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ALGORITHM OF VIRTUAL TRAINING COMPLEX DESIGNING FOR ENTERPRISE PERSONNEL RETRAINING

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In the study of most subjects it is necessary to support indissoluble connection between theoretical analysis and experimental research. In the traditional method of training experimental research can be conducted in normal laboratory conditions [2]. Current rate of development of distance education has put before the developers the problem of unification of virtual simulators (VS) creation methods. Solution to the problem is possible with common algorithm for the creation of computer simulator that is not focused on any particular discipline.

Modern computer technologies allow to automate the process of theoretical knowledge gaining, as it has no significant difficulties in implementing the corresponding software. More difficult in terms of automation is the process of practical skills development [2], as well as learning new methodologies used in the study.

The purpose of research is development of the algorithm of virtual simulator designing, and sequence of development stages. IDEF0 function modeling methodology is used as research method.

Simulators can be created with the help of specialized computer systems (constructors) or by a combination of various software tools. Currently, constructors of computer simulators, as independent software packages, allow you to create simulators almost of any subject from scratch, are not widespread. Either way, regardless of a method of simulator creation to be used, it is necessary to adhere some algorithm of virtual simulator designing to automate the process and try to consider maximum number of components and features in it [3,4].

In a number of works attempts to develop and formalize the algorithm of virtual simulator designing have been made, but they were focused only on a small number of industries: nuclear, petroleum, railway and electrical engineering. Also, besides this disadvantage – a narrow focus, it should be noted that there was no multi-user mode provided in a considered number of works. Among other restrictions, an orientation of virtual simulators on operators retraining can be mentioned. In this work we propose extended, yet universal (not tied to any particular discipline) scheme of the algorithm, which eliminates the above disadvantages (partially). The scheme of the algorithm of designing of a virtual simulator for operators of chemical and technological systems was taken as the base [1].

The process of computer simulator designing, which is an intelligent system itself, requires several tasks to be solved for providing required characteristics of a virtual simulator.

The algorithm of a virtual simulator designing can be represented as a functional diagram in IDEF0 notation. It consists of following 8 stages:

1. Development of the structure of a virtual simulator.
2. Analysis of regulatory documents.
3. Designing of a front panel of a virtual simulator.

4. Development of a mathematical model.

5. Development of core modules.

6. Development of training methods.

7. Assembly of a virtual simulator (integration of its modules).

8. Testing and approbation of a virtual simulator.

The inverse decomposition allows to represent considered algorithm stagewise as follows:

1. Analysis of the subject field.

2. Modeling of a structure of virtual simulator.

3. Adjustment of a virtual simulator.

4. Packaging and testing of a virtual simulator.

As a result of research, the algorithm of a virtual simulator designing was developed. The sequence of development stages were presented in the form of diagrams in IDEF0 functional notation. Obtained results are supposed to be used in creation of a virtual simulators. It will allow to increase efficiency of training process, to learn the technological process and its controlling system depending on the orientation of virtual simulator, to get practical skills, and to reduce influence of a human factor while operating with real equipment.

Simulator designing with observance of processes and stages separation makes it possible to significantly reduce development time, to improve the quality and reliability, to simplify the process of maintenance, updating and support of virtual simulators. Especially when a virtual simulator is created by a team, such approach gives the opportunity to adapt already developed technology (algorithm) for creating simulators on other disciplines.

References

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