Розроблено програмне забезпечення для організації та управління роботою мережі салонів краси із використанням технології .NET Framework та мови C#, проведено тестування на працездатність програмного коду та на відповідність вимогам до системи.

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CHARACTERISTICS OF THE DEVELOPMENT OF AN IT PROJECT FOR CREATION OF OPEN EDUCATIONAL RESOURCE

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As part of the development of an IT project for the creation of an open educational resource and taking into account the peculiarities of storing user information and educational content, it was proposed to implement the concept of multivariate persistence based on a relational and document-oriented DBMS.

Keywords: multivariate persistence, educational resources.

Introduction. Open educational resources (OER) are publicly available digital materials developed by means of an open license, which can be used for studying, teaching, research, and others [1]. The most popular OERs are ITVDN, WebAcademy, SoloLearn and Prometheus. An analysis of the capabilities of these and other resources has shown that they all provide learning content to users in various forms, namely text, video and audio files, images. Analysis of existing OER design technologies has shown that, as a rule, when developing such resources for storing heterogeneous information, it is proposed to use the capabilities of either relational databases (DB) (SQL) or document-oriented database (NoSQL) [2]. The adoption of such technological solutions in the design of OER leads to poor performance of the finished system, the lack of scalability, problems with the manipulation of big data.

Therefore, to develop a new IT project for the creation of OER, the concept of multivariate persistence (data storage) is proposed.

Main part. The concept of multivariate persistence (MP) suggests a hybrid approach to storing data in a database, according to which complex information systems use data of different types, so choosing the right logical model for storing each type of data may be more productive than trying to use one database model for storing all information.

Figure 1 schematically shows the generalized OOP structures with classical and multivariate data storage approaches. The classical approach involves storing all types of data in a single database (Fig. 1a) and is not the best solution due to the difficulties of access and manipulation of large amounts of educational content data. An approach using the MP concept implies the use of several unrelated databases for data of different origin. At the same time, users' access to data is provided by means of applications interacting with them (Fig. 1b).

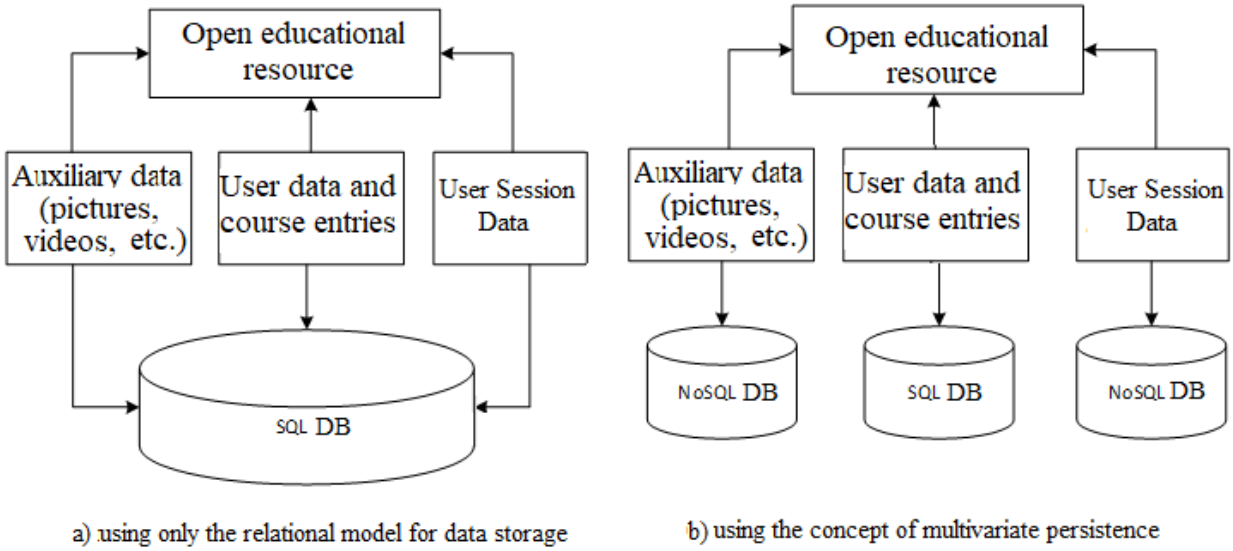

Figure 1 - OER schemes with different approaches to data storage

For example, it is proposed to store structured data about users and about the courses they attend in a relational database, where ensuring of their interaction takes place automatically due to the design features of each of the tables and the establishment of links between them. Training content will be easier to maintain in NoSQL database due to the possibility of storing large amounts of data and faster access to them, unlike SQL databases [3]. Thus, the MP uses the advantages of each type of database, by choosing to store the most

appropriate data models. Due to the fact that the databases in such a system are separate components associated only with a common management interface, they can be located on different servers and locations and can be easily scaled. Such a method will require synchronization of their work, which can be quite complex, but the advantage of increasing data availability covers all the disadvantages. The application, developed in accordance with the concept of MP, can include Redis as a MongoDB caching layer for collecting logs, Postgres for metadata and Elasticsearch for indexing and searching. The goal is to use the best component for a specific task.

Conclusions. As a part of developing an IT project for the creation of OER, existing approaches to data storage were considered. During the project initialization at the development stage of the technical task, it was decided to develop an OER supporting the concept of multivariate persistence using modern design technologies.

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КЛАСИФІКАЦІЯ ОБ'ЄКТІВ В ЗАДАЧІ СЕГМЕНТАЦІЇ МЕДИЧНИХ ЗОБРАЖЕНЬ

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Запропоновано алгоритм класифікації об'єктів в задачі сегментації медичних зображень з метою віднесення образу об'єктів розпізнавання до одного з кластерів, який може бути використано при створення інтелектуальної системи діагностики дерматологічних зображень.

Ключові слова: класифікація, сегментація, метод опорних векторів.