Increasing Functional of Learning Management System Moodle 3+ by Usage of Interactive Applications[*]

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Abstract. The article describes the specifics of using interactive applications in the learning management system Moodle 3+. The main ways of integrating interactive elements into the learning management system are described. The functionality of two web-based platforms that provide support in the development of interactive learning applications is reviewed. The ways of integrating interactive applications that were developed using the web-based platform Learningapps and H5p into the learning management system Moodle 3+ are highlighted. A review of the user interface of the Learningapps and Hh5p s platform was made, the functionality of the learning management system Moodle 3+ H5P plug-in was highlighted. The recommendations of the web-based platform Learningapps and H5p are proposed. The main stages of development, configuration, integration of interactive exercises are reviewed.

Keywords: Distance education, Learning management system, Moodle, Interactive exercises, Interactive application.

1 Introduction

The development and implementation of innovative elements of computer and information technology are common features of the modern stage of the higher education sphere. Currently, there is a lot of accumulated experience in the implementation of distance education with the help of specialized learning management systems (LMS). The approaches used to implement distance learning and its elements may differ in software and hardware implementation methods, methodological approaches, depending on the goals and objectives. There are three main approaches in the implementation of the distance course [8, 11,12].

The first approach involves that most part of the electronic educational content is linear video content. Such an approach is characterized by the maximum orientation of the educational institution towards providing a communication environment, the use of expensive hardware and software components of distance education systems. Development of the course, technical production of video content require significant amount of

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time and labor. This approach is often used in the massive open online course (MOOC) creation [1, 7].

The second common approach considers publishing text and multimedia materials on the special website of the university. Students can access learning materials through the Internet. This approach has positive moments: students will have decent knowledge and skills to use the tools of web-based technologies. The most popular way is to use learning management systems, which were designed to identify users of LMS and their learning gaps. In addition, those systems can utilize analytical data and have ability to generate reports. They can support wide range of uses, acting as a platform for online content, including asynchronous based and synchronous access to the courses. However, many LMS's contents lack interactivity [2, 3, 10].

The third approach has an innovative nature and consists of the creation and use of various forms of interactive exercise in the training course. There are some common types of interactive work: virtual models, intelligent interactive simulators, interactive laboratory workshops, interactive tasks and other forms of interactive work. Some modern LMS provides an option to include 3rd party applications into their components [8].

2 Benefits and Drawbacks using LMS Moodle 3+ when organizing the distance education process

Moodle is an open-source learning management system. Moodle acronym stands for "Modular Object-Oriented Dynamic Learning Environment" [15]. It is used by thousands of educational institutions around the world to provide an organized interface for e-learning or learning over the Internet [9].

Moodle allows tutors to create online courses, which students can access as a virtual classroom. Moodle start page will include a list of participants (including the course creator. tutors and students), course schedule, list of assignments and other educational information. Other Moodle features include various online tests, forums, chats where students can post comments and ask questions, local and global glossaries, web-pages and links to files, the Web resources [4,5].

Both tutor and course creators can use Moodle to:

— create virtual classes or courses;
— encourage the learning process through forums;
— share files via links, wiki activity, "File components";
— manage courses;
— Interact with other teachers and students through chats or forums.

Students can use Moodle to:

— review the schedule of the assignments;
— send tasks requested by teachers;
— give opinions and resolve doubts about the topics addressed;
— interact with other students, tutor via forums and chats.

Benefits of using LMS Moodle 3+:

— Free. There are no charges for using MOODLE LMS. Moodle is a free and open-source learning management system (LMS) written in PHP and distributed under the GNU General Public License.
— Customized. Moodle LMS can be customized as per the user's requirement. The system allows to customize the appearance of courses, start and end date, of course, allows to configure global and local user groups, customize user roles, installation of various plug-ins, also it supports HTML code editor.
— Unlimited Users. Moodle LMS supports unlimited users, so there is no capping on the number of users or restrictions to add more users. Users can be managed by group and role policies.
— Huge selection of add-ons and plug-ins. The user can add large amounts of add-ons and plug-ins to the Moodle LMS and he can make the LMS have features as he desires. Plugins can be installed directly via administration panel in system or downloaded from https://moodle.org/plugins/.
— Great Community. There is a great Multilanguage community of Moodlers more than willing to help you solve any problems you may come across.

Cons of Moodle LMS :

— No Support 24*7. There is no dedicated 24*7 support in Moodle LMS, the user has to go through the forums and he has to post his problems or issues and wait for the concerned person to respond. In case of emergency and urgency, it will be tough to solve. In addition, Russian forums contain less information and often information is outdated.
— Takes a little tech-savvy. Not just any trainer or teacher can download Moodle and be up and running with a quality LMS. It takes a little tech-savvy and access to IT Dept resources to implement. In addition, Moodle can be challenge for some students. If they have a hard time with technology, Moodle may be a problem for the student.
— User interface. Moodle has a very basic UI, which is not very user-friendly, for instance, if you click on any course, you would not get more information on it.
— Reporting. The basic functions of the report block work fine. But course creator wants to know which courses get viewed the most, which course is the most popular, which is the course is the most difficult for students, it will be quite a hard task.
— Lack of user-friendly interactive content or assignments. In the basic configuration, Moodle 3+ does not decent support of interactive presentations, crosswords, interactive exercises. It has powerful block for online testing, but some Moodle graphical tests have are not user-friendly. This problem can be solved by using 3rd party plugins or by importing interactive assignments in the SCORM format.

3 Increasing functionality of LMS Moodle 3+ with the use of interactive exercises

3.1 Common ways to import interactive applications into Moodle3+

To enhance its functionality, Moodle 3+ allows the use of third-party interactive applications. Typically, such an application can be embedded into the page code, imported into the SCORM format, or can be used with a special plugin that was installed on the server-side of the system [6].

3.2 Import of exercises form LearningApps.org into LMS Moodle 3+

LearningApps.org is a free Web 2.0 service that supports learning and the teaching process. This service is a kind of constructor for creating interactive training modules for different subject disciplines for use in class and extracurricular activities [14].

This online service allows creating your own exercises, tasks, applications, exporting them in various formats, has ready-made modules in its library, allows freely exchange information between users, create class and students record, and has tools that can help to organize the work of students. The Moodle 3+ system allows integrating the LearningApps interactive applications in two ways: by inserting code special from the application site, or by importing the exercise in the SCORM package.

Figure 1.2 showed an example of integrating an interactive application into the Moodle system using code. The disadvantage of this method is the inability to adjust the grading scale for completing an interactive task. Only the component that hosts the interactive element can be rated. The advantage of the method is greater easiness of usage and the ability to accommodate several interactive exercises into one web-page of Moodle3+.
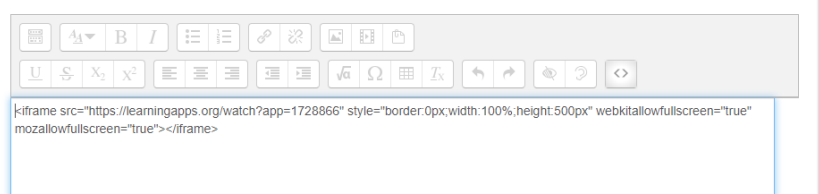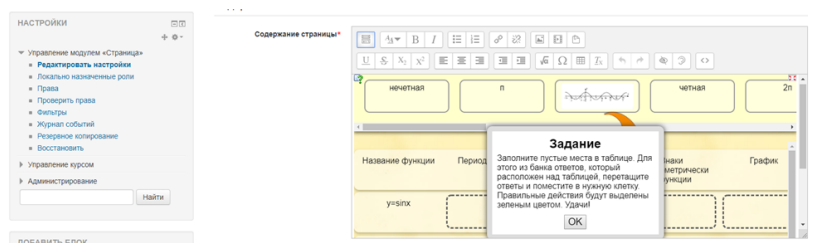

Fig. 1. Example of embedded code

Fig. 2. Imported interactive exercise

The second method allows you to export an interactive exercise from a Web service and import it using the SCORM container into the Moodle system. In this case, only one interactive exercise is placed in the container. Figure 3 shows an example of exporting an interactive exercise with SCORM format.
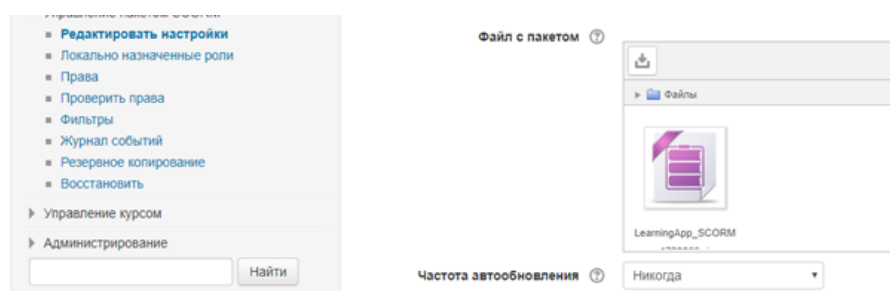

Fig. 3. Imported SCORM container

This second method provides much better options for exercise evaluation. Also, there is an option to set the evaluation method and the maximum score and adjust the number of passing attempts.

Fig. 4. Configuration of assignment of interactive exercise placed in SCORM container

To develop the most interactive application, you must go to the Learningapps web site. For example, the exercise "chronological ruler" type was chosen. It is necessary to set the initial and final periods. Then add components to the layout in the timeline. For each component, there is an opportunity to set a text, graphic, sound description. In the "assessment" column, the component is located on the timeline. Also in the exercise, you can specify a feedback block or detailed instructions. Figure 5 shows the application developed with the LearningApps platform. Figure 6 shows finished interactive application.

Fig. 5. Setup of interactive application on the LearningApps platform

Fig. 6. Finished interactive application on the LearningApps platform

3.3 Usage of H5P platform to increase Moodle 3+ functionality

The second platform for integrating interactive applications into the Moodle 3+ system is H5P [14]. This platform is a free co-development framework for JavaScript-based content. The platform allows creating interactive videos, presentations, quizzes, and interactive timelines. The platform consists of a web content editor, a website for the exchange of content types, plug-ins for existing ones.

An interactive application developed on the H5P platform integrates into the Moodle 3+ system in two ways: inserting the developed application into a floating frame inside a regular document or integrating with the H5P plugin.

Application code from the H5P website is used for the integration Moodle3+ webpage component. The component must support the ability to insert Html code. Figures 6.7 show the integration process of a demo version of an interactive presentation code developed by H5P. The insertion of the code takes place in the "Page" component of the Moodle 3+ system.
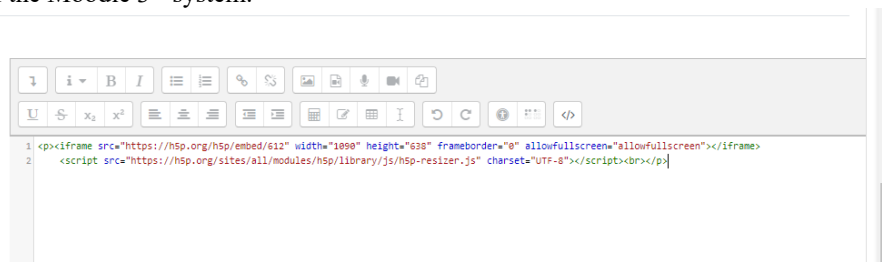

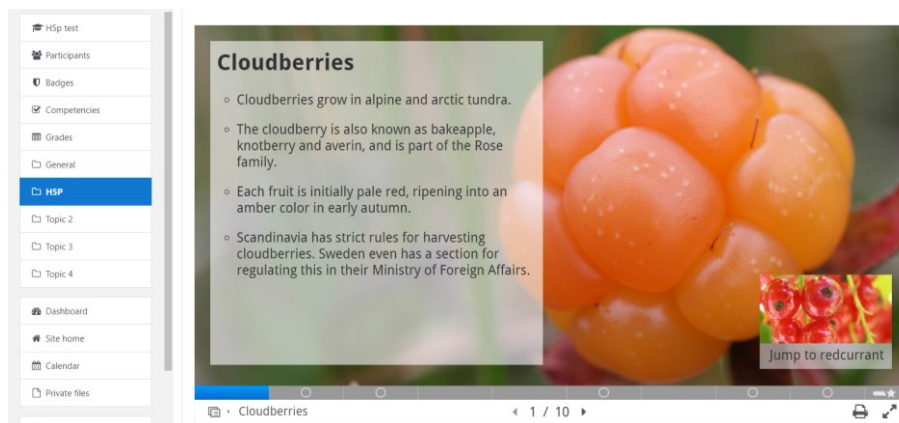**Fig. 7.** H5P Application Integration using the floating frame in the Moodle 3+ system

Fig. 8. Interactive presentation embedded into the "page" component

The second way to integrate H5P content into Moodle 3+ is to install plug-in directly into the Moodle 3+ system. After its installation, a new "Interactive content" component will appear in the "Add item or resource" menu (Figure 9).
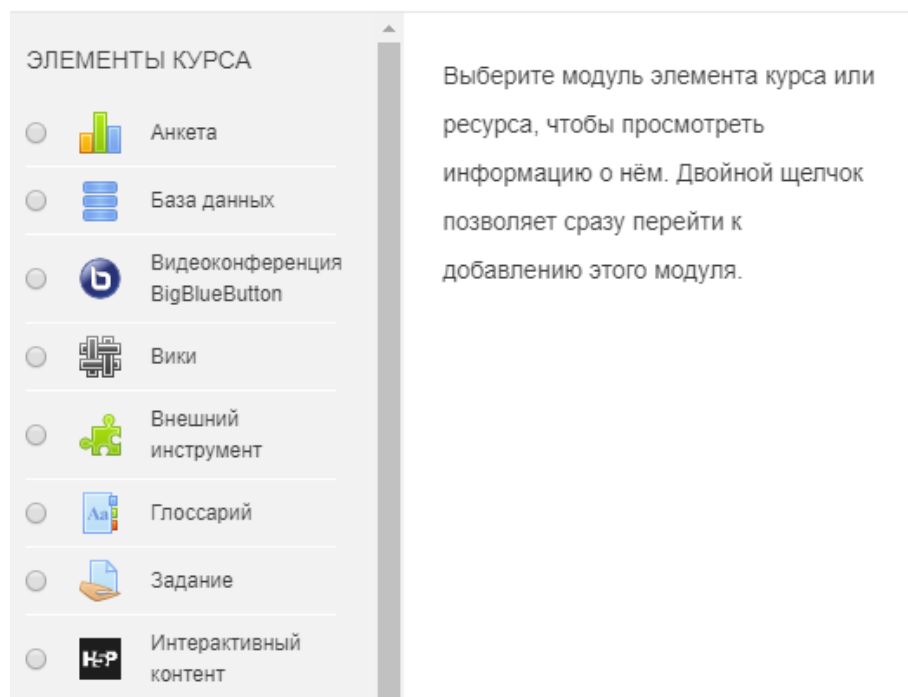
Fig. 9. "Interactive content" component after plugin installation

This component allows adding various interactive content to the directly into Moodle 3+ system. Figure 9 shows the interface for adding tasks and their main types.
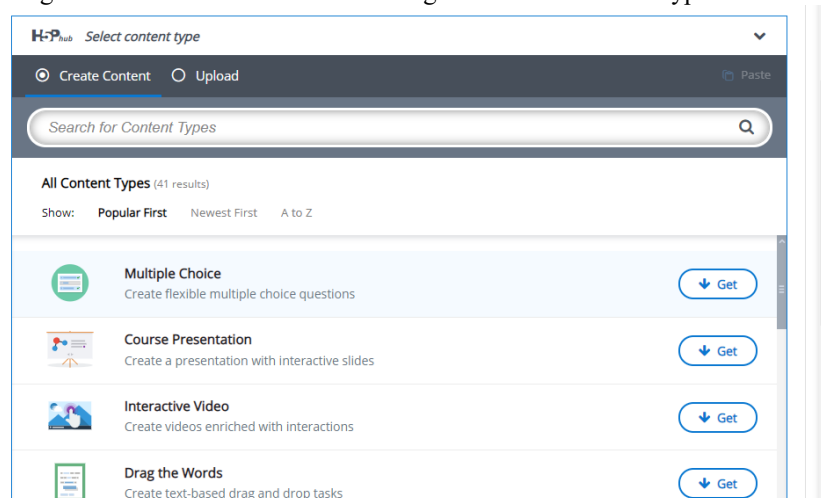

Fig. 10. Select the type of interactive H5P applications you create.

The following example describes the process of creating an interactive presentation using a visual editor of the H5P plugin. This editor supports the insertion of text, images, sound, video, tables. Its distinctive feature allows integrating into the presentation different interactive elements such as various test questions or graphical tests (Figure 11).
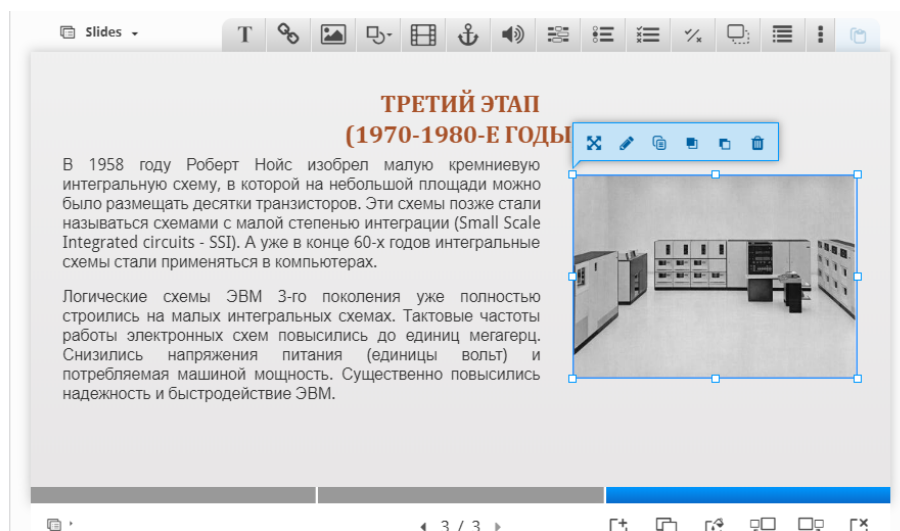

Fig. 11. H5P visual editor for creating an interactive presentation

4   Conclusion

The usage of various forms of interactive work with students in the distance-learning course allows improving the quality and speeding of learning the material, increasing the visibility of the lesson. The use of third-party applications allows expanding the functionality of the learning management system Moodle 3+. There are 3 ways to extend the functionality: embedding a frame with an application into the page code; exporting an application from a Web service in SCORM format and import it into the Moodle system; installation of a special plug-in that expands the functionality of the system.

Both services have sufficient functionality for use with Moodle 3+. The service Learningapps.org integrates with the Moodle 3+ system in two ways: placing the application using a floating frame into a web page or importing the finished application in Scorm format directly into the Moodle system. In the second case, a special component is used to host the application. The development of the most interactive application is carried out exclusively on web service Learning apps.

Interactive applications developed using the H5P service can be embedded in the Moodle 3+ system using a floating frame or by installing a special plug-in that adds an additional resource "Interactive Content". This component has a built-in visual editor

and allows you to develop interactive content directly from the learning management system.

References

1. Author Abramovskiy Anton Lvovich. "Rol distantsionnogo obucheniya na sovremennom etape globalizatsii rossiyskogo vyisshego obrazovaniya" Teoriya i praktika obschestvennogo razvitiya, no. 10, 2013, p. 133-135.
2. Author Ayupova Liliya Ildarovna. "Distantsionnoe obuchenie i rossiyskie realii" Elektronnyiy nauchno-obrazovatelnyiy vestnik «Zdorove i obrazovanie v XXI veke», vol. 18, no. 9, 2016, p. 10-15.
3. Author Grigorash Oleg Vladimirovich Distantsionnoe obuchenie v sisteme vyisshego obrazovaniya: preimuschestva, nedostatki i perspektivyi // Nauchnyiy zhurnal KubGAU - Scientific Journal of KubSAU. 2014. — p. 2048-2059.
4. Author Kozlova Darya Aleksandrovna. "Distantsionnoe obuchenie kak innovatsionnyiy podhod v realizatsii nepreryivnogo obrazovaniya" Vestnik Taganrogskogo instituta imeni A.P. Chehova, no. 1c, 2013, p. 36-40.
5. Author Novgorodova N. G. ELEKTRONNOE I DISTANTsIONNOE OBRAZOVANIE / N. G. Novgorodova // Mezhdunarodnyiy nauchno-issledovatelskiy zhurnal. — 2014. — # 11 (30) Chast 2. — S. 56—58. — doi: 10.24411/2409-3203-2018-00055. — URL: https://research-journal.org/technical/elektronnoe-i-distancionnoe-obrazovanie/ (data obrascheniya: 27.06.2019.).
6. Author Oleynikov N.N. Individualizatsiya traektorii obucheniya v sisteme distantsionnogo setevogo obucheniya. – Problemyi sovremennogo pedagogicheskogo obrazovaniya. Ser. Pedagogika i psihologiya. – Sb. statey:. –Yalta: RIO GPA, 2016. – Vyip. 53. – ch.2. –p.135-143.
7. Author Oleynikov N.N. Organizatsiya otkryityih distantsionnyih kursov v formate Mooc // Informatsionnyie sistemyi i tehnologii v modelirovanii i upravlenii. -Izd. Tipografiya «Arial» (Simferopol).- 2016 g.- p. 185-189.
8. Author Pravodelov S.V. — Preimuschestva distantsionnogo obucheniya i ego vidyi // Sovremennoe obrazovanie. – 2015. – # 2. – S. 70 - 79. DOI: 10.7256/2409-8736.2015.2.14207 URL: https://nbpublish.com/library_read_article.php?id=14207
9. Author Romanov E.V., Drozdova T.V. — Distantsionnoe obuchenie: neobhodimyie i dostatochnyie usloviya effektivnoy realizatsii // Sovremennoe obrazovanie. – 2017. – # 1. – S. 172 - 195. DOI: 10.7256/2409-8736.2017.1.22044 URL: https://nbpublish.com/library_read_article.php?id=22044
10. Author Starikov S. A.. "Vozmozhnost vyibora studentami individualnoy traektorii obucheniya v usloviyah distantsionnogo obrazovaniya" Nauchnyie issledovaniya v obrazovanii, no. 1, 2007, pp. 132-133.
11. Author Vorobeva Svetlana Alekseevna. "Distantsionnoe obuchenie: segodnya i zavtra" Munitsipalnoe obrazovanie: innovatsii i eksperiment, no. 6, 2012, p. 64-68.
12. Author Voznesenskaya Ekaterina Vasilevna Distantsionnoe obuchenie - istoriya razvitiya i sovremennyie tendentsii v obrazovatelnom prostranstve // Nauka i shkola. 2017. #1. . — p.116-123.
13. h5p. Homepage https://h5p.org/, last accessed 2019/06/26.
14. learningapps Homepage https://learningapps.org /, last accessed 2019/06/26.
15. LMS Moodle Homepage https://moodle.org/, last accessed 2019/06/26.