ONTOLOGIES IN CONSTRUCTION OF MEDICAL KNOWLEDGE MANAGEMENT SYSTEM

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High-technology medicine of XXI century calls for specialists with high level of professional competence. Value of qualitatively new medical knowledge and skills is growing up. Clinics increasingly frequently prefer to employ physicians mastered in cutting-edge treatment and disease prevention technologies, and future students opt for institutes of higher medical education that comply with requirements of modern medicine. Meeting human resources market needs competitive medical universities mold innovative educational strategies. Implementation of these strategies requires capability to manage large arrays of medical knowledge within diverse formats, sources and localizations. Knowledge management includes management of creation, dissemination, processing and utilization of knowledge. For this purpose knowledge management systems (KMS) are developed. To design KMS various methodological and technological techniques are used. This research was to investigate potential of ontological approach for KMS constructing.

Knowledge management is impossible without presentation of accumulated knowledge in system-based view and form eligible for computer processing. In our opinion ontologies that enable development of concept-based descriptive model of a subject field are optimally fit for handling this problem.

At Pirogov Russian National Research Medical University (RNRMU) significant amount of medical knowledge was accumulated that has various format, localization and structuredness level. The key stages of KMS designing are extracting and structuring of knowledge. Quality of these stages execution defines KMS viability and performance capabilities. Using methodology of ontological engineering the following was performed:

1) academic disciplines decomposition into educational modules and subjects;
2) key terms and notions selection;
3) subject field concept categorization and terms specification;
4) subject field glossaries development;
5) identification of core types of relations between concepts;
6) design of ontologies for selected medical disciplines;
7) implementation of reengineering.

Ontological approach allowed to:

1) systemize medical knowledge of various academic disciplines;
2) develop common glossary to describe medical education resources of the university;

3) integrate medical knowledge located within various departments and organizational units;
4) transform not evident medical knowledge to evident;
5) build structured index of education resources of the university;
6) structure subject fields and present medical knowledge in computer-readable format;
7) enable knowledge warehouse arranging within university;
8) construct the basis for automated designing of test tasks for academic disciplines according to medical university curriculum;
9) identify correspondence between referenced ontology and student's ontology of the medical-biological discipline developed during learning process;
10) manage learning trajectory of each student.

The study showed powerful capabilities of ontological approach for KMS contracting within medical education. Meantime, some limitations of this methodology are observed:

1) extra workload during ontology constructing, and its multiple increase due to depth and vastitude of medical knowledge;
2) significant obstacles while transformation of not evident medical knowledge to evident;
3) considerable time consumption for ontology development;
4) limited number of subject matter experts willing to participate in ontology development;
5) complexity of knowledge perception stored as ontology.

Nevertheless subject field ontologies within higher medical education evidently open up new opportunities for medical knowledge and studying process management aimed to develop higher level of competencies of a student within each academic discipline. It is one of the motion vectors towards professional competence elevation of modern medical doctor.