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### **Automatization create electronic learning**

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In this work a method of automatization created electronic learning are proposed. The programs for realization it on the computer are created.

Currently many high-quality software products designed for learning process purposes are presented at the market of computer-based learning systems. These products are developed both by domestic and foreign companies (mainly foreign). As for development of Electronic Educational Publications (hereinafter – EEP), it is quite a laborious task. While creating any EEP, in addition to selection of educational material, the developer has to consider some common issues, like data representation, implementation of user interface, preparation of control tests, etc. The EEP Generator allows us to automate these actions.

The Generator is designed for educators' independent work. It allows the instructors to create EEPs for their subjects in accordance with the requirements of national standard of the Republic of Kazakhstan ST RK 34.017-2005 “Information technology. Electronic publications. Electronic educational publications.” There are no counterparts of this shell program in Kazakhstan.

Using the Generator reduces the time of creation of electronic educational publications and expands the range of potential authors.

There is no need in programming when creating e-textbooks with the Generator. The teacher puts all the training materials in the program, and then it generates the EEP on the basis of the loaded data. Input and output data of the Generator is shown in Figure 1.

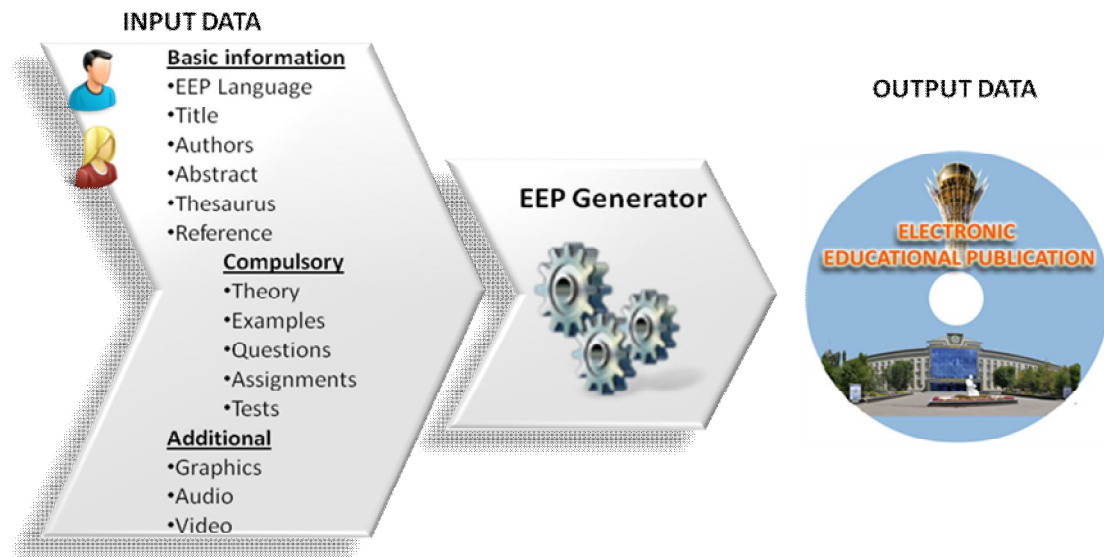


Figure 1

The advantages of this approach are as follows:

- Economically efficient;

- Allows concentrating on the material selection;
- Reduces the time of creation.

Data input is maximally simplified. There are two ways to input text information (theory, examples, assignments, questions and tests).

The first is to enter data in the EEP by selecting the buttons in the generator "Theory", "Examples", "Assignments," "Questions", "Graphics", "Audio," "Video", "Tests". The required structure of folders and files is created automatically and saved in a database.

The second method. Let's say you have already generated some data. To connect it to the EEP, you should just bring the information to a specific format.

The foundation of the generator development is the frame concept, designed by Marvin Minsky, one of the founders of the artificial intelligence theory. He believed that mental processes are based on people's memories stored in different data structures – frames [1]. Thanks to them, one realizes visual images (visual frames), understands the words (semantic frames), arguments and actions (scenarios frames and behavioral models). Thus, frame is an elementary semantic unit. This concept is used to improve the perception and control attention of students. For this purpose, EEP provides the possibility of installing educational material as a sequence of so-called “screens” – audio-visual frames, or simply frames. Training material is divided into semantic frames. Typically, one screen contains one semantic frame. If the semantic frames are simple to understand, hierarchically equal in the training material and follow each other, they can be placed on one frame-screen. This method of information presentation can significantly improve the perception of the information. Failure to follow these rules dramatically worsens the perception of information. For example, if one frame-screen contains several certain concepts, torn by explanations, the information cannot be perceived (violation of the equivalence of hierarchical frames). The correct choice would be to place concepts on the first frame-screen and their explanations on the next frames (preferably, each explanation should be on its own frame).

The collection of frames, which simulates some subject area, is a hierarchical structure in which the frames are gathered by genus-species relations. The hierarchical structure of the generated EEP is shown in Figure 2.

The EEP consists of a cover page, abstract, table of contents, elements of learning and management functions. An element of learning is a semantic unit of training information. Elements of learning are lessons, modules and components. The lesson is the least semantic unit of training information, which includes the following parts: content, questions, assignments, tests, a glossary and a reference.

The content is the theoretical part of the learning material presented in the lesson. The content must consist of text, graphics, audio, video and other information related to the theme and appropriate to the selected audience, goals and objectives of the EEP.

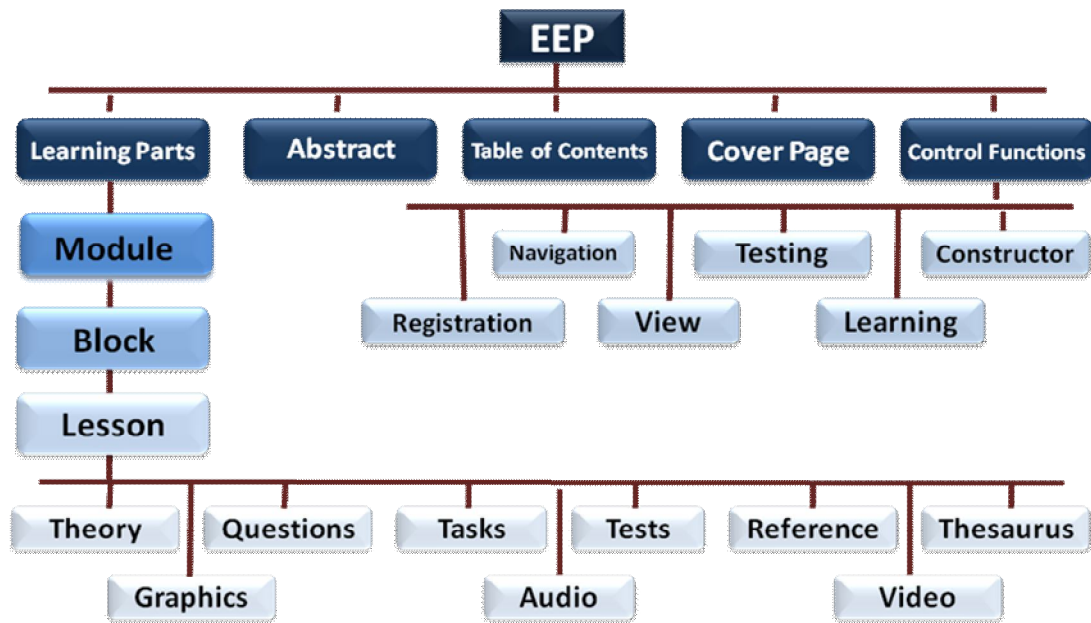


Figure 2

Management functions are registration, navigation, viewing, testing, learning, designing and help content. Registration provides the ability to enter data about the user (student) in order to keep statistics about him/her. Navigation is the apparent relationship between the elements of the EEP and provides the necessary means of orientation and movement in the EEP. View provides a view of the total volume of teaching material included in the EEP. The user will not perform the assessments. Testing allows you to check the student's knowledge as of the current lesson, and throughout the course of study. In order to do that, the tester randomly selects questions from a common database of questions on curriculum, provides questions and answers related to the chosen topic. Test results will be displayed on the screen [2].

Education provides the student with the opportunity to explore the theoretical material on the current lesson, look at the questions and answers, to do exercises or solve problems and take the tests. In case of insufficient number of correct answers to the tests, the student cannot go to the next lesson and will continue to examine the current lesson.

Start date begins with the selection of learning paths, which can be defined in three ways: manual selection, test selection and a full selection.

The manual selection allows the tutor or the student to determine the trajectory of their own by selecting blocks, modules, and lessons in the index of the EEP.

In the test selection the program automatically defines the trajectory of learning based on the test results throughout the volume of educational material included in the EEP. In this case, the trajectory will include only the lessons, which were failed by the students.

The full selection includes the entire learning trajectory of educational material (all classes, modules and components) included in the EEP.

One may continue the learning process according to the selected trajectory only, taking lesson by lesson.

The designer is a toolbar that facilitates the creating the path of learning. Each node in the framing system has the form shown in Figure 3.

Concept (Frame Name)		
Slot 1	Slot value 1	Procedures
Slot 2	Slot value 2	Procedures
...	...	...
Slot N	Slot value N	Procedures

Figure 3

The concepts in every node are defined as a set of attributes and their values that are contained in the frame slot. In addition to the specific value the slot may store procedures and rules that are invoked if it is necessary to calculate this value. Among them there are procedures-daemons and procedures-slaves. The first start automatically when a certain condition arises, while the latter are activated only by a special request.

A slot is an attribute associated with the node in a system based on frames.

The slot is a component of the frame. Slot is named in accordance with the type of attribute; the value of the slot may be an instance of the attribute, the other frame or a facet.

Each slot can be linked to one or more procedures that are performed when values of slots change.

Most often the following procedures are linked to the slots:

1. If added (performed when new information is added to the slot);
2. If deleted (this is done, when some information is deleted from the slot);
3. If needed (this is done, when requested information from an empty slot).

The data structure of a frame lesson is presented in Figure 4.

Procedure 1: daemon type procedure “if needed”, the necessary file is retrieved from the database, the program runs the macros that converts the documents into an \*.htm format to be included to the EEP. When delivering the text information, the generator adjusts the text information of all classes to a single style: font Times New Roman (Cyrillic), size 14, the background of the main text is white, correct answers’ text background is light blue, hints’ background is light yellow.

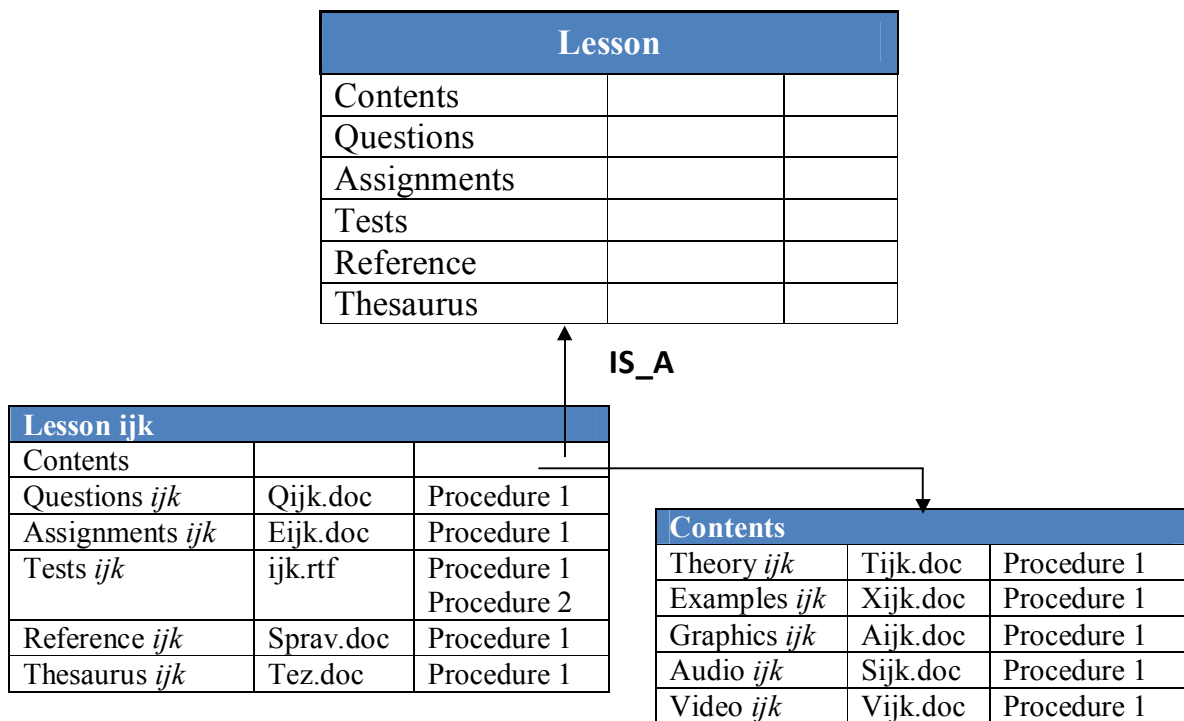


Figure 4

Procedure 2: if the test is not failed the student is moved to the next lesson. Once all the lessons of this unit are successfully completed, the student is automatically taken to the next unit. To move to the next block, you have to first pass the *intermediate* control of knowledge (the number of tests equals to the number of lessons in the unit; each test is randomly chosen for every lesson). To move to the next module, you have to pass the *endpoint* control of knowledge. At the end of training the *final* control of knowledge is offered. In case of an incorrect answer to a specific question in the intermediate, endpoint or final testing this lesson is included into the learning program again.

By the types of perception of information people are divided into three types: visual (perception of information through sight prevails), auditory (through hearing) and kinesthetic (through experience). The perception of information of all types of people is improved if all channels are used. Didactic feature of the EEP that are created by the generator is its multisensory experience. The student receives all kinds of information at the same time. In addition, the transition from one screen (and, hence, the semantic unit) to another is controlled by the student (just press the button). This allows the student to choose the pace that is comfortable for him/her. Besides, it adds the kinesthetic element in the perception of information.

To improve the perception the program also uses a number of methods of attention management. These include the high amount of graphic illustrations, animations, fonts, and color selection, etc.

Using the concept of frames, multisensory experience, and attention management possible technologies enabled the creation of EEP having high density of information. The learning process becomes an individual process (for teaching in a computer room or at a personal computer at home).

Psychologists have noticed that the recognition of objects is easier in the usual context than in a precarious situation. That is, the student will be easier and faster perceiving new information from various disciplines using the EEP with a unified interface, a single way of composition of the learning elements and management structure, all of which can be easily created with the generator.

## REFERENCES

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**Омарбекова А.С., Сундетова А., Исмагамбетов Б.**  
**Электрондық оқу басылымын жасауды автоматтандыру**  
Бұл еңбекте электронды оқу баспасын жасауды автоматтыңду әдісі ұсыныланады. Оны компьютерде жүзеге асыру үшін программалар құрылады.

**Омарбекова А.С., Сундетова А., Исмагамбетов Б.**  
**Автоматизация создания электронных учебных изданий**  
В этой работе предлагается метод автоматизация создание электронных изданий. Для его реализации на компьютере разработаны программы.