

OBJECTIVE QUALITY ASSURANCE AND STRATEGIC INSTALLATION OF ELECTRONIC LEARNING RESOURCES MANAGEMENT PROGRAM

Samandarov B.S., Kudaybergenov A.A., Tajibaev Sh.

Karakalpak State University named after Berdakh

Summary. The article deals with the construction of an object quality assessment algorithm and software architecture in designing the development of e-learning resources, successfully integrated into the system of education, the requirements for designing e-learning resources (ELR), and the features of automated learning systems effectively used in educational institutions - and from the point of view of developing the software quality assurance tool. As a result, the ELR Quality Assessment Algorithm and software development toolkit have been developed.

The mathematical expression of ELRs is based on their classification and selection of informative characters, as well as issues related to the quality of ELRs.

Key words: *e-learning resources, software engine, evaluation, quality criterion, client-server.*

Introduction

The development of information and communication technologies has increased the demand for information resources, as a result of which a great deal of attention was paid to the introduction of electronic resources into educational institutions [1].

In general, any information that can be used by an electronic device can be understood as an electronic resource. This definition of the electronic resource does not address the type of information used or its content. It can be seen that any information can not be used in the learning process. The information for the learning process is characterized by a sequence of sequences, consistency and regular updating of information. Information also has a complex of differentiating character, characterizing itself, and is intended for an audience.

Open source automated software systems that are embedded in the educational system are typically represented by a web page, web platform, or e-learning system of different types.

Website Content Management Systems - The development of Content Management System (CMS) has resulted in the emergence of special education systems that can be viewed as an example of a platform for educational systems or sites. Based on the definition of a management platform for education, this process is related to management. Then, we can estimate this process by relying on events that occur in a particular system of control [2,3]. ELR formation in e-learning is one of the key factors in ensuring its quality [5-9].

Mathematical support of the problem

Let's assume that the selection of educational choices is as follows: $x_{p1}, x_{p2}, \dots, x_{pm_p} \in X_p, p = \overline{1, r}$. Here's the $x_{pi} - N$ dimensional field vector, $x_{pi} = (x_{pi}^1, x_{pi}^2, \dots, x_{pi}^N), i = \overline{1, m_p}, N$ - number of characters, X_p is the object class, where m_p consists of x_{p1}, \dots, x_{pm_p} objects.

$\lambda_p = (\lambda_p^1, \lambda_p^2, \dots, \lambda_p^N), \lambda_p \in \{0; 1\}, i = \overline{1, N}$, which corresponds to the X_p class of informative characters in the partial space. It is determined by the quality criterion $I(\lambda_p)$ conforming to the given class of the given p -class and we have to choose the $l_p (l_p \ll N), \lambda_p$ informative character space:

$$\Delta^{l_p} = \left\{ \lambda_p: \sum_{k=1}^N \lambda_p^k = l_p, \lambda_p^k \in \{0; 1\}, p = \overline{1, r} \right\} \quad (1)$$

The criterion or character set (1) for the ELR class of the studied class is selected based on the $I(\lambda_p)$ quality criterion.

We set the quality criterion in the Fisher functional view [4] and describe it as follows:

$$I(\lambda_p) = \frac{(a, \lambda_p)}{(b_p, \lambda_p)} \quad (2)$$

Here are the vectors of $a = (a^1, a^2, \dots, a^N), b_p = (b_p^1, b_p^2, \dots, b_p^N)$, and their computation is as follows:

$$a^j = \sum_{p,q=1}^r (x_p^j - \bar{x}_p^j)^2, b_p^j = \frac{1}{m_p} \sum_{i=1}^{m_p} (x_{pi}^j - \bar{x}_p^j)^2 x_{p1} x_{p2} \quad j = \overline{1, N}$$

where \bar{x}_p is the average object of \bar{x}_p :

$$\bar{x}_p = \frac{1}{m_p} \sum_{i=1}^{m_p} x_{pi}, p = \overline{1, r}.$$

Let's assume that from the class X_p , let's give a pair of $\varepsilon = (\varepsilon^1, \varepsilon^2, \dots, \varepsilon^N)$ containing two small x_{p1}, x_{p2} objects and components with sufficiently small numbers.

The proximity function $\rho_i(x_{p1}, x_{p2})$ of the ELR is as follows:

$$\rho_i(x_{p1}, x_{p2}) = \begin{cases} 1, & \text{arap } \|x_{p1}^i - x_{p2}^i\| \leq \varepsilon^i, i = 1, N. \\ 0, & \text{otherwise} \end{cases} \quad (3)$$

The first condition indicates the closeness between the two ELRs, and the second condition is that they are different from each other, meaning that these components are not identical.

Below is the $x_{pj} \in X_p$ formula for computing the j -object's contribution to the formation of the class p

$$\Gamma_j(x_{pj}, x_{pk}) = \sum_{k=1}^m \sum_{i=1}^N \rho_i(x_{pj}, x_{pk}), j = 1, m; k = 1, m; j \neq k. \quad (4)$$

Below is the formula for determining the total contribution of p to class formation, taking into account the proximity of all objects

$$\Gamma_{general}(x_{pj}, x_{pk}) = \sum_{j=1}^m \sum_{k=j+1}^m \sum_{i=1}^N \rho_i(x_{pj}, x_{pk}), j = 1, m; k = 1, m; j \neq k. \quad (5)$$

Here's where value $\Gamma_{general}(x_{pj}, x_{pk})$ indicates the total contribution of all objects to the class P, it follows as

$$\Gamma_{average}(x_{pj}, x_{pk}) = \frac{1}{m} \sum_{j=1}^m \Gamma_j(x_{pj}, x_{pk}), j = 1, m; k = 1, m; j \neq k. \quad (6)$$

the value p indicates the average contribution of the class to all the items involved.

Software engineering architecture

Based on the above-mentioned algorithm, based on the requirements of the current software market, the demand for client / server technologies is strong. At the same time, the web client role must be browser-server function - web-servers.

Taking into account that the development of web browser-style user interfaces is one of the most striking changes in creation of software, the need for special client software layouts is solved, the platform selection problem is solved, and most importantly, the application will be able to access the software from anywhere.

Based on the need to develop a software tool for web-based work efficiency and object quality assurance software, when we build a software architecture, we divide it into an official form of three independent components:

- client side module - We can write such software in any language supported by the browser;
- server-side module - such software can be written in languages supported by the selected web server. Recently php language has been widely used;
- database (DB) - there is a great choice in this field. The selection is based on the goals and objectives that the DB should fulfill.

The software should perform the following tasks: 1) read the information stored on the ELR level (ELR, author, its users, etc.). 2) Introduction of assessment tools. 3) check of references. 4) Formulation of reports. 5) use of client-server technology.

When selecting a program tool for Server, we need to work on the platen backplane, which will be used to make the first tool stapler. For this purpose, the most commonly used web browsing technology is the technology used to work on the web.

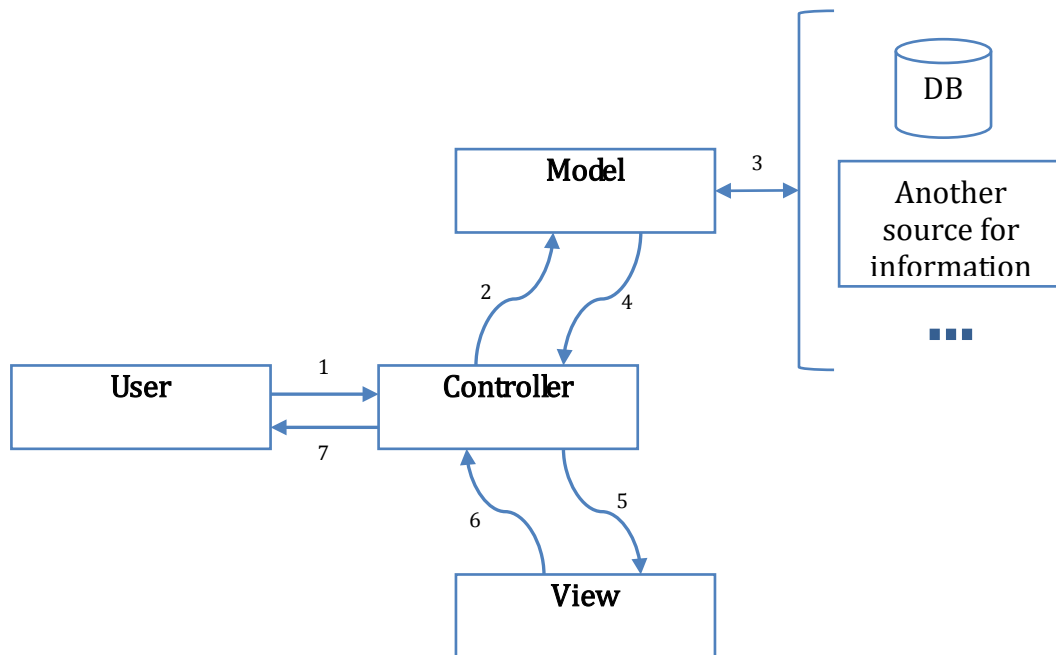
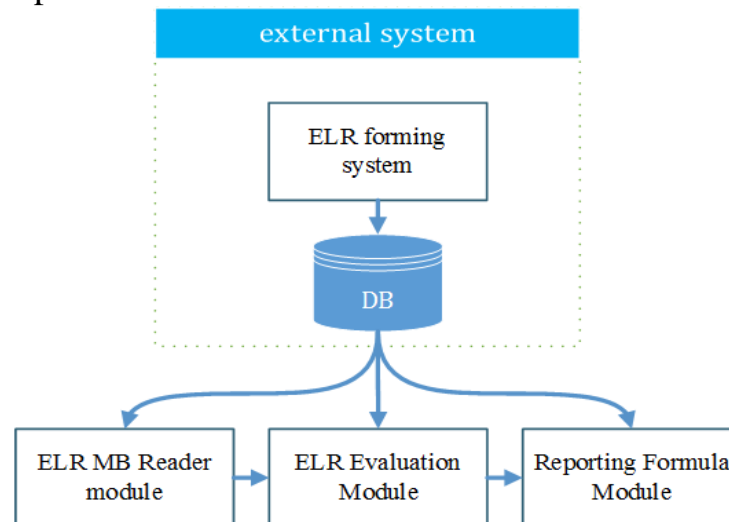


Figure1. MVC Designing Software for WEB Applications

When using the MVC concept, we get a great deal of advantages for shaping the user's interface and the program interface. One of the most important problems of today is the problem of support and support of different users on different platforms. The user must be able to detect that the module, which forms the user's profile, is a personal computer or mobile phone. At the same time, the information forming the information is shaped differently for two different platforms.

The MVC concept is designed to facilitate the creation of a ready-to-use engine encoder and simplify the code readability, as well as simplify the process of refinement. The concept of a multi-media tool is formulated as follows:



Initial engine stack scheme

Monitoring of the big cover is the quality of the knowledge process. It should be borne in mind that in the process of studying monitoring, we can assess whether we are able to overcome the problem, and whether or not the student has a positive or negative impact on education. It is also important to develop a tool for timely and timely delivery of relevant information to the trainee.

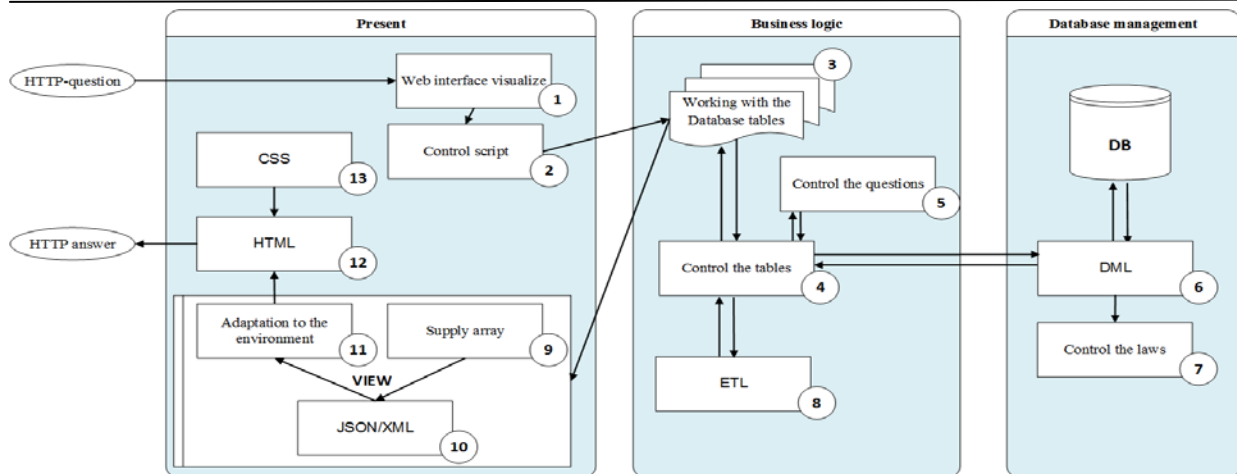


Figure 2. Software tool architecture.

The compact tool created in such an architecture ensures that the electrophase monitors the quality of the training parsing into LMS systems and reduces the bandwidth of the ELR

Conclusion

It has been understood that the proposed project can evaluate the quality of the ELR object through mathematical software, structural scheme, and software engine architecture. It should be noted that the proposed software tool is the common architecture of the workflow for any web applications that run on client-server technology.

References

1. ОЎМТВ 2016 йил 30 декабрдаги «Олий таълим муассасаларида электрон таълим тизимига ўқув услубий мажмуаларни киритишни ташкиллаштириш тўғрисида»ги 526-сонли буйруғи
2. Нишанов А.Х., Самандаров Б.С. Автоматлашган таълим берувчи тизимлар ходисалар баённомаси объектларини синфлаштиришнинг динамик алгоритми. // Вестник ТУИТ. – Ташкент, 2016. - №4(40). – С. 63-71.
3. Самандаров Б.С. Хасанов У.А. Метод «искусственные объекты» при решении задачи классификации объектов протокола событий – log. // Вестник ККО АН РУз. Нукус, 2017. – №1. – С. 63-71.
4. Фазылов Ш.Х., Нишанов А.Х., Маматов Н.С. Методы и алгоритмы выбора информативных признаков на основе эвристических критериев информативности. Ташкент: «Fan va texnologiya». 2017г. -132с.
5. Фаулер М. Архитектура корпоративных программных приложений.: Пер. с англ. — М.: Издательский дом "Вильямс", 2006. — 544 с.
6. Osipov I. V., Nikulchev E., Volinsky A. A., Prasikova A. Y. Study of Gamification Effectiveness in Online eLearning Systems // International Journal of Advanced Computer Science and Applications, vol 6, No 2. 2015: pp. 71–77
7. Бубнов Г. Г., Плужник Е. В., Солдаткин В. И. Критерии оценки качества в системе электронного обучения // Cloud of Science. Т. 2. № 4. 2015. С. 530-543.
8. Малинов М.Б. Разработка системы показателей для мониторинга вузов в области электронного обучения и дистанционных образовательных технологий / М.Б. Малинов, С.П. Мочалов, В.С. Третьяков, Л.А. Ермакова, Л.Д. Павлова, О.А. Кондратова // Открытое и дистанционное образование. – 2013. – № 4 (52). – С. 10-13.
9. Лебедева М.Б. Дистанционные образовательные технологии: проектирование и реализация учебных курсов // СПб.: БХВ-Петербург, 2010 - 336 с.

Rezyume. Maqolada elektron ta'lim resurslarini ishlab chiqish jarayonlarini loyihalashda ob'ekt sifatini baholash algoritmi va dasturiy vosita arxitekturasini qurish masalasi qaralgan bo'lib, unda ta'lim tizimiga muvaffaqiyatli singdirilgan, elektron ta'lim resurslarini (ETR) loyihalashga bo'lgan talablar va ta'lim muassasalarida samarali foydalanilayotgan avtomatlashgan ta'lim beruvchi tizimlar xususiyatlari – kelajakda ularning ish samaradorligi va ob'ekt sifatini baholash dasturiy vositasini ishlab chiqish nuqtai nazaridan tahlil qilingan. Tahlil natijasida ETR sifatini baholash algoritmi va dasturiy vositasini loyihalash jarayoni hamda arxitekturasi taklif etilgan.

ETR larining belgilari orqali matematik ifodalanilishi, ularni sinflashtirish va informative belgilar majmuasini tanlash hamda ETR lari sifatini baholash masalalarining qo'yilishi keltirilgan.

Резюме. В статье рассматривается построение алгоритма оценки качества объекта и архитектуры программного обеспечения при разработке разработки ресурсов электронного обучения, успешной интеграции в систему образования, требованиях к разработке ресурсов электронного обучения (РЭО) и функциях автоматизированных которые эффективно используются в учебных заведениях – и с точки зрения разработки инструмента обеспечения качества программного обеспечения. В результате был разработан алгоритм оценки качества РЭО и инструментарий разработки программного обеспечения.

Математическое выражение РЭО основано на их классификации и подборе информационных символов, а также на вопросах, связанных с качеством РЭО.

Tayanch iboralar: *electron ta'lim resurslari, dasturiy vosita, baholash, sifat mezonlari, klient-server.*

Ключевые слова: *ресурсы электронного обучения, программные средства, оценка, критерий качества, клиент-сервер.*