

The structural organization of the electronic database of clinical cases of a higher medical institution based on informational and educational web technologies

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Nowadays, the most important direction in the field of higher medical education is the necessity of great increasing of the practical aspect of the future physicians training, as well as high-quality postgraduate training with the keeping of the appropriate level of theoretical knowledge. The classical system of higher medical education is not able to solve the problem of practical training of doctors fully. The main obstacles to this are the impossibility of a practical illustration of a number of clinical cases and situations.

The visualization of educational information with the help of informational and educational technologies allows to solve a number of pedagogical tasks, such as providing the intensification of education, the activation of educational and cognitive activity, the formation and development of critical and visual thinking, the visual perception, the imaginative vision of knowledge and learning actions, knowledge transfer and the recognition of images, the improving of visual literacy and culture.

Within the framework of medical education the implementation of visual methods of displaying information improves the quality of the physicians training within medical education. It is also contributes the deeper memorizing the material, development of professional capacity and most fully responds to the requirements of modern medical education and to the physician necessity in continuous improving of professional competence.

There is a special interest in the implementation of the visualization methods into the continuous medical education, which is motivated by the development of medical science, the increasing of the information flow, to learn which the traditional methods and means are not appropriate. The dynamic, mobile learning means are required to accumulate, absorb, keep, revise and transfer information within the medical education. They promote the systematization of knowledge based on the visualization. The educational information based on multimedia opens up the possibility of supplementing of the traditional teaching methods with audio and video files and schematic visualizations that enables to enrich the educational process with multifarious information and to contribute to its more effective mastering.

The modern medical education, both undergraduate and postgraduate stages of the physicians training, should support the formation of an active learning process, the development of abilities for self-learning, memorizing, systematization of the learned material and the ability to use this knowledge on practice.

That's why, the appearing of the simulation training using interactive web technologies is an indispensable part of the modern medical education, and computer simulation based on objective data and data of the additional research methods of the real patient (ECG, Echo-Cardiography, CT scan etc.) allows to predict the tactics of examination and treatment, reduces the potential risk for the patient and, as a result, improves the quality of medical care.

Prerequisites for the creation and implementation the electronic database of the clinical cases into the educational process with the help of the informational and educational Web technologies in clinical departments:

- The periodic absence of thematic patients to demonstrate to the students and the connected with it impossibility of a practical illustration of the whole diversity of clinical situations;
- the necessity of significant amplification of the practical aspect of future physicians training, as well as high-quality postgraduate training with the proper level of theoretical knowledge keeping;

- the necessity to optimize the traditional means, methods and forms of learning;
- the necessity of a qualitative visualization of additional survey methods;
- the necessity of improving knowledge control methods, the introduction of the computer testing, and the active learning strategies;
- the necessity of including new information and educational Web-based learning technologies that increase the efficiency of teaching and learning into the educational process.

The creation of the electronic databases of clinical cases and the exchange of them between different higher medical institutions is most important today. It would ensure the experience exchange, the preparation of high-quality educational content and the improvement of the medical education quality, both in the undergraduate and postgraduate stages.

In this article, according to own experience, the structural organization of the electronic database of clinical cases of the higher medical institution on the example of the subject "Internal Medicine" is presented. The electronic database of clinical cases should have two modes of studying the material: the first one is the studying/training mode, and the second - is the exam mode. Before starting the work with the electronic database of clinical cases, the user has to choose the mode of work with the electronic database of clinical cases. The case number should be assigned centrally at the general university level for convenient systematization of educational information with the discussion of the form identifier for the presentation of the material.

The electronic basis of clinical cases may include the following forms of clinical situations presentation (the forms identifiers of the clinical cases presentation in the electronic database):

1. A publication (the detailed description of the clinical case in the form of an article);

2. A publication with a separate test simulator according to the clinical situation described in the article;
3. A presentation of clinical cases, video / audio lectures of clinical cases, lectures on problematic clinical situations (a detailed presentation of a clinical case with visualization of the results of the survey, a review of clinical guidelines due to the case pathology presented, a discussion of clinical situation features, treatment results, a discussion, pending issues, research perspectives, etc.);
4. Clinical cases simulators (combining a specific clinical case with logically related test tasks on the topic of the clinical situation);
5. Information simulators for working out practical skills (a combination of the theoretical material on a specific topic (clinical situation) with a number of testing clinical situational tasks);
6. Medical educational web-quests (a combination of several topics in "Internal Medicine " subject within one problem task with the elements of the detective-style information game, with the creation of a manifold scenario with a combination of the theoretical material on several topics, with the working on the practical skills and the test simulators)

The structural organization of the clinical cases electronic database of a higher medical institution can be represented as follows (on the example of the subject "Internal Medicine") (Fig.1.).

The use of the interactive simulators / virtual simulators of real clinical cases allows you to simulate different clinical situations using the modern web technologies, including rare clinical cases with the practice of the diagnostic skills and treatment algorithms, the algorithms for action according to one or another clinical situation. It allows to do certain exercises and actions according to the offered algorithms (the possibility of unlimited number of repetitions of skills working out), provides an individual approach in the preparing/improving the qualification of medical personnel and therefore provides the improvement of medical care quality.

It is also advantageous that clinical experience in the virtual environment does not have a risk to the patient, and with the help of test control an objective assessment

of the achieved skills level is conducted. The training can take place at a convenient time, regardless of the work of the clinic, a part of the teacher functions is given to the virtual simulator, that contributes to the formation of independency in making a decision, and also contributes to the increasing the effectiveness of medical professionals training in accordance with the new high-tech techniques.

The studying/training interface for the systematization of the presented clinical cases involves an open thematic structure of the clinical cases selection, the exam mode assumes that the user does not have the information about to which section or topic a specific clinical case belongs to, because, first of all, the student has to make the correct diagnosis. This applies more to such forms of displaying the clinical cases electronic database, such as the clinical cases simulators and medical educational web quests.

The case number should be assigned centrally at the general university level for the convenient systematization of educational information with the discussion of the form identifier for the presentation of the material.

In the electronic database of clinical cases the form material presentation identifier may be represented by the letters A, B, C, D, E, F, G, located next to the case number. Thanks to the letter the user will understand what form of presentation of a clinical case is typical for the particular case.

Example

- A. A publication;
- B. A publication with a test simulator;
- C. A presentation of clinical cases;
- D. Video / audio lectures for clinical cases, lectures on problematic clinical situations;
- E. Simulators of clinical cases;
- F. Informational simulators for working out practical skills;
- G. Medical educational web-quests.

Case 1 (A)

Case 2 (B)








Case 3 (C)

...Case 58 (D)

...Case 115 (E)...

Alternatively, the identifier of the form of the material presentation in the electronic database of clinical cases may be represented by graphic images located next to the case number. Thanks to the graphic object, the user will also understand what form of the clinical case presentation is typical for a particular case.

Example

	A publication;
	A publication with a test simulator;
	Presentations of clinical cases;
	Video / audio lectures for the clinical cases, lectures on the problematic clinical situations;
	Simulators of clinical cases;
	Information simulators for working out practical skills;
	Medical educational web quests

Case 1



Case 2



Case 3



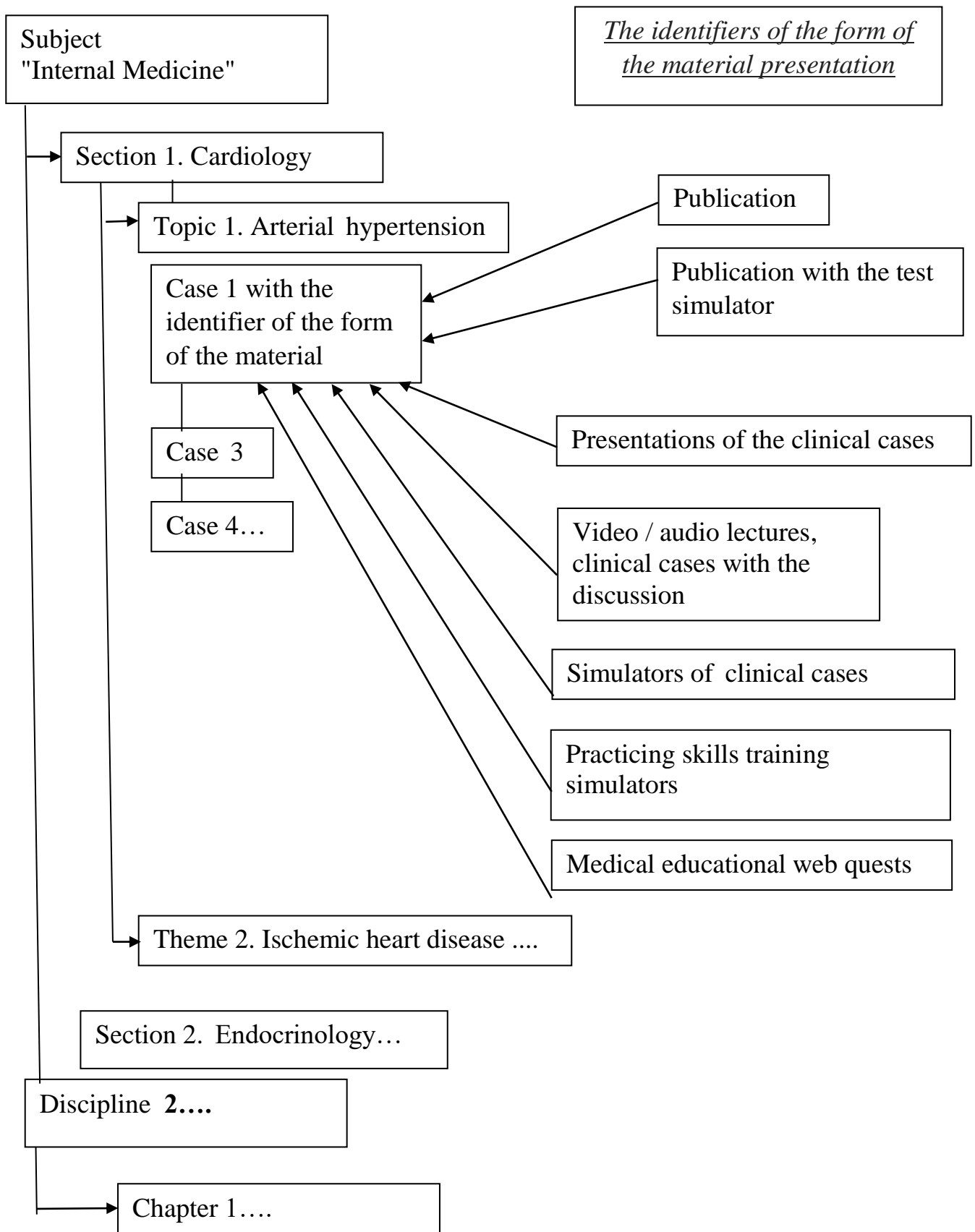
... Case 58



... Case 115



THE ELECTRONIC DATABASE OF CLINICAL CASES



Picture.1 Structural organization of the electronic database of clinical cases of

a higher medical institution (studying / training process).