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DEVELOPMENT OF WEB APPLICATIONS FOR REMOTE LEARNING OF ENGLISH

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In recent decades, an additional problem has emerged in the development of education: knowledge ages every three to five years, and technological knowledge every two to three years. The amount of knowledge of university graduates doubles every three to four years. If it does not change educational technologies, the quality of training of specialists will lag the labor market. The assimilation of knowledge by students with the help of modern information technologies is faster than using conventional technologies [1-3].

Modern computer technologies can provide the transfer of knowledge and access to a variety of educational information more efficiently than traditional teaching tools [4-8]. In addition, the use of new technologies increases the interest of young people in the learning process [9, 10].

It should be noted that distance learning systems do not have special requirements for computer support, but are configured in such a way that someone automatically updates educational and methodological materials using the Internet [11].

Another major advantage of distance learning technologies is the cost of training. For example, Microsoft executives believe that the cost of online learning can be at least half the cost of traditional learning because the instructor can deliver classes from anywhere. Thus, the role of the teacher has a consultative value, freeing up time for the teacher for scientific activities.

We should note that adaptive learning web systems have gained particular importance, they adapt to the knowledge and abilities of the student, such systems have certain advantages [12]:

– Allow to reduce the unproductive labor costs of the teacher;

– Stimulate student learning, change the leading role of the teacher;

– Take control and assessment of learning outcomes to a new level;

– Provide for a differentiated approach to students, based on the recognition of the fact that the initial experience and level of knowledge in one area are different for different students (the student comes to mastering new knowledge with his intellectual baggage, which determines the degree of his understanding of the new material and its interpretation);

– Guarantee continuous communication in the relationship “teacher-student”;

– Contribute to the individualization of educational activities;

– Increase the motivation for acquiring knowledge with an individual approach;

– Contribute to the development of productive, creative functions of thinking, the growth of intellectual abilities, and the formation of operational thinking.

Among the most common distance learning systems are IBM Lotus Learning Management System, IBM Lotus Workplace Collaborative Learning, WebCT Campus Edition; WebCT Vista 3.0, BlackBoard, Prometheus, Moodle, eLearning 3000, WebTutor, Adobe Connect Training, Microsoft Learning Gateway, Virtual University.

Each of these distance learning systems has its advantages and disadvantages. For example, all software applications do not support such important learning functions as reporting support, development, and modification of schedules.

To automate the distance learning system, the functions of budget management, control of remuneration and training, integration with payment systems, accounting for internal and external transactions, and integration with billing systems are very important. Most of the existing remote systems do not support these capabilities.

Currently, the global informatization of all spheres of life is especially important to support advanced technologies and encourage users to work and training in remote systems with the organization of interactive interaction. For example, conducting online meetings, presentations, negotiations, meetings, as well as organizing web conferences, reports, lectures, educational seminars, and training. It should be noted that the more functions the system can adequately support, the more expensive its cost. In addition, the popularity of the developer company and the spread of the platform also affect the price.

The purpose of this work is the development of web applications using information systems design tools, which will allow users to learn a foreign language remotely.

The main table of the system is Articles (Fig. 1), where the main information about the articles available on the site is stored. Other tables also contain important information for the operation of the web application.

Tables have one-to-one and one-to-many relationships. The system MUST NOT have a many-to-many relationship; to avoid it, auxiliary tables are created.

For the development of the system, six main tables were developed (Table 1-6), excluding the database tables, where information about users is stored.

When developing the service for working with data, the Firebase system was used. Firebase allows you to store and sync data with a cloud NoSQL database. They synchronize data between all clients in proper time and remain available when the tool goes offline. The data is stored in JSON format and synchronized in proper time with every connected client.

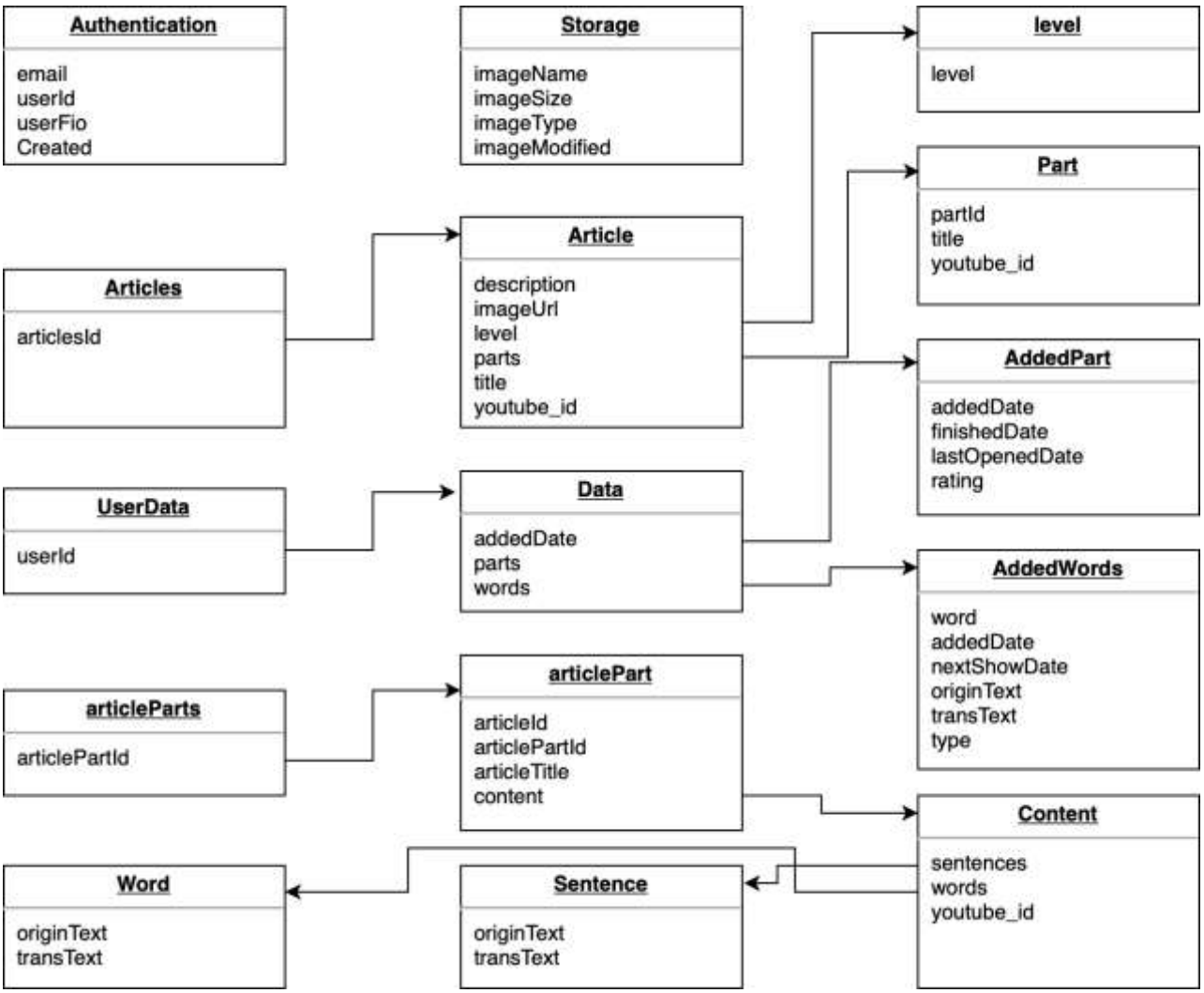

Figure 1. Scheme of the database of a web application for learning a foreign language.

Table 1. Table of the Article DB of the service for learning a foreign language

Data	Type	Autocreate	Example
description	String	No	Learning simple words
imageUrl	String	No	https://firebasestorage.googleapis.com /v0/b/english6499f.appspot.com/o/hppart1. jpeg?alt=media&token=1aee7cb5-9276-4a54-8e36-d541ed6ea0cd
level	Array	No	[B1, B2]
parts	Array	No	[part1: {Object}, part2: {Object}]
title	String	No	Simple phrases
youtube_id	String	No	nf3UfTY3fha

Table 2. Table Level DB of the service for learning a foreign language

Data	Type	Autocreate	Example
level	String	No	B1

Table 3. Table Part of the DB of the service for learning a foreign language

Data	Type	Autocreate	Example
partId	String	No	hp1
title	String	No	Simple phrases
youtube_id	String	No	nf3UfTY3fha

Table 4. Storage table of the service DB for learning a foreign language

Data	Type	Autocreate	Example
imageName	String	No	done.jpg
imageSize	Integer	Yes	44.15Kb
imageType	String	Yes	image/jpeg
imageModified	Date	Yes	Apr 22, 2021

Table 5. Authentication table of the service DB for learning a foreign language

Data	Type	Autocreate	Example
email	String	Yes	ivan@nure.ua
userId	Integer	No	Hjfswosjdv7xShS2Fjjsarbz1N8S
userFio	String	No	Ivanov Ivan Ivanovych
Created	Date	No	Apr 22, 2021

Table 6. Table userData database service for learning a foreign language

Data	Type	Autocreate	Example
userId	String	No	Hjfswosjdv7xShS2Fjjsarbz1N8S

When cross-platform SDKs are built for iOS, Android, and JavaScript, all clients use a single instance of the real-time database and are updated with the latest data.

When modeling the system, all scenarios that the user can perform are defined (Fig. 2) [13-17].

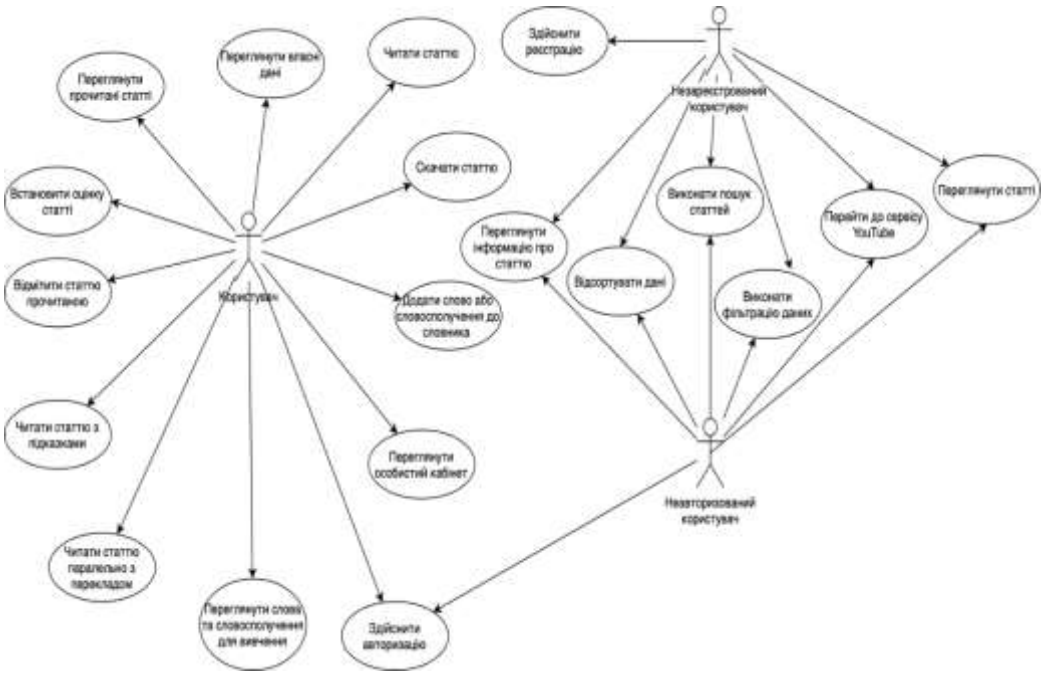

Figure 2. Use Case diagram.

When developing the system, difficulties arose when working with a new database; it is not relational and has a different logical approach – Firebase. Figure 3 shows an example of a table structure from a back-end data warehouse.

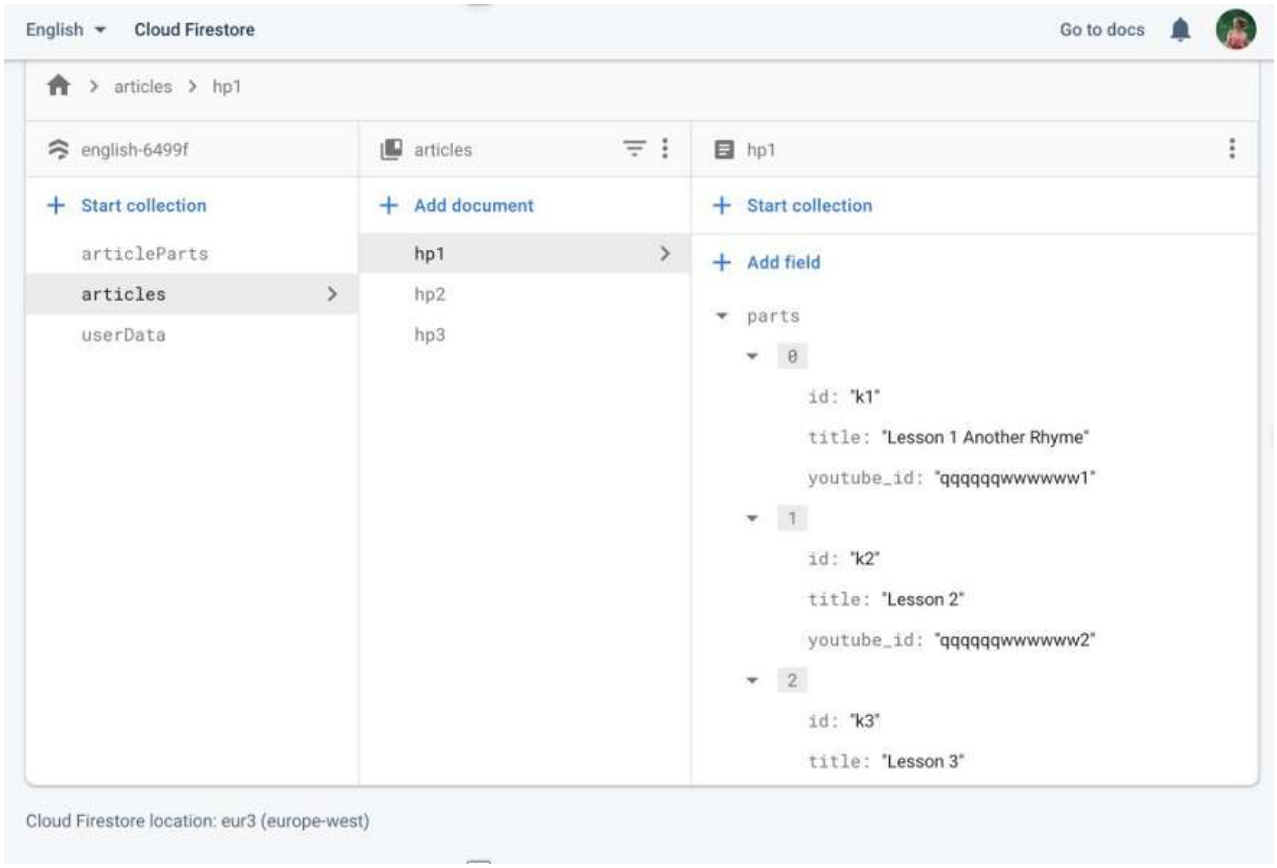

Figure 3. An example of a table structure in a Firebase database.

In the future, it is planned to expand and improve the implemented functionality, in particular, to implement a message system for users of the system, which will be

triggered when an action is performed, which is important for a specific user of the system, as well as to create a mobile version of the system, provide access to educational materials anywhere in the geographic location, for example, in transport, on vacation, and will allow the most efficient allocation of time to users of the system.

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