Requirements for the e-learning Platform for Bulgarian Education

Best Practice Document

Produced by the BREN-led working group on Networking

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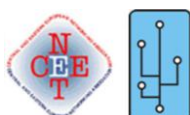
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Campus Best Practice Document:
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Table of Contents

Executive Summary

A key requirement for the e-learning platform is that it should contain modules for:

- System administration.
- Course management.
- Content management.
- Management of school societies and organisations.
- Collaboration and videoconferencing.
- Electronic register.
- Anti-plagiarism.

The e-learning platform should also offer localised, online training with user guides: and video tutorials covering basic operations such as log-in, navigation, system settings, creating, editing, or deleting a course, and other key functions.

The system should include all modules and functionalities at the time an order is placed. The same developers should also be able to connect additional modules, if required, without the need for further programming, in order to ensure compatibility with the functionality of updated versions and upgrades. The platform should be provided with an unlimited license for use of all available modules and functionalities. The contractor shall install, configure, adapt and test the platform in order to ensure and guarantee its complete working capacity.

The contractor shall train administrators and teachers to use the system and shall provide relevant documentation (system, technical and user documentation). The e-learning platform, including all proposed modules and functionalities, should be of proven and tested quality and easy to implement.

1 Modules of the e-learning Platform

The e-learning platform shall include the following modules and functionalities (it is not necessary to use the same names for the modules or to present them in the same order, provided that all of them are present in the e-learning platform, as described).

1.1 Module 1: System Administration

The administration of the system shall include a full range of functions for the management and configuration of system parameters and attributes, data, users and courses. The following basic functions shall be included, which cover: authentication, management of rights and roles, user management, import and export of users and resources, customisable view, management of language packs and log and report management.

1.1.1 Required Functionalities for System Administration

- The system should support a number of standard roles (e.g. Administrator, Teacher, Student, Parent, Guest, and Evaluator/Reviewer) and have the potential to create an unlimited number of additional roles.
- The system should also be able to create user groups to collaborate, communicate and share content. These can also accommodate different groups of users attending different courses.
- The platform should enable users to access resources from external websites.
- It should be possible to access all administrative tools and functionalities from a single interface.
- System Administrators should be able to set quotas on the disk space for individual users, courses and organisations.
- The administrator should be able to set specific settings for the rights of users based on user roles, including settings for bandwidth on e-resource access.
- The possibility to monitor visits and other statistics of the platform (i.e. number of users, time period, etc.).
- Event log storage and log analysis functionality for the needs of system administrators.
- The following Language packs should be available and included in the RSS module: Bulgarian, French, German, Spanish, Italian and Russian.

1.1.2 Recommended Functionalities for System Administration

- A functionality allowing the administrator to move and distribute objects, users, other administrators, tools and other items from one school to another, or to another unit within the hierarchy by using a graphical user interface without the need to use the back-end system or have knowledge of Web programming.

- A functionality that allows the administrator to select the design and layout of the websites of different schools and to choose from catalogues with various graphical user interfaces without the need to use the back-end system or have Web programming experience.

- A functionality that allows the administrator to update and edit the structure of the individual school websites, using graphical user interface without the need to use the back-end system or have Web programming experience.

- A functionality that allows rotation, analysis and management of all system logs through graphical user interface without the need to use the back-end system.

- A functionality that allows integration with external systems through encrypted web services from the graphical user interface without the need to use the back-end system or have Web programming experience.

- A functionality that allows the creation of a hierarchical structure of institutions (schools) with their own system administration within the same installation. It should be possible to perform all actions and operations through the graphical user interface without the need to use the back-end system or Web programming experience. This functionality should make it possible for each school to use its own domain, administrators, system view and settings, and roles in the institution, even though all schools are part of the same system installation.

1.2 Module 2: Course Management

This module should provide tools for synchronous and asynchronous e-learning, creating, editing, saving and deleting e-learning courses, encouraging student participation in the learning process and ensuring better interactivity within the teaching process. The platform should provide an opportunity to post news and announcements. It should also provide an opportunity to test, assess and oversee the student and teacher performance.

1.2.1 Required Functionalities for Course Management

- An opportunity to assign different roles and rights to the different users, as well as assign access rights to various e-resources within the system.
- Single Sign On authentication protocols that save the specified rights and roles and offer students and teachers a single point of access to the entire system.
- The possibility of integration with LDAP, or other authentication protocols used by schools and the Ministry of Education.
- The possibility of producing standard user activity and system access reports and creating customised reports without the need for additional programming.
- The system should dispose of available tools for communication and interaction such as a calendar, messages and announcements, email service, tasks, and chat.
- The system should allow the upload of syllabuses that are accessible through students' specific access rights. The objective is to provide students with a source of reference and basic information on specific topics that will enable them to efficiently participate in the course by undertaking home assignments, exams and other components of the e-learning process.

- The system should allow for the publishing of notices accessible to all students, or by assigning specific access rights to relevant students.

- The possibility to create templates for the courses and a course content wizard to help create standard courses from templates.

- Modern and intuitive Web 2.0 interface with the possibility for the user to customise the appearance of the Web interface (colours, fonts, design, background and content). A possibility to customise the layout of the platform at the user level, or at community or school level. Users should be able to remove modules and change their location via drag-and-drop functionality.

- The possibility to create course catalogues and to search and view training courses according to specific rights and roles of individual users in the system.

- The possibility to integrate and embed images, presentations and video content from Flickr, YouTube, Facebook and other social networks without leaving the school environment and without the need for specialised knowledge of web development (HTML, CSS, JavaScript).

- Support for common file formats and the possibility to embed the content of such files, (including: aam, aiff, asf, au, avi, doc, gif, html, htm, jpg, jpeg, jif, mpe, mpg, mpeg, moov, mov, pdf, pps, qt, ra, ram, swa, swf, tiff, txt, wav, wpd, xls, xlsx, docx, ppt, pptx, wma, wmf and wmv), in addition to display and reproduction of the above-mentioned file formats within the platform, subject to the availability of the relevant plug-ins in the installation of the user's browser. If the relevant browser plugin is not installed (or is unavailable), the platform should run an external desktop application to display or play the file.

- The possibility to create, edit and design learning content without specialised knowledge of web programming (HTML, CSS, JavaScript).

- The possibility to create different sections within a course.

- Accessibility for disabled people – this should be proved by references from external organisations (international/national) related to people with disabilities.

- The possibility to provide a structured lesson plan with descriptions, evaluation criteria and guidance from the teacher.

- The possibility to set an order for accessing educational materials with a view to their utilisation in a particular sequence.

- The possibility to access different content, depending on individual performance and student progress.

- The possibility to change the course settings and make certain tools and parts of the course content (in)accessible on specific dates and at specific times.

- The possibility for the teacher to archive a portion of the course or the entire course.

- The possibility of automatic notification to users about new activities, publications, assignments, examinations, tests, or changes in the course.

- Teachers should be able to create groups, to control a group's membership by assigning specific rights to users, and to determine what tools are available to certain groups.

- The possibility to publish publicly available information related to the teacher and the course.

- The possibility for online submission of assignments and tests.

- The possibility to conduct surveys among users in the system.

- The platform should have the following functionalities for evaluating users:
  - It should be possible for test questions to be defined with additional descriptive information (metadata) that allows rapid sorting by subject or other indicators, in order to reuse questions in subsequent tests.
  - The tests should allow testing the knowledge of students via online quizzes.
  - The possibility of multiple submission of tests and examinations.
  - The possibility of self-assessment.
  - The possibility for anonymous evaluation by the teacher.
  - The possibility to import and export tests and questionnaires.
  - The possibility to create a repository of questions, allowing repeated use of the questions in different courses and tests without the need for recreation.
  - The possibility to set different weights for the automatic evaluation of questions and award partial credit.
  - The possibility to review, correct and evaluate the work of a classmate.
  - The possibility to set the evaluation criteria for peer evaluation.
  - The possibility for the teacher to evaluate the peer evaluation.
  - The possibility to generate reports on tests, exams and assignments.
- Visualisation of the course progress allowing the user to quickly and easily understand where s/he stands in the learning process.
- Availability of integrated tools for promoting student participation in the learning process, such as tools for creation and management of forums (discussion boards), journals, blogs, wikis, and for the personal assessment of each contribution and comment by individual users without leaving the platform.
- Automatic addition of the assessments and posts by students in the electronic register module described in the documentation.
- The possibility for personal feedback by the teacher for the student.
- The forums should allow teachers not only to communicate with the students, but also to assess their work.
- Forum members should be able to receive e-mail notifications about changes in the forums in which they participate.
- Journals should be shaped as communication areas between teachers and students, allowing the accumulation of different kinds of information - learning tasks, materials, home assignments and others as well as written feedback from students about the learning process.
- Only teachers should be able to create blogs, but students should be able to participate. Teachers should be able to regulate the blog content related to the learning process.
- An integrated chat system in the platform. The teacher must possess a set of tools to set the rights of students in the chat and to moderate conversations.
- Creation of a centralised location for group project activities, involving communication between group members, file sharing, discussions and peer assessment between the users in one course and users attending different courses.
- The possibility to use different types of questions in tests, surveys and polls.
- The possibility to create a bank of questions that can be used by the system in any combination of questions to test different students.
- The possibility to set different weights to questions from different pools. There should be algorithms for creating tests with diverse content and an option to regulate the level of difficulty.

- The platform must possess a built-in a system for sending and receiving e-mails.

- The system needs to support the import and export of courses, and should support SCORM and other generally accepted standards.

- The possibility to set different indicators to monitor the course activities and progress through tools that show key information about the course to students, teachers and parents.

- Tracking the activity level and student progress through standard or specialised reports generated by the platform without the need for additional programming.

- The possibility to set recommended sources of information for educational purposes by teachers to students.

- The teacher or the instructor should be able to quickly and easily check the student view of the course without logging out of the system and logging in as a student, or switching from one interface to another.

- The teacher should be able to choose a language pack for certain groups of users, or for a particular course, regardless of the system's language settings.

- The system should allow students to create and manage their own groups (if they are given such rights).

- The possibility to submit group projects and for teachers to award a group mark.

- The possibility to assess a student's personal contribution (individual mark) and to provide feedback to each member of the group.

- The possibility to assess the performance of all students on a single question (assessment on question-by-question basis).

- The possibility to separate forums into discussions and topics that can be attached to certain elements of the course and its content.

- The possibility for teachers and students to enter comments under any bit of information in the journals.

- The possibility for teachers to regulate the rights of students to view individual journals either partially or fully.

- The possibility for students to create blogs after the respective rights have been assigned by the teacher.

- Functionality that allows a teacher to issue a warning if individual students fail to meet certain individual performance criteria.

- The possibility of two-way communication between the built-in email system and external mail servers.

- The possibility for each user (student or teacher) to create a personal portfolio where they can include information such as: images, projects, reports and other personal information, as well as individual access rights to their portfolio.

- The possibility to set a required personal portfolio template for various user groups.

1.2.2 Recommended Functionalities for Course Management

- The possibility to evaluate blogs. The settings and criteria for blog evaluation should be set automatically once the blog is created.
- Functionality allowing dynamic blog evaluation with multiple components. The system should allow the definition of multiple blog evaluation components through which to assess interactively student performance.
- The possibility to assess publications in the wiki page (wikis), while assessment criteria should be set automatically as soon as the page is created.
- Functionality allowing dynamic multi-component assessment of student publications in the wiki pages. The system should allow for the definition of the multiple wikis assessment components through which to assess interactive student performance.
- Functionality allowing teachers to customise individual design, colours, layout and appearance of the object (the course) without affecting the content and structure. This functionality should be enabled or disabled individually by the administrator.
- Functionality allowing teachers to customise the individual structure of the object (the course) without affecting the graphic content. This functionality should be enabled or disabled by the administrator.
- User-friendly interactive wizard to help teachers create objects, i.e. they should be able to choose a ready-made structure for the course and a graphic design in accordance with the course topic, the age group of students and the teaching method (for this function, there should be at least 10 course templates).
- Functionality that allows the setting of centralised standards for educational content and the generation of school reports that show the extent to which the content of various course elements, or the entire course, correspond to the specified standards.

1.3 Module 3: Content Management

This module should store and manage learning content of all users on the platform in order to facilitate work with the learning material.

1.3.1 Required Functionalities for Content Management

- The possibility to store and manage any type of content from a centralised location where it can be administered, updated and shared.
- The possibility to set different access rights to users.
- The possibility of centralised organisation and management of electronic content, including multimedia in several different courses rather than duplicating the changes in every single course.
- The possibility for teachers and students to set access rights to specific files and directories for a number of different courses, instead of copying the content for each course.
- The possibility to track the history of each file or directory from the content management system, i.e. to check which user accessed it, when and from where.

- The possibility to provide summary and history of the file, or the directory.
- The possibility to keep different versions of the file – the system should be able to automatically save the last version of the document and keep all previous versions. The possibility to store detailed information about all versions and track changes to the file or project made by different users.
- Graphical functionality resembling the management of files and directories in desktop operating systems such as Windows, Linux and Mac.
- The possibility for users to easily, quickly and conveniently share educational resources by assigning access rights to files and folders that can be organised and managed by both the administrator and individual users.
- The possibility for quick and simultaneous update of information from one centralised location to different organisations, portfolios and courses.
- The platform should have a drag-and-drop functionality.
- The content management module should be fully integrated with the File Managers of desktop operating systems (Windows Explorer, Finder, etc.). The system should allow access to directories in the information repository direct from the user's desktop via the file managers of operating systems without the need to use a Web browser.
- Teachers should be able to quickly and easily view and manage all the files related to their courses.
- Visualisation of supported file formats from external websites through hyperlinks.
- The possibility for controlled sharing of content components with external users.

1.3.2   Recommended Functionalities for Content Management

- The possibility for users to directly share content with external portals and platforms (YouTube, Facebook, etc.) without logging off.
- The solution should offer advanced content management functionality and should be able to create separate information repositories for users, objects and an information repository for the entire school.

1.4   Module 4: Management of School Societies and Organisations

The purpose of this module is to provide a place in the learning environment to stimulate extracurricular activities for students and teachers. The module should allow for the creation of different school societies and clubs, according to users' interests, and for the purposes of information exchange.

1.4.1   Required Functionalities for Management of School Societies and Organisations

- The possibility of automated provision of personal information to users for the sake of time efficiency and increased user involvement, in view of their needs, marks, interests, or role in an organisation, school, club, etc.

- The possibility to create micro-websites for school societies by specifying different roles and managing access rights in order to foster communication and further engagement of students in the learning process outside the classroom.
- The possibility for branding and personalisation of the view for different users, user groups, teams, school clubs, etc.
- The possibility of cooperation and communication between members of different groups and communities by giving them the opportunity to access a location in order to collaborate and share resources.

1.5 Module 5: Collaboration and Videoconferencing

This module should provide a virtual environment resembling the actual learning environment and containing the required functionality for online learning, such as videoconferencing, in addition to facilitating the work on group projects within the class and encouraging interaction between students.

1.5.1 Required Functionalities for Collaboration and Videoconferencing

- Videoconferencing.
- Text messaging.
- The possibility to raise your hand in an online class, give the floor to someone and allow online discussions between the students.
- Recording and playback of audio and/or video messages during certain activities in the learning process.
- Sharing desktop applications.
- Sharing presentations.
- Adding an existing sound recording to the current session.
- An 'Interactive Whiteboard' space, to support interaction of all participants simultaneously or separately (the rules for such interaction should be set by the teacher who acts as moderator).
- Screen sharing (or sharing parts of the screen).
- Sharing Web content and management of students' browsers in order to focus on the content imposed by the moderator.
- The possibility for audio and/or video recording of the session for streaming purposes and for reusing the learning material integrated into the platform.
- Management of the classroom by the teacher, including granting and revoking rights for voice and video participation, rights for writing on the whiteboard, assignment and withdrawal of rights for writing and receiving text messages, for screen sharing and for individual desktop applications.
- The possibility to make advanced audio and/or video recordings of parts of the session, or the entire session, and specify settings for classroom management in the absence of a moderator.

1.5.2 Recommended Features for Collaboration and Videoconferencing

- The module for videoconferencing and virtual classroom should allow real-time posting of questions and inquiries, which students can respond to in real time.
- The videoconferencing and virtual classroom module should offer an option to use a timer for certain activities with automatic submission of the task after the time limit.
- The videoconferencing and virtual classroom module should allow for splitting the session into individual subgroups or chat rooms to be managed inside the session.

1.6 Module 6: Electronic Register

It stores the results and marks from various examinations, tests, assignments and group projects. The system should be able to generate various reports on student performance in order to help analyse their performance and attendance.

1.6.1 Required Functionalities for Electronic Register

- The possibility to create multi-component evaluation schemes.
- The possibility of anonymous assessment.
- The possibility to automatically assess a student's activity in forums, blogs, journals, wikis and student portfolios.
- The possibility to make a weighted evaluation of several different types of performance and the opportunity to individually set different weights for different users.
- The possibility to create and save filters for the results of students so that the teacher can analyse their individual and group performance.
- Automatically adding marks for homework, examinations, tests and other student assignments in the electronic register.
- The possibility of manual editing by the teacher of the automatically generated assessments.
- The possibility to hide personal information about the student from the teacher in order for the assessment to be anonymous.
- The possibility to track changes in the assessments.
- The possibility for teachers to directly send messages to students and parents from the electronic register.
- The possibility to write notes and information to accompany marks that can be seen only by the teacher and/or authorised users.
- The possibility to generate reports on student progress and analyse the level of acquisition of various elements from the learning material.
- The performance of students can be monitored by the teacher through automated reports that reflect student participation in courses and other e-learning activities.

- An early warning system functionality, if students fail to meet specific performance criteria set by the teacher.
- The possibility to use colour schemes and a visual displays to show the results achieved by students.
- The possibility to create and save filters for the results achieved by students at the level of class, school and community.
- The teacher should be able to share the student's progress inside and outside the class with the parents by using some of the built-in platform features.
- Functionality allowing import and export of the electronic register in xls and csv format.

1.6.2   Recommended Features for Electronic Register

- In order to compare achieved results to predefined standards and objectives in the educational process, the system should allow for assessment of the elements using multi-component evaluations that can be retained, copied and processed.
- Functionality that enables teachers to identify all components that are to be assessed from a single location and to visualise all components for assessment in a single screen, regardless of where the elements are located in the structure and content of subjects. This functionality should allow the teacher to evaluate all collected components awaiting assessment without having to look for them throughout the structure of the course.

1.7   Module 7: Anti-Plagiarism

This module should be part of the learning platform and check for plagiarism the work of individual users and compare their work to Internet sources.

1.7.1   Required Functionalities for Anti-Plagiarism

- The system should function with Cyrillic encoding of the text.
- The system should display a link to the source from which content has been plagiarised as well as an overlap percentage.
- The system should highlight the plagiarised content.
- The system should allow access to information databases that can be used to compare and test the content submitted by students. The module should provide for the accumulation of content which can subsequently be compared with and used to investigate plagiarism in the content imported from students into the platform.
- The system should allow plagiarism checks of content submitted to the platform in a variety of formats such as Microsoft Word (doc, docx, odt), text (txt), and Rich Text Format (rtf). For comparison, one should also be able to use the specified formats, except for plain text format.
- The module should be able to compare content available on the platform to a source outside the system specified by the teacher.

2 Quality Requirements

The system should also meet the following quality requirements:

- **Productivity** – the system should have the capacity to serve a minimum of 100 000 simultaneous (concurrent) sessions.
- **Scalability and flexibility** – the system should be able to expand and serve up to one million concurrent users, and to allow for additional settings.
- **Compatibility** – the system should be compatible with current Web standards (HTML, XHTML).
- **Accessibility** – the system should be installed centrally on one or more servers, and should be accessible via http or https over the Internet. It should have a Web-based user and administrative interface for public and protected sections and, as a minimum, it should be compatible with the most popular Internet browsers, such as Internet Explorer v.8 and higher, Mozilla Firefox v.3.6 and higher, Safari v.3 and higher and Chrome v.10 and higher.
- **Functionality and easy access** – the system should be adapted for people with visual impairments to allow for ease of access and use.
- **Stability** – the system should guarantee a secure and reliable learning process.

3 Technological Requirements

There are also a number of baseline requirements for the technology:

- **Interface** – the system should be simple and easy to use with an intuitive Web interface, following Web 2.0 + trends.
- **Architecture** – the system should have a standard three-layer model for Web applications, consisting of database, application server system and user interface.
- **Database** – the system data should be stored and managed in a relational database management system whose price should be calculated in the applicant's tender and should comply with the following requirements: the possibility of complete backup and recovery, the possibility to work with arrays larger than 100 GB, simultaneous operation with unlimited number of users. If licensed software is used, all necessary licences have to be reported and delivered to the system for implementation and operation of the developed information system. Maintenance fees and licence costs should be taken into account to allow the assignor to use the software for an indefinite amount of time.

4 Other Requirements and Remarks

It is important that the system should be able to be integrated with other existing systems.

This will provide greater potential for:

- The ability to convert data from the built-in e-register into table format (xls, csv, etc.) in order to develop an interface for automated incorporation of data from existing systems.
- Information integration from the existing SCORM-compatible elements and interactive lessons.

Glossary

AAM	Authorware Shocked file (Adobe)
AIFF	[Audio Interchange File Format](#)
ASF	Advanced Streaming Format (Compressed Windows audio/video)
AU	Sound (audio) file
AVI	Audio Video Interleaved animation file
CSS	Cascading Style Sheet
CSV	Comma Separated Values text file format (ASCII)
DOC, DOCX	Document; Office Open XML Text document
GIF	Graphics Interchange Format (bitmapped graphics)
HTM, HTML	Hypertext Markup Language
JPG,JPEG	Joint Photographic Experts Group (graphics file)
JIF	JPEG File Interchange Format
MPE, MPG,	
MPEG	Multimedia container format, video, audio
MOOV, MOV	Movie file
ODT	Open Document Text
PDF	Portable Document Format
PPS	PowerPoint Slideshow
PPT, PPTX	MS Office Open-XML Presentation
QT	QuickTime movie
RA	Remote Access file
RAM	RealAudio file
RTF	Rich Text Format
SWA	Shockwave Audio file (Audio)
SWF	Shockwave Flash
TIFF	Tagged Image Format File
TXT	ASCII text file
WAV	Sound format (Windows)
WMA	Windows Media Audio file
WMF	Windows MetaFile (vector graphics)
WMV	Windows Media Video file
WPD	Windows Printer Driver
XLS, XLSX	Excel Spreadsheet