not found" error appears. In real life, the expert has established that the cause of the problem was that the client had cache entries containing incorrect data on IP addresses. Therefore, the expert wants to describe his new experience in the knowledge base, that is, to expand the database fragment to the state shown in the figure.

By logging into the system under its login and password to add condition / scenes, the expert highlights the desired flow in the tree, clicks on the Add button and makes data on the condition to the appropriate fields. When creating the condition, the expert must also specify the types of nodes.

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In the described example, a fragment of the required tree already exists in the database. Therefore, the expert creates only missing ate, and the existing target "joins" in the form of a condition for the purpose "Computer is available by name". In addition, the expert should describe the problems arising from the non-fulfillment of a certain condition regarding a specific goal. For each problem, it fills three fields: the goal relative to which the problem arises; the condition, with the failure of which the problem arises; and actually the wording of the problem.

Thus, the expert describes all formalized knowledge and experience in the training system. Actions of the teacher. The main actions of the teacher are to create and send problem tasks, viewing the results and developing control influences. Consider the necessary actions on the task of the problem situation to the student with the source data: the goal is "the computer is available on the network by name", and the problem is the "specified node not found".

Initially, the teacher enters the system under its login and password. On the "Create Task" page there is a master of creating and sending problem situations with students, which conducts a teacher through all the necessary stages.

1. The teacher chooses from the list of students who will be sent to the task.

2. On the next page, you search and select the main objective task in the knowledge base, in this example it "computer is available on the network by name". The search occurs by keywords.

3. After choosing a goal, the system looks through its tree for the presence of branch alternatives in it. If those are present, the system is in turn from top to bottom. Each follower requests the choice on one alternative to the teacher. Alternatives are displayed as a list with switches. In our fragment, there are two alternatives in our fragment: computers are located on the same network and computers are in different networks. The teacher chooses a simpler version - "Computers are on the same network."

4. The penultimate stage consists in choosing unfulfilled conditions / conditions. Based on previously specified data, the system automatically defines all possible conditions and gives the teacher to their list. In this case, the condition "Cache of DNS records is relevant on the client" is selected.

5. At the final stage, the teacher confirms all the specified information and sends the task of students.

Student actions. The student, having logged into the system, on the "My tasks" page has access to all tasks sent to him. For each of them, it can view the source data (target and problem) and select any to solve. The tree of formalized knowledge and the problem of problems learned is unknown and unavailable. The purpose of solving problems is precisely in developing skills of optimal solutions to problems, as well as in the indirect formation of understanding of causal relations in the subject area.

The goal of solving the problem is to specify the learner unfulfilled conditions or conditions that lead to the problem. To do this, in the interface of solving the problem by keywords is looking for a condition and triggers it, as a result of which the system returns the answer - this condition is executed or not. Of the foregoing it is

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easy to notice that all the solution to the problem task looks like a dialogue with a training system.

It is important that this dialogue is aimed at narrowing the circle of suspected conditions, that is, to reduce the level of uncertainty of the cause of the problem.

In the figure, for this task, the suspects are allocated by an additional contour. In the proposed example, one of the students may be as follows.

1. Seeing the problem "Node not found", the student decides to find out whether the specified computer is enabled, as this is a common cause of the problem. He finds the keyword "PC of the appointment 'b' included" and requests its execution. The system responds - "Yes (executed)", that is, the computer is turned on.

2. The student is trying to find out if there is a connection between the nodes on the network level, and checks the hypothesis: "Ping's request passes between the nodes." The system returns a positive response, since the unfulfilled condition is not in the tree of the scene.

3. Then a student, realizing that the problem lies at a higher level than the network, namely, it may be in the operation of the DNS service, they will check the "DNS queries' resolution is successful." The system will return a negative answer ("no, unattainable"), since in the case of an irrelevant cache, incorrect information about the IP address is returned.

4. If the student correctly understood the topic of the lesson, he will not be difficult for him to check all the conditions on which the functioning of the characterization of character names in the IP addresses depends, and find unfulfilled. Thus, the problem situation is permitted, in the course of its solution, all student requests narrowed the circle of suspected problems, and therefore the level of uncertainty the cause of the problem declined.

The actions of the second trainee:

1. The first check will be the hypothesis "Ping request passes between nodes." The system will respond "Yes, executed". This request narms a circle of suspected conditions.

2. For example, the student badly understood the explanation of the teacher (or does not have proper experience) and requested the test of the hypothesis "on the client the DNS server is specified." The system will also answer that the scene is achieved. However, the query does not narrow the set of suspected conditions, since this condition causes another problem - the message "Unable to resolve the name of the node". Thus, the student performed a non-optimal action.

3. Suppose that as the next hypothesis, he requested the verification of the condition "the permission of the DNS requests is successful" and then successfully solved the task.

Conclusions and suggestions. Based on these two examples, a possible course of students' thoughts was demonstrated when resolving the problem situation, one of them is completely optimal, the second - no. Thus, it is proved that in the intellectual system, the decision of any task may differ. Nevertheless, it is important that every step is aimed at reducing the uncertainty of the cause of the problem. Solving such

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tasks in the ITIS Learning System system, trained acquire individual experience in distressed situations and develop their own level of independence.

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