QUALITY OF THE INTEGRATED E-LEARNING SYSTEM – STUDENTS' PERSPECTIVE

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Abstract

Implementation and use of e-learning in higher education has become a necessity in the 21st century. While first researches were focused more on the functional understanding how to use the technology and which ICT skills are needed in order to get better results from it, latest studies are focused more on the user satisfaction with tools such as the e-learning systems and how they can contribute to user motivation for learning. More precisely today's e-learning research is concentrated on the quality of e-learning systems. E-learning systems (also called course management systems or e-learning platforms) are considered as the most basic e-learning requirement and their ease of use encourages e-learning adoption. Within the E-learning Centre at the University Computing Centre University of Zagreb SRCE an e-learning platform named Merlin was established, available and free of charge to all university teachers and students. The e-learning platform Merlin is a complex system consisting of several tools and has grown to be virtual learning environment (VLE) for higher education teachers and students. The VLE Merlin is in operation for nine years now and hosts e-courses held at higher education institutions in the Republic of Croatia. In order to provide the ease of use and user friendly interface, the E-learning Centre conducted the survey on users' attitudes towards usefulness of VLE Merlin, satisfaction with its design, functionality and user' support that is provided by the E-learning Centre. Within this paper results of the students' response are elaborated. The results showed that majority of students were satisfied with VLE Merlin, and find it easy to use. Students also consider VLE Merlin useful as it facilitates access to learning resources and communication with teachers and students. However, only half of the students, participating in the survey, expressed their satisfaction with the graphic design of the VLE Merlin. Some of the students left us comments regarding VLE Merlin design. We have considered students' comments seriously and based upon them decided to make additional improvements to the VLE Merlin for the academic year 2016/2017.

Keywords: virtual learning environment, quality of e-learning systems, students' perspective.

1 INTRODUCTION

Technology has become an integral part of the modern educational process. In order to improve the learning experience of learners and to enhance the learning efficiency, education institutions usually implement e-learning systems. E-learning systems are mostly organized as web-based platforms that are available to students and teachers anywhere and anytime. Firstly, these systems had been organized as a collection of static web pages with the prime aim to present course information. With time, these systems have been improved to support the publication of learning materials in different formats like ppt presentations, audio and video recordings, etc. Also these systems in later stages have been enriched to support the asynchronous and synchronous communication between teachers and students, collaboration among the students and publication of announcements. More recently, these systems support online tests and implement a central evidence of learners' achievements. Todays' e-learning systems have evolved so much and they have become an integrated environment containing a wide range of tools and applications. Because of its richness in functionalities, today's e-learning systems are referred in literature as Learning Management Systems (LMS), Course Management Systems (CMS), Learning Content Management Systems (LCMS), E-learning Platforms or as Virtual Learning Environments (VLE) [1]. The e-learning system Merlin maintained by the E-learning Centre at SRCE is VLE as it's a complex system consisting of several tools. According to Becta ICT Research [2] VLE is "a software tool which brings together in an integrated environment, a range of resources that enable learners and staff to interact online, and includes content delivery and tracking". Similarly, Cassidy [3] defines VLE as: "a web based software system comprising a collection of tools and applications that enable online communication, collaborative learning, uploading of instructional content, student assessment and feedback and course administration". At the E-learning Centre at SRCE, VLE is defined as an integrated environment, consisting of number of systems and

tools (including LMS and a variety of social software e.g. forum, chat, wiki, blog etc.), usually connected with administrative information system and digital libraries [4].

According to Rienties et al. [5] many of Higher Education Institutions (HEIs) in the Western Europe (e.g. UK, Germany, Ireland, Spain etc.) use VLEs for some time now. In recent years there is also a growing use of VLEs in secondary and primary schools as well [6]. When VLEs are used correctly, they can transform learners experience into more satisfying, enjoyable, and more effective experience [7]. Some of the benefits of VLEs use are: increased convenience and flexibility while accessing learning material, there are no time or space limitations to participate in online activities, learner has more control over the learning process and the feedback about learning progress is timely. If VLEs are not used correctly, they can have negative effects as well. For example, if teacher doesn't provide appropriate instructions for learners, learners can be confused about the learning path they need to follow. Further, if teacher overloads learners either with information or activities, learners can feel overburdened, frustrated and dissatisfied which can decrease their learning performance and motivation. Next, if there is a lack of communication or collaboration between learners, they can feel isolated and lose interest for online learning. Using VLE only as a medium focused on information presentation or repository of educational material can diminish learning or students' engagement. Instead VLEs should be used as communication, collaboration and knowledge building mediums that encourages students to participate in discussions, sharing and building new knowledge [8]. Therefore, in order to get benefits from VLE use, both students and teachers need to be interested, engaged and committed for active participation in VLE activities [9].

At the beginning the research about e-learning was more focused on the understanding how to use the technology [10], how to effectively implement e-learning within university context [11] or which ICT skills are needed in order to get better results from it [12], [13]. However, latest research is focused more on the user satisfaction with the e-learning technology and its usefulness [14], [15], [16]. More precisely today's e-learning research is concentrated on the quality of e-learning systems i.e. quality of VLEs. VLE is an information system for HEI stakeholders' teachers and students. If the information system has good qualitative features, it can increase the users' satisfaction and influence better performance [15], [17]. Within this paper authors are concentrated on VLE usefulness, user satisfaction with interface organization and design, user satisfaction with VLE functionalities and adequacy of available user support.

2 VLE MERLIN

The E-learning Centre at SRCE (ELC) was established in 2007 as a focal point for support to institutions, teachers and students in implementation of e-learning especially at the University of Zagreb. Later, the E-learning Centre has grown and broadened its support to all higher education institutions in Croatia. One of the first activities of the E-learning Centre was establishment of the reliable, accessible and easy to use e-learning platform. The platform was named Merlin and has grown and expanded through the years. Today the VLE Merlin (http://merlin.srce.hr) consists of a learning management system Moodle, an e-portfolio system Mahara and a webinar system Adobe Connect (Figure 1). Further, VLE Merlin is connected to the remote cloud storage system ownCloud and extended with a custom made plugin that is connected to the national Information system of Higher Education Institutions (ISVU).

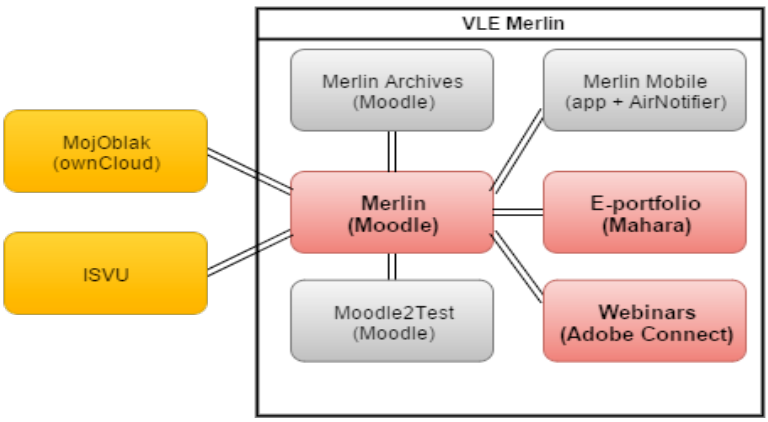

Figure 1. VLE Merlin

VLE Merlin from its beginnings till January 2017 had 96.155 created user accounts. For academic year 2016/2017, there were 35.406 enrolled users of which 2.987 users in the role of teacher and 32.961 in the role of student. The rest were institutional administrator or online assistants. For the same academic year, on VLE Merlin there were total 5.736 e-courses, 4.960 e-courses from six universities and 776 e-courses from polytechnics and schools of professional higher education.

Availability and accessibility of the VLE Merlin, easiness of its use and the quality of support are priorities of the E-learning Centre. However, it is very challenging to provide a stable and rich VLE for such a large number of teachers and students [18]. VLE should enable teachers to make changes to their e-courses whenever they want to, whether they are uploading new learning materials, setting a new task for the students or evaluating students work. On the other side, VLE should be available to students to access published learning materials or to participate in the scheduled activities whenever they need to. Therefore, VLE Merlin is regularly maintained and upgraded with new capabilities to meet the needs of it users. The E-learning Centre team is trying to consider all users' comments and suggestions and implement them within VLE Merlin. Hence, in addition to the modules and blocks that already exist in the VLE Merlin, there are additional ones which were programmed by the E-learning Centre team.

For each academic year the VLE Merlin is upgraded to the newer version of Moodle and additional adjustments and possibilities are added. As VLE Merlin is big and complex system with number of users, major upgrade and changes are done once a year in August when there is no teaching and learning activities. For the academic year 2015/2016 new version of Moodle (2.9) have been tested and installed. The VLE Merlin was improved with the new design and functionalities. New visual design was developed based on the concept of responsive design that offered simpler user interface in general and better usability on mobile devices. New features were added for easier operation within the system: the use of the dock option (hiding/un-hiding blocks), enabling/disabling course content view in full screen and tool for quick return to the top of the page. Further, user personal menu and inbox section were added to the VLE Merlin, and interface for student grading and for managing the activity Forum was improved.

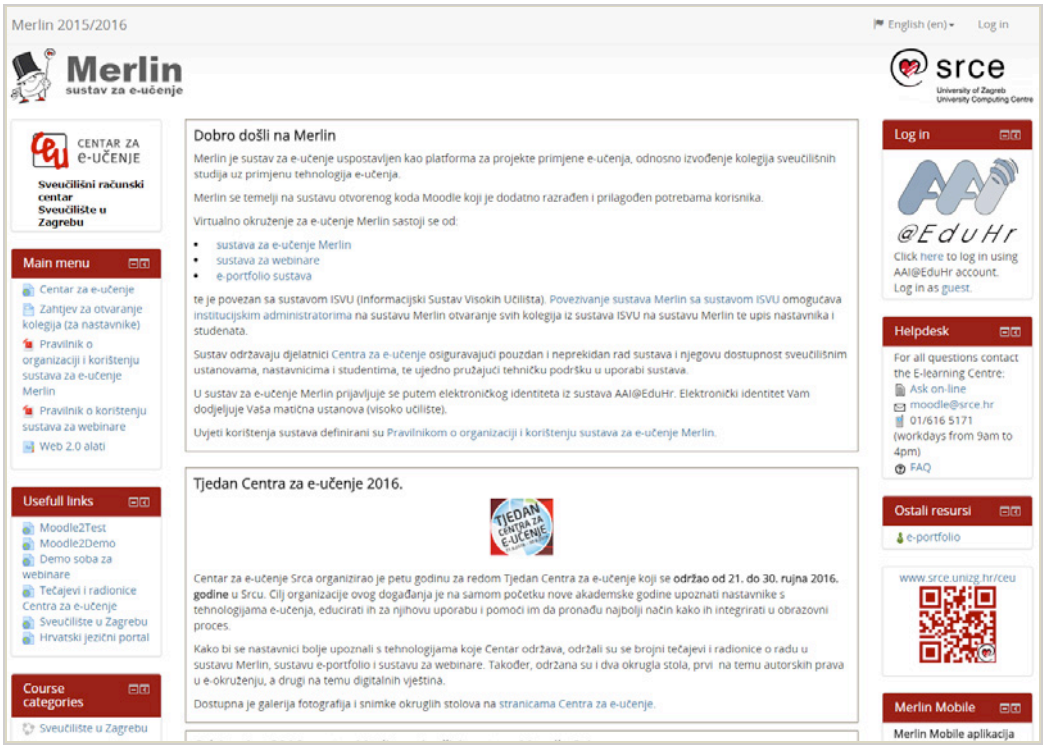

Figure 2. Design of the VLE Merlin for academic year 2015/2016 (VLE Merlin home page)

In order to get feedback from users about satisfactions with VLE Merlin, the E-learning Centre performed the survey. Although, the E-learning Centre obtains a large amount of feedback on the regular basis communicating with users through helpdesk service, an organized and planed survey was needed. Aim of the survey was to gather information regarding user satisfaction with VLE Merlin

in general, its design, interface organization and provided support. Besides that, we wanted to find out whether users find VLE Merlin useful for their education process.

2.1 Survey design

An online survey was prepared and users of VLE Merlin were invited to participate in November 2015. The invitation to participate in the survey was published on the VLE Merlin main page and on the top the users' personal page. The survey was available to Merlin users from 2nd to 20th November, 2015. In general, survey was organized into three sections: (1) demographic questions; (2) questions regarding length of the VLE Merlin use and (3) questions regarding users' satisfaction with VLE Merlin functionalities, its navigation and design, adequacy of provided support and questions regarding user's attitudes about VLE Merlin usefulness. Based on the users' role (teacher or student) in the VLE Merlin, the survey showed the different set of questions. In total, there were 30 questions for teachers and 21 for students.

2.2 Survey results

In total 950 answers to the survey were collected, 79 from teachers and 871 from students. Only one student answer wasn't complete through the whole survey, therefore total number of students' responses taken for consideration within this study is 870. Within this paper, the results of the students' response are elaborated.

2.2.1 Demographics

Majority of students that have participated in the survey were female (68.9%). They were mainly from universities (University of Zagreb, Zadar, Rijeka, Dubrovnik and Osijek) and from three other higher education institutions (polytechnics and school of professional higher education). Majority of students were in the age group between 18 and 24 (90.2%), the rest were older.

2.2.2 Length of the VLE Merlin use

The majority of students, participating in the survey, have used the VLE Merlin for less than three years (43.4%) or started using it from academic year 2015/2016 (42.7%). Only 13.9% of students have used the VLE Merlin for more than three years. In their responses, students stated that they use the VLE Merlin mostly for tracking course announcements and to access the learning material (94.8%), for assignments submission (68.3%) and to check their grades and score (62.4%). Only 36.3% of students used VLE Merlin for communication with teachers and/or students, and 30.0% of students used VLE Merlin to monitor the feedback of their progress within the course. The most used activities by students in VLE Merlin are activity Assignment, Messages and Quiz. The least used activities were Glossary, E-portfolio, Wiki and Workshop. None of the students that have participated in the survey have used activity Chat in their e-courses.

2.2.3 Usefulness and satisfaction with VLE Merlin

The great majority of students consider VLE Merlin useful. The 84.9% of students agrees with the statement that VLE Merlin facilitates access to learning materials. Small percentage of students disagree (6%) or cannot determine whether they agree or disagree (9.0%). 63.2% of the students believe that VLE Merlin facilitates communication with teachers/students, 13.0% disagree while 23.8% of them cannot determine whether they agree or disagree.

The survey showed that great majority of students (75.4%) find the VLE Merlin easy to use, however, small percentage of students disagree (9.6%). Based on the few students' comments, possible reason for disagreement is that too many clicks are necessary to access the desired content. Several students commented that there should be simpler overview of the e-course notifications. Some of the students' referred in their comments to excessive use of the same e-learning activities and content organization within the e-courses, however this is something that is not in the domain of the E-learning Centre.

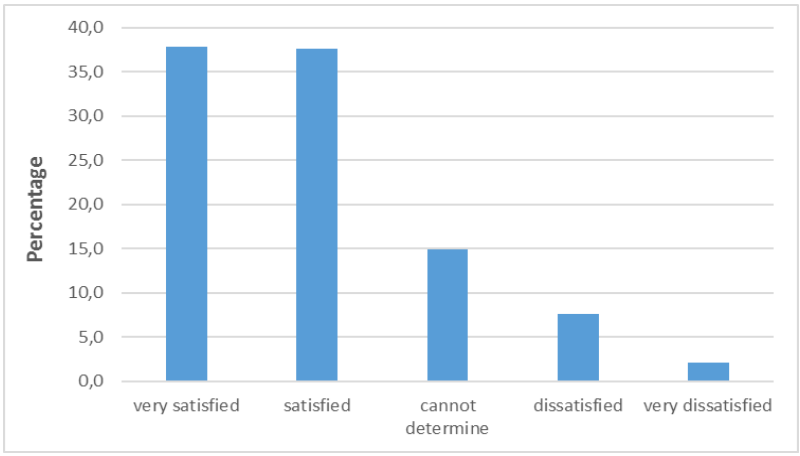

Figure 3. Students' agreement with statement: VLE Merlin is easy to use.

67.6% of students stated that they are satisfied or very satisfied with VLE Merlin. The rest could not determine their satisfaction (18.7%) or were dissatisfied with VLE Merlin (13.7%).

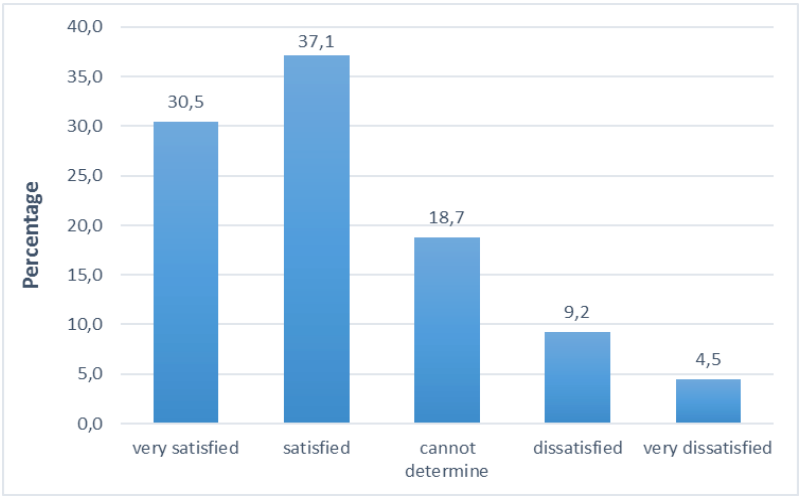

Figure 4. Students' agreement with statement: I am satisfied with the use of VLE Merlin.

Results showed that just half of students 53.0% were satisfied with the graphic design of VLE Merlin. 23.1% of students were not satisfied, and 23.9% of students cannot estimate their satisfaction towards graphic design of VLE Merlin. In the few comments that students have left, they stated that the design of VLE Merlin should be more attractive, modern, and that needs some improvements.

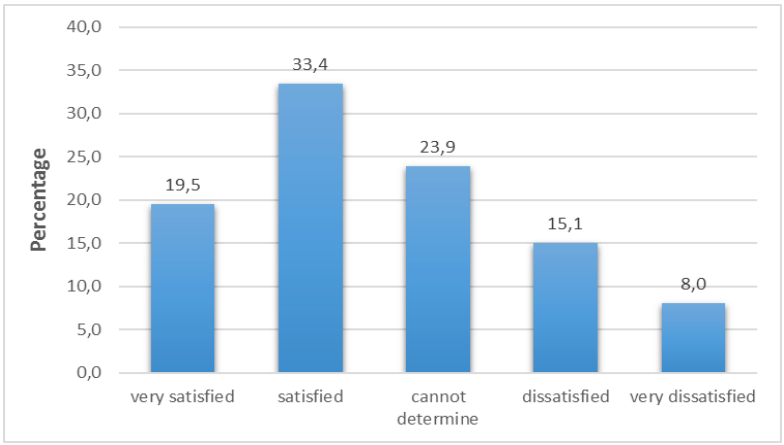

Figure 5. Students' agreement with statement: I am satisfied with graphic design of VLE Merlin.

Similarly, half of the students (55.1%) were satisfied with the interface organization, the use of colors and icons within VLE Merlin However, 21.7% of them were not satisfied, and 23.2% of students cannot assess their satisfaction. Several comments, that students have left, were related to graphics and selected pallet of colors within VLE Merlin. They think that colors could be more vivid and visually attractive. As for the interface organization, several students have considered that there is a space for improvement because they sometimes lose orientation on the page. They didn't find the current way of accessing e-courses simple enough. Some students suggested that there should be more space for course content display, and that there should be blocks (menus) only on one side of the interface.

Further, results showed that the support in use of the VLE Merlin provided by the E-learning Centre is sufficient to 55.5% of students, 6.1% of them disagree, while 38.4% of them cannot determine. This percentage of students that cannot determine whether support from the E-learning Centre is sufficient can be explained that students did not have the need to use the E-learning Centre support. Students usually are quite well acquainted with new technologies and need seldom help. When they need help with some task or access to learning material, they ask collogues, as the VLE Merlin is mostly used as part of blended learning. 57.6% of students agree that the E-learning Centre provides a quick and useful feedback, 6.2% of students disagree while 36.3% of them cannot determine because they did not use the E-learning Centre support.

3 IMPLEMENTED CHANGES IN VLE MERLIN

Even though the majority of students find the VLE Merlin useful and they are satisfied with it, the E-learning Centre team considered their comments and decided to make further adjustments of the VLE Merlin in order to improve students' online learning experience. The survey results indicated some dissatisfaction with the VLE Merlin interface organization and design, it was decided to make additional improvements with VLE Merlin interface design. Besides this, based on students comments, following comments were taken into consideration: clearness of the presented information within the system; more interactive and visually more attractive user interface; simplification of the navigation; reduction of the amount of red color; menu blocks just on one side, not on the both sides (left and right columns) because it reduces visibility; reduction of the necessary mouse clicks to access e-course; organization change of blocks for mobile version (more important should be placed at the top); login block should be placed on more visible place; improvement of the contrast change within accessibility block.

In order to provide users of VLE Merlin with the best possible user experience the E-learning Centre team started finding the best solutions for the improvement of the VLE Merlin based on students' comments. For the interface design the E-learning Centre team took into the account that the user interface should be adapted to larger audience and followed the rules defined by World Wide Web Consortium (W3C) and principles of Universal Design[1]. For the new visual design Boostrap Moodle template[2] has been chosen as main base. Boostrap is the most popular framework for creating responsive web design and allows easy modification and customization.

The defined steps in order to improve the VLE Merlin in academic year 2016/2017 reflected the students' comments. The preparations for the new improvements and adjustments of the VLE Merlin have started already in May and new version of the VLE Merlin included following:

- new home page was developed, it consists of (1) menu bar where users prior to logging in can access the user manuals, links to other useful resources and systems, help information etc., (2) login section, where existing users can log in or enter as guest, and (3) blocks with general information about Merlin, information about novelties within VLE Merlin and support information.
- when user logs in, he gets new elements in the menu bar through which user can access its courses more intuitively;
- after accessing the e-course in menu bar, menu element shows course activities and resources for faster access;
- link to access personal details is placed as well on the menu bar with user picture;

[1] http://www.srce.unizg.hr/files/srce/docs/CEU/sustavi-na-daljinu/Merlin/Smjernice_za_osiguravanje_pristupacnosti_nastavnih_materijala.pdf

[2] https://moodle.org/plugins/theme_bootstrap

- information about new messages, search bar and language settings are also placed within the menu bar;
- content space in the central part of LMS has been increased by removing the right column with blocks, making more space for the content;
- number and type of visible blocks has been reduced on the left side and only the most important and most used blocks are kept, however users can freely add new blocks to their own home page or to the e-course page;
- for mobile version of VLE Merlin positions of blocks are also reorganized, and login block is placed on more visible place;
- and lastly, presence of red color on VLE Merlin is more aesthetically dosed.

Final design of the VLE Merlin is presented in figures 6 and 7. Figure 6 presents the main page of VLE Merlin. Figure 7 presents design of the e-course page within VLE Merlin.

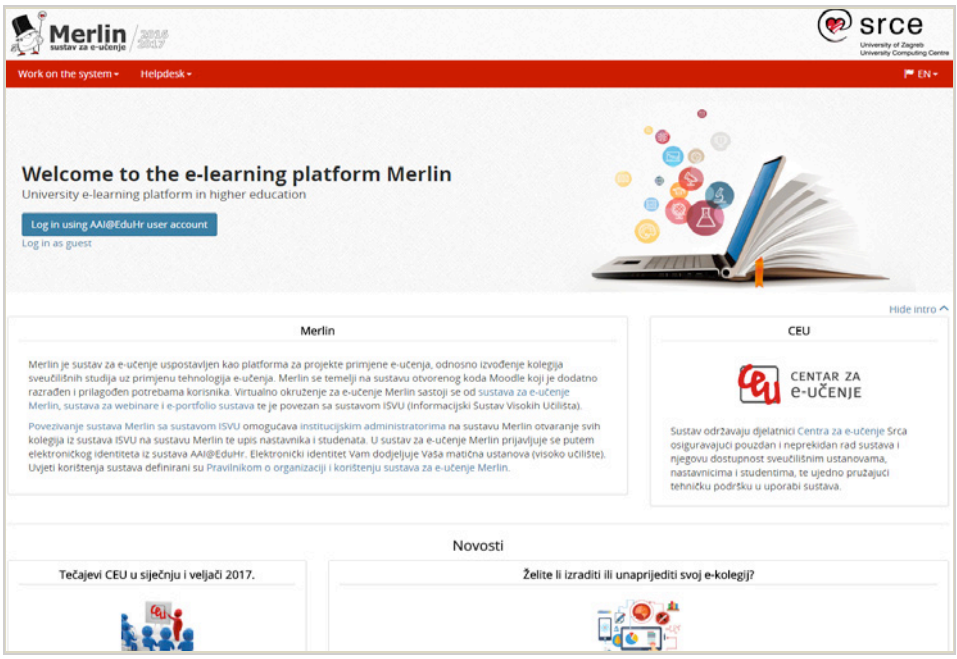

Figure 6. Design of the VLE Merlin for academic year 2016/2017 (VLE Merlin home page)

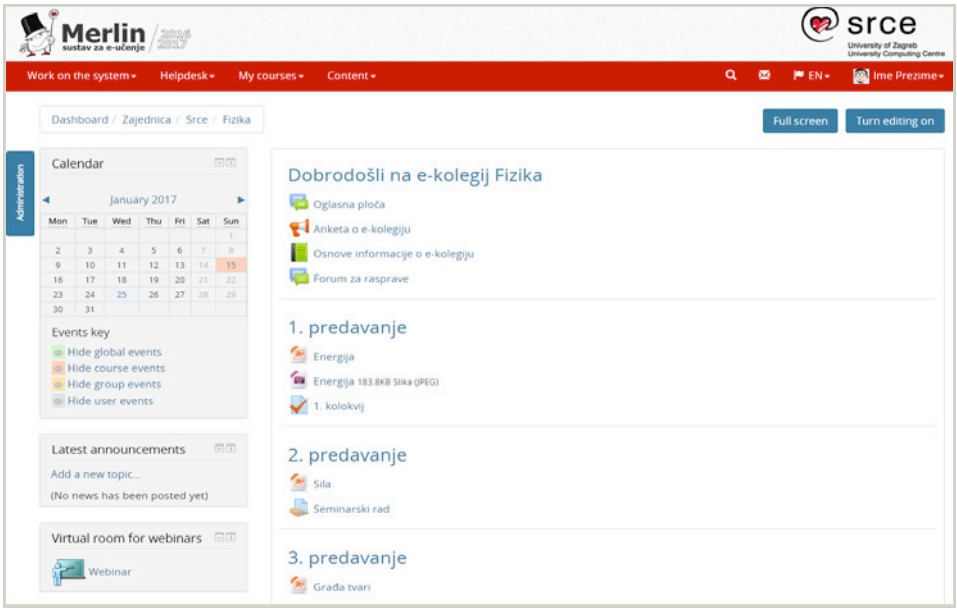

Figure 7. Design of the e-course page within VLE Merlin

The preparations and modifications and improvements along with testing were made on the internal test system. Along with that a small scale research was conducted in order to test the new VLE Merlin installation before launching it in to the production phase. Seven users have been invited to participate in the study, five in the role of teachers and two in the role of students. The case scenarios for users with instructions what to do within VLE Merlin were prepared. The results showed that all users were very satisfied with the design, interface organization, navigation and ease of use. While testing the new VLE Merlin installation users also kept notes (comments). Based on their comments, the E-learning Centre team made the final adjustments of the new VLE Merlin (e.g. repairing missing links and updating official instructions how to use some resources within VLE Merlin).

The new VLE Merlin was officially set into production on September 1st 2016. Gathered feedback in everyday communications shows that users like very much the new design and possibilities of the system.

4 CONCLUSION

The success of a VLEs depends on many quality criteria. First of all, they should be easy to use and their functionalities should be considered useful by its users. Further, they should be flexible enough to satisfy users' needs in order to achieve learning goals. Very important for users is also the VLE interface, it should be attractive enough to engage users to use it but also clear enough not to distract users from the main goal - learning. However, after having all of these qualities, the proper use of VLE is crucial for its success in practice. Teachers need to be trained about the VLE features, how to use them and what instructional design principles should they follow when creating an e-course in order to get more benefit from VLE. The results of the user survey conducted in November 2015, helped the E-learning Centre team to further improve VLE Merlin. Even though, results showed that many students may not need support while using VLE, authors consider support as backbone to the every VLE. Support ensures that everything works correctly, that VLE functions and features are up to date, and supports teachers while using VLE. ELC team have done its part by developing quality VLE and ensuring the support in terms of providing online and face-to-face courses for the teachers, creating and maintaining manuals, video animations, help guides etc., the rest is on the motivation and engagement of teachers in order to get the best from VLE Merlin i.e. to encourage communication, collaboration, building and sharing knowledge between students.

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