OPEN LEARNING

A Qualitative Study Exploring Important Aspects of a Custom Learning Application's Design

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Executive Summary

Learning Managements Systems in educational institutions facilitated the communication between teachers and students but at the same time raised new challenges.

This thesis presents a qualitative study which explores a custom learning system called OPEN LEARNING. It aims to identify important aspects of the system's design to make informed decisions on how to redesign it to better suit its users needs. The collected data covers how workers, students and teachers interact with the learning system in real-life context to give a better idea about the use of the system.

A design-based research methodology is used to bridge theory with practice and to help discover how people learn while user-centred design methodology steers the design phase of the project. The research brings end-user experiences and opinions together with subjective requirements of the company, thus providing a detailed feedback from students, teachers and workers.

The conducted analysis describes the role of teachers in lessons, the role of the system and how it influences interactions between users and the system. It reviews the feedback and reveals important aspects of the design while discussing and demonstrating proposed solutions to identified issues.¶

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CMS - Content Management System
DBR - Design-based Research
HCI - Human-computer Interaction
IDS - Instructional Systems Design
LMS - Learning Management System
UCD - User-centred Design

1 Introduction

Since the late 1990s, the ways of teaching and learning in educational institutions have been changed vastly by the growing technologies. The communication between students and their teachers has been highly facilitated by the integration of new technologies into educational environments. The developments and consequent changes in education present many challenges for research including issues relating to focus, design, learning theories, user adoption and many more (Pishva et al., 2010).

There is no doubt that opportunities for change have shifted. The scope for learning in a range of various settings and on the move has grown immensely. Therefore, researching information and communication technology in education requires not only understanding teaching and learning in formal context but informal situations as well.

The diverse nature of developments in ICT in education and their far-reaching effects and potential for change mean that while it is important for the ICT in education research community to achieve coherence and identity, it is also crucial to draw on research developments in other areas.

The ways in which ICTs are being utilized in education differ and are evolving. Web-based systems such as Learning Management Systems (LMS) stand out from the crowd. A 2007 report showed that over 90% of all responding American universities and colleges have established some sort of LMS-type product for student and faculty use (Hawkins & Rudy, 2008). There is many different ways these systems are being used by educators and studied by researchers.

The trend among many classroom instructors is to use the LMSs to simply deliver course materials electronically in order to offer students more flexibility in accessing these materials. Instructors who teach in-class courses may also choose to use a 'blended' approach by utilizing the LMS as a tool to deliver additional or supplemental course materials to students. This teaching method is usually called 'blended learning' and the courses are called 'hybrid courses' (Garnham & Kaleta, 2002).

Nonetheless, the importance of well designed ICTs is somewhat overlooked. Since 2010, twenty seven companies founded by designers were acquired by bigger companies like Google, Facebook, Yahoo!, Adobe, Dropbox, and LinkedIn and 20 percent of these companies' co-founders were designers (Wired, 2015). When talking about the success of a LMSs or any other ICT in education, we want an e-learning site that is easy to navigate, well-organized and contains high quality materials. So while a system must be well designed and efficient, the quality of the content is on par with the impression you want the LMS to make. This is

exactly why design is such an important piece is a success of ICTs in education (elearning 101, 2014).

1.1 Context

In order to cast a bit of light onto this project, it is essential to start with exploring the landscape around my research. This chapter aims to introduce the company which I have been working for for an extended period of time. As part of the company, it is important to understand its mission and business goals that have had a significant influence on the research. Following parts introduce the company's learning system and the research objective.

1.1.1 Open Agency

Open Agency is an educational company based in Czech Republic. The company was founded in 2009 and it specializes on textbook publishing, online language teaching and face to face language teaching of professional work-oriented terminology. Open Agency creates and offers high quality materials for teaching at secondary schools, universities and industrial companies. They cooperate with firms, universities and other providers of language education on offering complex educational courses for their clients. They tailor their educational materials for specific branches of industry and emphasize on the interconnectedness of the educational materials with real professional practice (Open Agency, 2016).

In teaching, the company uses a learning system called OPEN LEARNING, a web-based application developed in-house. In OPEN LEARNING, students have access to educational materials such as texts, audio recordings, videos, pictures, graphics, etc. The system gives them freedom so they can decide when and where they want to learn in accordance to their needs.

When creating study materials, the company maps requirements for using foreign languages in a concrete work context (engineering, machine building, chemical industry, services in tourism, international trade and marketing, etc.). Based on an analysis of relevant study programmes, job profiles and discussions with professionals from specific branches of industry, the company creates descriptions of necessary knowledge and skills which serve as a base for creation of each unit. Flowingly, through interviews with employees, they evaluate the real importance of created content and examine which parts to further develop.

Next step in the development of study materials goes with respect to the process of learning in which integration of professional and language knowledge occurs. This integration is supported by usage of online digital technologies.

The teams that are responsible for creation of these materials consist of experts from companies, experienced teachers from all levels of education, translators, native speakers and foreigners from specific industries and cooperating companies. Open Agency applies several principles such as that the learning of foreign language is not based on building only a professional vocabulary foundation but rather develop all basic skills (listening, reading, writing, speaking). Each unit consists of three parts: content presentation in one or two videos and texts, content practise in five or six exercises and evaluation - two different tests and task (written or spoken). The task's goal is to motivate students to using the foreign language and gain self-confidence.

1.1.2 Company Mission

"A digitally self-confident tutor and teacher believes that modern technologies can appropriately complete the teaching process and make it more efficient and that they have their practical meaning in language education. Tutors and teachers are irreplaceable in the educational process but the different way of treating information requires change of their role into guides and motivators." (Open Agency, 2016).

As Mrs. Kuncarova, CEO of Open Agency said, the company has been aware that its mission is not only to create and sell their materials and courses but, for the most part, support the transition of teachers' role. As she points out, the key focus has been to gradually explain to teachers that ICTs have arrived and as other types of businesses had to adjust to this trend, they will have to as well. Therefore, Open Agency offer courses to teachers in a form of methodological sessions and various practical workshops.

> *"Just like a figure skater does not learn how to jump on skates by watching a video hundred times, nor a teacher learns how to change their teaching by only listening someone talking about it."*, Kuncarova explained.

And she continues on demonstrating the main aim of her company: "Nowadays, students want to be more and more autonomous and with that comes greater responsibility for what they learn and how they learn it. This is the change we see among today's children. Before, they used to listen to teachers and follow their instructions but now, they like to explore and that is what we call constructivism. The children are already familiar with many areas but they add new information to their knowledge foundation and create new links and context. This is how they learn. Not by teachers telling them everything. The teachers' role is to make the kids explore context and build on top of their existing knowledge."

After several years, Open Agency now offers a complete concept. They ensure an integrity and strive to support and further develop teachers. They bring a disruption without which

the majority of teachers would struggle to explore their own possibilities in organizing the interaction between them and their students.

1.1.3 OPEN LEARNING

OPEN LEARNING is a web-based self-paced learning system that guides students step-by-step through a module. The module is a sequence of ten units which include expositions, videos, audio recordings, graphics, various types of exercises, tests and a task. It is aimed at conscious learning, although some subconscious acquisition of language is inevitable, as students hear and read samples of foreign language. The system has been designed as a tool for blended learning and its uniqueness stands in the ability to adapt to a change of content.

The concept of OPEN LEARNING integrates several aspects in such a way so the learning of foreign languages is effective and in accordance to knowledge of foreign language teaching didactics. The most important principles are the role of a foreign language teacher, autonomous students learning and attractive learning content.

The key resource for OPEN LEARNING concept is the theory of constructivism. Constructivism puts emphasis on an active role of a subject in pedagogical processes (Průcha et al., 2003). Constructivists implement their approach based on a hypothesis which states that cognition occurs when subject is combining snippets of information from an external environment into a meaningful structures with which he or she performs mental operations conditioned by an adequate level of his or her cognitive development. This can be achieved by putting focus on students' internal motivation, acquisition of their knowledge and opinions and an emphasis of usability, usefulness and helpfulness of content which they students study.

Practical application of OPEN LEARNING is represented by textbooks with specific vocabulary, units created systematically and the online learning system which enables students to have an overview of their progress, their results and perform activities that lead to the development of language skills. The use of OPEN LEARNING leads to a development of teachers' skills too. For example, the ability to motivate, initiate and activate students, plan and organize learning process, etc. Open Agency motivates teachers to create their own learning practices in their classrooms and delivers a platform where teachers can reflect and share their experiences with others. Based on six years of experience and a cooperation with tens of schools and hundreds of teachers from all over Czech Republic, the company claims that only a self-confident teacher believes, that ICT can make teaching and learning much more effective and it has its purpose in education.

1.1.3.1 Main Features of OPEN LEARNING

Classroom Organization and Management

The learning system enables administrator to create classrooms - virtual spaces which contain a study materials. Administrators manage users and tutors within classrooms and give them access to their courses.

Content Management
Editors of OPEN LEARNING are able to create custom modules and custom units by choosing various exercises, tasks, tests, importing texts and media, etc.

Monitoring Progress
Teachers are able to monitor students' progress, view their results in all exercises, tests and tasks to make teaching more effective and to possibly adjust the learning process and activities in face-to-face setting.

1.2 Project

The motivation for this project stems from my extensive involvement in Open Agency's activities over the past years during which I have gained detailed knowledge about their learning system, users and activities around the system such as the user support, constant improvements, maintenance of the system, user training, etc.

> *"The most important property of a program is whether it accomplishes the intention of its users."* (Hoare, 1969)

In 2015, Open Agency had registered a severe increase in the amount of their users. In fact, the biggest in its existence. This, as well as other reasons, led to several meetings inside the company, debating the future goals, evaluating the current system's and organization's performance under such a load of users, etc. A realization was spurred and we agreed that there was a need for an analysis of the current learning system, its users and the environment around the system which would possibly lead to redesigning the current version of OPEN LEARNING. Other reasons for undergoing the analysis are stated below:

- Potential massive increase of users based on cooperation with other educational providers in Czech Republic.
- Simplification of processes, mostly regarding user management, to keep costs of administration low.
- Ageing technologies (obsolete front-end framework) which increases maintenance costs.
- Broken functionality of some part of the system.
- Internal evaluation and a desire to lead the market by providing cutting edge solution.
- Desire to better understand our users.

This realization led to the need of assessing the current learning system and other aspects mentioned above. An important decision was made to keep investing into the in-house system rather than looking for a solution among LMSs and other learning applications on the market. There were several reasons that led to this decision:

- Positive feedback from users over past few years which indicated a need for an evolutionary step rather than revolutionary one.
- Lower investment for further training and the fact that the company does not have to adapt its processes to a new system.
- Desire to involve our users in the design phase to make them feel involved and increase the chances of positive acceptance of the new version.
- End-to-end control over the system, no need to rely on external providers.

Even though Open Agency is not a technically savvy company but rather specializes in educational aspects, the technical knowledge of a few partners (part-time employees) gives them the power to develop this in-house system rather than rely on external software consultants, designers, developers and other specialists. Nonetheless, the initial agreed upon description of the project stands as follows:

> *"You will work on the analysis of user requirements and create a prototype of our learning system based on the requirements. The goal is to provide users with a redesigned application that does not hinder the process of learning. It is extremely important to solve the current issues and design a sustainable solution - highly usable new interface to display Open Agency's unique materials according to users' needs."*

Building a new system does not always imply that it will be accepted and widely used. It is even more difficult when someone tries to replace an existing system, which during its lifetime proved to be very popular and extensively used. My goal is to design a more user-focused system so that users of OPEN LEARNING will adopt the new version more easily.

Because I have an experience with following UCD methodology from previous projects, I proposed that we could adopt this approach in the project as well. The idea is to put emphasis on real users and take advantage of their knowledge and experience since Open Agency already has a fairly large user base. The benefits are that we will be able to gather data to understand our users' needs, build a prototype, test it, collect valuable feedback and iterate on it.

1.3 Research Objective

The intention of this research is to explore the landscape around UCD in accordance with designing educational systems. There are a few arching perspectives to this research. Firstly, learning perspective - to identify learning theory that supports, influences and drives the design of the learning system. Secondly, user adoption perspective - explore the current trends and issues in the field of learning systems' usability and adoption. Thirdly, design perspective - how to use UCD methodology to ensure that the system is highly usable, easy to navigate and meets the needs of its users.

1.3.1 Research question

The practical project objective is to identify and solve problems with the existing learning system such as obsolete infrastructure, compliance with different learning models advocated by Open Agency, identifying missing as well as redundant features in current system with the goal of making learning more effective, integration with company's processes and other problems that will be found during the lifespan of this project.

> The main research question states: *What aspects do users identify as important in the design of OPEN LEARNING and are there any aspects that hinder the use of the system?*

With the collected feedback, I strive to demonstrate how the system can be redesigned to incorporate the feedback. To answer the research question, I explore methods used nowadays, discuss my research design and thus contribute to the current research by validating some of the statements of other researchers. Due to the multidisciplinary nature of this thesis, the bridge between User-centred Design, learning theories and learning management systems will be created by reviewing the literature on all disciplines. It is important to map the current trends in ICTs design and use in educational sector to help prevent mistakes in my process. It is also important to review how UCD methodology is being used to further build on top of existing experience and knowledge of other researchers, institutions and organizations.¶

2 Related Work

This chapter gives background information on the research done in the fields of Learning Management Systems and User-centred Design. In order to understand the big picture, this chapter aims at exploring the work around Learning Management Systems, their role in education, the direction of LMS research and the methods researchers use. The second part focuses on User-centred Design and tries to bridge these two separate research fields. It gives examples of using User-centred Design methodology in development of computer based interactive systems as well as in other various projects and settings and also explores methods researchers use in various studies.

2.1 Learning Management Systems

Learning management systems (LMSs) are very widely used in higher education. These systems have an unquestionable space in educational setting.

There have been a lot of studies that focus on learning management systems as tools and pieces of technology to manage and share knowledge in educational institutions (Abu Shawar, 2009). Comber et al. (2010) examined if the tools (LMSs) affect a learning process. For that, he implemented a person-centred blended learning course in three different e-learning platforms: Moodle, Fronter and CEWebS. These platforms allowed students to accomplish many of basic tasks in the course more or less effectively (Comber et al., 2010). The research came to a conclusion that an implementation of a blended learning scenario is successful depending on the choice of an appropriate e-learning system.

In 2010, Pishva et al. (2010) have investigated the current usage of a learning system Blackboard and the way in which it helps educational institutions around the world. 19 universities participated in the study and the conclusion stated that Blackboard is assisting educational institutions in many ways including face-to-face learning, blended learning and online education. They also found that it is dominant on LMS market together with another open source LMS Moodle.

Another approach in the e-learning research field is LMS evaluation. For instance, Landry et al. (2006) used TAM (Technology Acceptance Model) created by Fred Davis in 1989, to examine the users' perceptions of usage, usefulness, and ease of use. TAM was applied in the academic setting to measure reactions of students to Blackboard. Results suggested that participating students (nearly 700) found the course content elements (documents, announcements, quizzes, lectures) to be much more used and more useful than items that provided course support and communication such as e-mail, discussion boards, external links,

etc. Overall, the outcomes for usage, usefulness, and ease of use for this study provided support for the TAM and closely matched what has been reported in the information systems literature. That usefulness is a stronger determinant of usage than ease of use, suggesting that it can potentially be a helpful tool in an instructional setting. In the same way, Roca et al. (2008) have extended the Technology Acceptance Model (TAM) by adding more aspects that examine the effects of motivational factors affecting TAM construction.

On contrary, other researchers focused on studying LMSs from the perspective of users. Servonsky et al. (2005) looked at skills and challenges of course navigation using Blackboard in School of Nursing at Hampton University. The research addressed challenges like students' various IT skills and knowledge and a help to adapt to the technology. The study stated that preparation for an online course of distance learning requires larger time invested into planning and preparation for instructional materials than the traditional face-to-face course.

In other work, Machado & Tao (2007) studied the user's experience through a comparison study between Blackboard and Moodle. They used online surveys to compare user experience of basic functionality of each system such as communication tools, student-to-student interaction tools, and student-to-instructor interaction tools. The results of the research claimed that Moodle was the preferred choice for the users.

Buzzetto-More (2008) surveyed students' perception about different components of an LMS. Their study from University of Maryland examined an e-learning perceptions and students' preferences. During this study, series of courses were designed as blended learning experiences. They adopted Blackboard and created paperless learning experiences. The results indicated that students find course websites to be helpful resources that enhanced the understanding of course content. The examination of individual e-learning components showed that students responded favorably to most features available in Blackboard.

In a context of blended learning, other researchers used COI (Community of Inquiry), developed by Garrison, Anderson, and Archer (2000), as a theoretical base (Rovai & Jordan, 2004; Garrison & Kanuka, 2004; Vaughan & Garrison, 2005; Vaughan & Garrison, 2006). The Vaughan's study developed professional blended community for establishing social presence in face-to-face context (2004). This study investigated how blended learning approach can support faculty learning community from participants' perspective. The study suggests that the nature of the social and teaching presence changes over time in order to support development of a complete cognitive presence and that learning activities should be intentionally designed to attain this phase, face-to-face and online learning environments should be structured to complement each other and coordinators should focus on providing direct instruction strategies which enable the participants to move forward in their inquiry process. Although these study demonstrate strong points, they do not give an unambiguous

answer to how much influence the blended design has on social, teaching and cognitive presence patterns.

In the work of Hanson and Robson (2004), they studied the use of WebCT and Blackboard at three US colleges (Williams, Brandeis, and Wesleyan). They looked at how teachers and students perceived value from using LMS and what activities provided the most learning benefits. Researchers showed that teachers and students chose “time saving” much more often than “learning improvement” as benefits of using LMSs. The most valued features were those that supported making class information and reading materials available. With respect to learning benefits, teachers highly valued online discussions while students responded favorably to LMS features that allowed online access to grades, quizzes and audiovisual materials, all of which were seen as having strong learning benefits.

Parker, Bianchi and Cheah (2008) investigated student perception about learning through PowerPoint and WebCT at a large public university. While the faculty's view on LMS was a tool to connect students and increase social networking, students did not perceive it that way but used LMS rather as a repository for course materials. Researchers stated that such use is unlikely to increase student learning for those who prefered problem based learning activities.

In an example how LMS can facilitate pedagogical change, a teacher from University of Missouri agreed to participate in a WebCT pilot program (Bender, 2005). During one semester, he started teaching more courses via WebCT and began to make a series of pedagogical shifts, including having students participate in online discussion groups and collaborate on the content of their required essays. "Instead of focusing on management issues, (LMS) need to focus on a new pedagogy that facilitates group interaction, allows students to control much of what they are learning, and encourages ownership" (Bender, 2005).

In more recent study from 2013, evaluation of an LMS for productive language skills (Hamat et al., 2014), research team developed an e-learning platform to help with the productive aspects of language skills, especially writing. The intention was to break the “one-size-fits-all” approach where LMSs are often designed to be used for all disciplines. They tested the system for one semester with a group of learners at Universiti Kebangsaan in Malaysia. The learners answered a questionnaire that focused on three aspects of the system: usability of the system, communication effectiveness and learners' attitude toward the system. The findings revealed positive attitude toward the asynchronous nature of the system highlighting the interaction with others in forums. They positively evaluated the fact that they could work at any time and it was convenient to communicate with fellow students about the course work. Overall, the findings showed that the system has been able to help student improve their writing skills as well as enhance their understanding of certain topics through explanation and examples given by peers and lecturers.

Another study from Pontifical Catholic University of Rio de Janeiro was done on usability issues in LMSs (de Moraes, 2012). The researchers open with a hypothesis that there are usability issues in Moodle interface that hamper the use of communication and collaboration tools by teachers. Interviews in their project were conducted with professionals on distance education and the answers were subjected to techniques of content analysis. From their data, they saw that over 50% of content units referred to difficulties when using Moodle interface. This pointed at the existence of usability problems in the interface. They found out that most cited parts of the interface were forum and chat and concluded that these parts were very important for respondents and a subject for further usability studies. They concluded with a statement that the results of content analysis suggest their hypothesis is valid.

Learning analytics provide educational institutions with opportunities to support student progression and enable more personalized learning. An increased availability of large datasets, powerful analytics engines and their visualizations of results institutions are able to build on previous experiences to build richer learning processes.

A study by Rienties, Toetenel and Bryan from Institute of Education Technology called "Scaling up" learning design: impact of learning design activities on LMS behavior and performance focused on element of learning design. Learning design establishes the objectives and pedagogical plans which can be evaluated against the outcomes captured through learning analytics. Researchers claimed that no empirical study that would link learning design with usage of LMSs and learning performance was available. In their study, 87 modules were compared using cluster and correlation analysis. The count was a substantial limitation and as a result, more advanced regression or structural equation modeling were not feasible to determine the direct and indirect relations in their datasets. Though, their finding indicate there there seems to be an invisible blueprint in how academics design modules. Their cluster analysis yielded four distinctive learning design patterns: constructivist, assessment-driven, balanced-variety and social constructivist modules. They argue that learning design activities had a strong influence on how students engaged online and that the activities also have an impact on learning performance.

Discussion

Several studies have been done on LMSs, yet many of these studies have focused on technical aspects such as evaluating the usefulness and ease of use of these systems or extending LMSs with a functionality to incorporate learning styles. However, fewer studies focused on users' real experiences in using LMS as a platform for their learning and teaching activities. Still, most of these studies have focused only on distance-based learning.

Some studies presented above demonstrate that teachers and students have a strong affinity for the ability to share course related materials and manage course information using LMSs. If management of course materials is the initial draw to LMS, perhaps teachers can be persuaded to begin using the interactive tools once they have adopted LMS for material and information management. There are examples above that show how these systems can help teachers modify and adapt their pedagogical approach in order to use the provided tools to guide student interaction and collaborative learning.

This part of the literature review shows some possible patterns that could be very helpful throughout this project. The evaluation methods in research included TAM (Technology Acceptance Model), online surveys and interviews to examine perceptions and user experiences. It was shown that it is essential to chose the correct system for each environment and that indicates that knowledge about the environment and the users is needed in order for a system to be accepted positively. Some studies point to the fact that there are usability issues with certain LMSs and so it would be daft not to respect these finding and chose a design methodology which does not take in consideration the users.

Some of the interesting findings from the work above include results such as: the course content (documents, quizzes, lectures etc.) was found to be much more useful and used than other content that provided features for communication. Or, face-to-face and online learning environments should be structured to complement each other. And lastly, students positively evaluate fact that they can work at any time and that it is convenient to communicate with others about the course work.

To sum up, User-centred Design approach is to be considered as it puts users in the forefront. Based on some of the studies above, students seem to enjoy using content elements in LMSs and value time saving, access to grades and quizzes, etc. Hence, it is important to take into consideration results from these studies and to reflect them in my own work.

2.2 UCD in Designing Educational Systems

User-centred Design (UCD) is an approach that focuses on usability in the entire development process and life cycle of computer-based interactive systems (Gulliksen et al. 2003). In the book The Design of Everyday Things by Donald Norman (2002), Norman describes UCD as a design process based on the needs of the user, leaving aside marginal issues like aesthetics. Nonetheless, UCD approach has been used in various settings as oppose to only computer based systems.

Plass (1998), in his paper Design and evaluation on the user interface of foreign language multimedia software: a cognitive approach, was concerned with criteria for a design and evaluation of such software. He proposed a hybrid model that combines a cognitive and

software engineering approaches. He developed a domain-specific evaluation criteria to describe how well a user interface is able to support the cognitive processes involved in a development of linguistic skills and competencies. He gave an overview on existing models to user interface design and discussed their strengths and focus. His hybrid approach incorporates rapid prototyping. He also argues that a contextualized cognitive approach to interface design can lead to a more domain-specific support of cognitive processes involved in the acquisition of foreign language competencies and skills, and will result in a more user-centred design of the user interface.

In different study Employing User-centred Design Approach to Improve Operator Interfaces (Bias, Nixon, He, Kim, 2015), researchers presented a case study involving the collaboration of software developers, users, and academic researchers, highlighting the contribution of Information Science to distributed control system design and arguing for a general decision and user-centred design approach to distributed control system interface design. The article focuses on understanding the needs of the operators and using task based analysis to improve the overall design of operator displays. Even though they could not empirically evaluate whether the changes had improved operators' performance, there are two measurements of the impact they explored. Firstly, during the co-discovery phase, when researchers consulted the participant operators and engineers and shared their proposed redesigns, the users were very receptive, and researchers worked together to fine-tune the designs to make them maximally acceptable. Secondly, the designs were presented to a DCS (Distributed Control Systems) development team and they reported that the focus on task analysis and decision making has led to improvements in design guidelines for identifying content to be included in graphic displays and methods for identifying structure and navigation. The paper states that these findings are utilized as part of overview display projects at the participating companies as well as other companies.

In the work of Nivala (2005), his thesis' aim was to find out how user-centred design approach could be included in the development of a mobile map service. His literature review revealed that current map application projects are usually executed by either cartographers or software developers and that there is a need for a multidisciplinary approach to design and development that bridges the two separate fields. He proposed a synergy model to provide guidelines on putting the UCD approach into practice of developing map services and applications. He supported the sustainability of the model by the innovative aspects developed during the design phase.

A paper Usability Issues While Building a New LMS (Shehu et al., 2009) done by researchers from South East European University in Macedonia covers a process of building a new LMS as a successor of a previous, extensively used and popular version of the university's LMS. They used users' experience from previous system as a starting point and a minimal threshold that needed to be developed further. They employed the user-centred approach by

gathering data from stakeholders (network administrators, maintainers, IT professionals and others) to collect comprehensive answers and critical viewpoints. In the paper, they discuss some of the usability challenges they faced during the process and propose new approaches that could be taken in order to improve such systems. After the implementation, they stress the opportunities and need of running various usability studies such as cognitive walkthroughs, empirical studies, observations, etc. to further address possible issues in the future releases of their system.

Alexander and Golja in their paper Using Students' Experiences to Derive Quality in an e-Learning System: An Institution's Perspective (Alexander & Golja, 2007) begun to explore benchmarking as a current strategy in common use in universities to identify and implement quality practices: from the use of checklists to a more contemporary dynamic systems approach involving continuous cycles of feedback and improvement centred around the learners' experiences of e-learning. The study focused on eliciting from students and teaching staff what they did and what they wanted to be able to do with particular LMS, what they valued and what their experiences were. The researchers give an account of two major evaluation studies at University of Technology in Sydney utilising a systems approach to investigate the consequences of e-learning. One of their findings reveals that students' experiences warrant consideration in shaping e-learning system developments at the university and that students value e-learning experiences, especially access to education and interactive learning activities while still recognising constraints imposed by developers of LMSs.

Researchers from Human-Centered Technology Group of University of Sussex (Wood & Romero, 2010) describe a design process of an application Move Grapher. As they explain, Move Grapher is a GPS-enabled, mobile learning application to support teaching and learning of kinematic graphs in schools and colleges. It implements a hybrid mode of interaction. Besides a graphical interface, it enables learners to employ an embodied type of interaction as a way of supporting them in generating learning insights. The process of design in this project exploits learner centered design methods. These methods highlight the importance of involving stakeholders (students, teachers, educational researchers) at all stages of the design of educational applications and of refining the design through an iterative prototyping process. The researchers describe that these methods have been used successfully when designing systems employing innovative concepts or technologies. Their final version of Move Grapher met the initial requirements. It enables both teachers and students to create graphs by moving, to send those graphs to other users and allows students to match a graph displayed on screen by recreating the movement described. The application had a good usability and a preliminary learning evaluation suggested that the tool has plenty of scope in reinforcing the learning of movement graphs and addressing students' misconceptions in this area. Researchers argue that learner centred design proved to be very useful when designing

learning applications for which innovative concepts and technologies play a crucial role. They state that in this design approach, iterative prototyping is encouraged and medium fidelity prototypes needed to be created to simulate some part of the functionality that is being created.

The role of system interfaces that are more closely tailored to the way people naturally work, live and acquire knowledge is unquestionably recognized as important. Paper by Granić and Ćukušić (Granic & Cukusic, 2011) named Usability Testing and Expert Inspections Complemented by Educational Evaluation: A Case Study of an e-Learning Platform presents a comprehensive usability study within the context of Europe-wide project. Their paper aims to present the effectiveness of the evaluation methods applied to e-learning platforms. The evaluation methodology brings together users assessments and expert inspections, thus providing a detailed teachers' and students' feedback. User testing integrates six empirical methods into a laboratory-based test. Usability study ascertains usability problems by means of recognized heuristics and enables an "educational evaluation" of the platform by means of three sets of criteria. The evaluation procedure includes inspection reviews, judging system interface compliance with recognized usability heuristics as well as enabling "educational evaluation" and end-user assessments. To collect qualitative and quantitative data, several methods were used such as multi-choice questionnaire, memory test, attitude questionnaire, semi-structured interviews and evaluation form. The research work undertaken within the context of this research is in line with the growing need to intensify the development of new usability approaches for e-learning systems and advance the current methods. Researchers state that the most important contribution is that the evaluation method proved to be successful, provided general findings and know-how from the experience and that it could be easily reproduced by other researchers.

The advocacy of student-centred learning and the emergence of digital classrooms lead to the demand for transformation of pedagogical design that supports the development of 21st century skills through domain knowledge learning. In work of researchers from The Hong Kong Institute of Education: E-learning in School Education in the Coming 10 Years for Developing 21st Century Skills: Critical Research Issues and Policy Implications (Kong et al., 2014), they identify six research issues critical for e-learning in school education, namely the realization of developing 21st century skills of learners, bridging of the gap between curriculum in school and situations in society, maximization of learning opportunities in the learning process, the collection of evidence of improvement and building awareness of progress, assessment of 21st century skills, and provision of teacher development for enculturating learners to develop 21st century skills. The paper shares insights and implications and spreads promotion for an effective implementation of e-learning systems in schools. The reason why the paper is relevant is that it points to the importance of teachers' role in learning and digital literacy of all subjects involved in the process of learning.

Researchers anticipate growing trend toward individualized and collaborative learning where physical classrooms still keep their importance yet learning will extend outside the classroom and will play an important role in learners' knowledge construction. Among other findings, they state that practitioners in the field, including school leaders, teachers, parents, learners and business partners, should put effort in realizing the e-learning vision as discussed in this paper. School leaders need to steer goals and directions of e-learning programs, teachers need to develop and implement sound e-learning pedagogical practice, parents need to acquire digital devices and e-learning resources for learners' seamless learning after class, learners need to learn with diverse subject-related digital resources that encourage active engagement in constructive learning and peer interaction for developing domain knowledge and 21st century skills (Kong et al., 2014).

An example of using UCD in different context than ICTs is a work by Black and Torlei (2015), Designing a New Type of Hospital Gown: A User-centered Design Approach Case Study. The article examines a UK case study of the redesign of hospital clothing from a user-centred design perspective. The researchers found out that the concept of a "universal gown" was not feasible to meet all hospital needs and the intensive care requirements necessitated a different solution. The project demonstrates how designers, working closely with patients and healthcare experts in a user-centered design methodology, can bring new thinking to real and important challenges and design creative new solutions.

In another example, Traver (2007) argues that the philosophy and practice of user-centred design can, and maybe even should, pervade most human activities. Meaning that not only human-computer interaction but also human-human communication may benefit from this perspective. In his paper, he is concerned with the application of user-centred design approach to educational setting. More precisely, the formal learning and teaching could be improved if instructional design, in analogy to the interface design, was student centered. He provides an example of an iterative design of a university course. The course can be modified by allowing students to contribute to the design of it. He states that these changes bring improvements to the quality of the course and argues that UCD has many promising ideas and implications that should be explored in future.

A paper by Borges and Baranauskas (1998) reports objectives, design approach and first results of their research project which aimed at developing an intelligent computer based learning environment for industrial applications. The system is a part of modelling and simulations which enable workers to test new philosophies to manufacturing in work practice. Their approach is focused on intelligence augmentation paradigm, user-centred system design and constructionist theory of learning. The design of the proposed environment was a result of continual interactions between designers and developers with the target users (shopfloor workers). Preliminary results of using the system encourage further research in formal assessment of the system as well as the effectiveness of learning since various test scores do

not necessarily address the depth and understanding of the acquired skills and knowledge. The study showed how designing such system can be supported by UCD approach, constructionist ideas about learning and IA techniques and how providing new style of training can be achieved.

Discussion

The progress in the field of e-learning has been rather slow with problems mainly related to poor design of e-learning systems. So far, the development focus has been more on technology aspects rather than on user-centred design related issues.

My goal for the second part of the literature review was to look at how LMS and UCD research fields overlap, look at the projects researchers have been working on, what kind of issues they faced, what kind of methods they used in their research and even look at recommendations they give for future work.

Some authors have argued for more collaborative approach among usability and e-learning researchers. Squires and Preece (1999) have made an initial attempt towards integration of usability and learning proposing Learning with software heuristics, a list of guidelines adapted to the context. Subsequently, researchers argued how important it is to focus on users when designing any kind of product for them. Some of them mentioned the importance of rapid prototyping and quick iterations when working with users and they showed how beneficial this method was for their projects. A good example was the work by Granić and Ćukušić (Granic & Cukusic, 2011) in which they developed a comprehensive evaluation procedure of learning systems, they described how successful it was and even proposed that others replicate this procedure in their projects. In the literature review of Nivala (2005), he stresses that there is a need for a multidisciplinary approach to design and development to bridge the gap.

Overall, researchers have been focusing on understanding the needs of users, their experiences and critical viewpoints, what they did in particular systems and what they wanted to be able to do. The methods used highlight the importance of involving stakeholders. They include interviews, cognitive walkthroughs, empirical studies, observations, judging interfaces with usability heuristics, multi-choice questionnaires, memory tests, attitude questionnaires, semi-structured interviews and various evaluation forms. Though, an important aspect of the whole process is refining the design through an iterative prototyping process.

The UCD approach has also been utilized in many other research areas as it was shown above. UCD can have positive impact on improving quality of education, workers performance or developing other services and application as maps or hospital gowns. Nonetheless, the arching term - User-centred Design really seems to be the right approach

when designing a learning application due to the success demonstrated in projects mentioned above.

Despite the efforts undertaken, there is still space to contribute to the culture of usability importance within e-learning. It is rare to see both traditional usability and pedagogical aspects of e-learning in the context of use. Additionally, there is a need for usability studies that would have real impact on design and learning applications and their development.¶

3 Theoretical Background

This chapter presents an overview of blended learning and describes models of blended learning based on Horn and Stalker's work (2014). It introduces User-centred Design by looking at how different researchers define this term, what key parts of UCD process are there as well as key principles of this approach. I mention several evaluation methods within UCD and discuss benefits of applying UCD in design and development of software products. Then, I introduce the term usability and rapid prototyping, a methodology that holds potential to resolve some of the limitations of conventional instructional systems design model.

3.1 Blended Learning

Over the recent years, there has been a significant amount of research on the integration and use of ICT in education. The main feature that is different between e-learning systems and more traditional systems is the degree of technology used and the increasing shift of control and responsibility of the learning process to the students, giving them the opportunity to learn anytime and anywhere. This shift of control seems to positively influence the learning effectiveness of students (Chou & Liu, 2005).

The term “blended learning” has been interchanged with other terms like “mixed mode learning”, “hybrid learning” and “technology mediated learning”. Different definitions can be found in studies but none provides us with a coherent and complete view of what constitutes blended learning and its components. Perhaps the most common understanding of blended learning is that it is a combination of face-to-face learning and computer mediated instructions (Graham, 2006, p. 5). Though, there are different concepts such as:

- To combine or mix modes of web-based technology (e.g. live virtual classroom, self-paced instruction, collaborative learning, streaming video, audio, and text) to accomplish an educational goal.
- To combine various pedagogical approaches (e.g., constructivism, behaviourism, cognitivism) to produce an optimal learning outcome with or without instructional technology.
- To combine any form of instructional technology (e.g., videotape, CD-ROM, web-based training, film) with face-to-face instructor-led training.
- To mix or combine instructional technology with actual job tasks in order to create a harmonious effect of learning and working (Graham, 2006).

As defined by Heinze and Procter blended learning in higher education is described as "the effective combination of different modes of delivery, models of teaching and styles of learning" (Heinze & Procter, 2004). Blended learning can be seen as a form of pedagogical content knowledge that mixes various learning methods in order to create a new teaching method and model. It has an influence on the amount of face-to-face interactions, expansion of education and learning opportunities as the amount of integrated technology increases (Kim & Bonk, 2006). Or, on the other hand, the model can continue with face-to-face interactions and add the technology component. Followingly, blended learning involves a "planned combination of approaches, such as coaching by a supervisor, participation in online classes, face-to-face tutoring, visiting websites, consulting manuals, attending seminars, workshops, and online communities" (Georgouli, Skalkidis & Guerreiro, 2008).

Blended learning presents balance of in class activities as well as after class activities. After face-to-face part, students can continue to learn using educational technology platforms and systems either by themselves or with one another.

Picciano (2009) in his study Blending with Purpose: The Multimodal Model recognizes that "because students belong to different generations, have different personalities and individual approaches to learning, teachers and instructional designers should seek to take advantage of multiple approaches including face-to-face methods and online methods that meet the needs of a wide spectrum of students" (Picciano, 2009).

In several studies, researchers registered an increased demand for the usage of blended learning in higher education (Banerjee, 2011; Deepwell & Malik, 2008; Napier, Dekhane, & Smith, 2011). In general, students' experience has been overwhelmingly positive. Although students in blended learning environment are often more responsible for their learning and have to have discipline as self-directed learners, there are still solid results in favor of blended learning (Deepwell & Malik, 2008). Also, it is believed that more and more faculty believes technology is important for their students on some level (Picciano, 2009).

3.1.1 Models of Blended Learning

Blended Learning is a big concept, an umbrella term, that contains several other sub-methods. Below are the four models that are most used in schools today based on work of Michael B. Horn and Heather Staker (Horn and Stalker, 2014).

Rotation Model

In a station rotation model, within a given course or subject , students rotate at fixed points in time between different learning stations at least one of which is an online learning station. Other stations might include activities such as small group or full class instruction, group

projects, individual tutoring, and pen and paper assignments. Some implementations involve the entire class alternating among activities together whereas others divide the class into small group rotations. In the station rotation model, students rotate through all of the stations.

Flex Model

In this model, materials are primarily delivered online. Although teachers are in the room to provide support as needed, learning is primarily self-guided as students independently learn and practice new concepts in a digital environment. Online learning is the backbone of student learning even if it directs students to offline activities at times. Some implementations have substantial face-to-face support whereas others have minimal support. For example, some flex models may have face-to-face certified teachers who supplement the online learning on a daily basis whereas others may provide little face-to-face enrichment.

A La Carte Model

In this online driven model, students work remotely and materials are primarily delivered via an online platform. Although face-to-face check-ins are optional, students usually chat with their teachers online if they have questions. This model of blended learning is ideal for students who need more flexibility and independence in their daily schedules.

Enriched Virtual Model

In Enricher Virtual mode, students have required face-to-face learning sessions with their teacher and then are free to complete their remaining tasks and assignments remotely. Online learning is the backbone of student learning when the students are located remotely. The same person generally serves as both the online and face-to-face teacher. In this model students seldom meet face-to-face with their teachers every weekday. It differs from a fully online course because face-to-face learning sessions are more than optional office hours or social events, they are required.

3.2 User-centred Design

One of the most frequent and important challenges faced by technologists is how to design and develop products that supports both users' learning and performance in an effective and efficient way and also generate user satisfaction.

Over past few decades, many researchers have pointed out that the traditional instructional systems design (ISD) approach is reductionist in nature and tends to solve problems by fragmentation (Finegan, 1994; Jonassen, 1990; You, 1993). In Gordon and Zemke (2000) and Zemke and Rossett (2002), several researchers and practitioners attacked the traditional ISD approach for its bureaucratic and linear nature, as well as its slow and clumsy processes. The

adoption of UCD into systems design is vital and crucial for designing systems that better suit users' needs (Willis and Wright, 2000).

UCD concept places users at the center of the design process during all stages -- planning, designing, implementing and testing a product. The ISO 9241-210 (2010) standard – formerly known as ISO 13407 (1999) outlines UCD as a process for interactive system development with the focus on enhancing usability of that system (Bevan, 2009). Usability is defined in the standard as in the above mentioned ISO 9241-11 standard. However, ISO 9241-210 does not provide a generally accepted definition only guidance for the planning and management of UCD projects nor it provides a detailed description of methods and techniques used (Jokela et al., 2003).

> *"What the term user-centered system design means or how it can be achieved is far from clear."* (Bannon, 1991, p. 38)

In general, there are two different approaches to design and development: product-oriented and process-oriented. The product-oriented approach is focused on creation of a product. Usually, the design requirements can be determined in advance. On the other hand, process-oriented approach requires to view the process of design and development in a context of human learning, work, communication, use, etc. In the ever changing world, users' needs change constantly. This imposes various constraints.

In UCD, planning stage plays its role but it is only the beginning. The main mission does not necessarily remain conformed to the plan but rather it is responding to changes during the project's lifecycle. My focus is on process-oriented approaches and specially those which are recognized as sociotechnical. The sociotechnical perspective considers not only technical aspects of a certain system but also social aspects (people and their roles in an organization, their tasks, etc.) (Goodrum et al., 1993; Mumford, 1983). In order to use the sociotechnical approach, insights and data must be collected from the social context.

UCD and sociotechnological perspective are guiding philosophies as opposed to specific methods of design. UCD approach to design puts emphasis on user requirements and the leading idea is to utilize social and cognitive analysis of human activities. It is important to find out early in the process what users need to do, how they learn and perform. This phase is done iteratively.

Maguire (2001) and McCracken and Wolfe (2004) specified a general and widely used term "users". They differentiated that there are primary users -- those who directly interact with a system and use it to do tasks. Then, there are others they call stakeholders -- those who are influenced by primary users' capabilities to carry out their tasks or who affect the system requirements. In UCD, both user groups should be heard and respected in the design process.

User participation is a key part in UCD and so users should be involved actively throughout the entire process. When asked correctly, they can provide "folk knowledge" that usually casts light onto their work process and tasks (Walenstein, 2002, p. 21). And sometimes, not everything can be verbalized in an interview so designers should be aware of this and try to understand users' context. This interactive approach potentially increases the acceptance of a product when it is shipped. Designers must care to respect users' various backgrounds and fields of expertise as it is a necessary condition for mutual learning (Muller, 2003). At the 1994 Participatory Design Conference, Tom Erickson of Apple Computer suggested four dimensions of user participation (Kuhn and Winograd, 1996). They were: direct interaction with the designers, long-term involvement in the design process, broad participation in the overall system being designed and maintaining a significant degree of control over design decisions.

Designers who work within UCD, are expected to initiate early contact with potential users and focus on whatever is important to users and how they require technology to be designed. The iterative process is one of reflection-in-action in which development stages are shaped in context to deal intelligently and creatively with "uncertainty, uniqueness, and value conflict" in a constantly changing world (Schön, 1987, p. 6).

3.2.1 Key Principles

No matter how broadly we can understand UCD, there have been researchers like Gulliksen et al. (2013) that identified twelve key principles which characterize successful UCD process and are not constrained to any part of product's lifecycle:

User focus
The design and development should be guided by users' needs rather than any technical issues and decisions.

Active user involvement
Users that represent the intended user group should be continuously involved in the whole lifecycle of the system.

Evolutionary systems development
Development of the system should be iterative as new requirements appear during any phase.

Simple design representations
Users and all stakeholders should easily understand the language and design of the system. Otherwise it might be difficult for them to understand the future use situation and their involvement might be suboptimal.

Prototyping

Prototyping should be used throughout the project to to better visualize, communicate and evaluate design ideas and decisions with real users.

Evaluate use in context

The development should be started early in the project so that it can be evaluated against crucial usability goals and design criteria.

Explicit and conscious design activities

The user interface design and design of interactions should be a consequence of decisions and activities which are dedicated and conscious and not just a byproduct of coding or modelling.

Professionalism

Multidisciplinary teams should perform the design and development as each activity as the process requires different skills and qualifications.

Usability champion

Experienced usability designers with authority should be brought to the project early on to decide usability matters and resolve important issues.

Holistic design

As software products are interconnected with tasks, work activities and other subprocesses, all facets that are somehow influenced or affected by the system should be considered in the design and possibly modified and developed in parallel.

Process customization

Contents of the UCD process should be adapted to each specific project as UCD does not work with the one-size-fits-all approach.

A user-centred attitude should be always established

The development team and the client should always be committed and aware of the value of usability and good design.

3.2.2 User-centred Design Process

Any UCD project's foundation is to understand the intended users, their environment of use and the task they intend to perform. Therefore, the process usually starts with identifying the users. This includes both primary users and stakeholders. Researchers should put emphasis on user group characteristics as opposed to individuals but that also depends on the size of intended user group (ISO 9241-210, 2010).

The description of the interaction between intended users and the product is key in many cases and it may include information on what users currently do to achieve their goals and

what the pros and cons are of the medium they use. It is also possible to gather information about users' wishes for future products.

Following activity usually focuses on developing requirements. This phase is about structuring information collected in the step before. Different authors present different methods to develop requirements but most of them mention these:

Personas
A fairly detailed description of a fictional person with real characteristics of intended users. A narrative to describe the users' groups behaviour, goals, physical abilities, etc. It is crucial to develop several different personas as it is impossible to map all characteristics onto one person (Benyon, 2010).

Use cases
Use cases are used to display interactions users have with the system. It is essentially a model where users' intentions and corresponding system responsibilities meet. Interrelated use cases can be mapped onto a use case map (Constantine & Lockwood, 1999).

Scenarios
Scenarios are used to display tasks users perform in specified context. The degree of abstraction can vary. They can be stories of real user experiences or even conceptual scenarios (Benyon, 2010).

After compiling the use cases or scenarios they can be validated according to relevance and importance. Decision must be made on which tasks or components of the use context requires usability criteria. A set of the most important tasks representing the significant aspects of the overall task are typically selected to evaluate the overall usability.

Once requirements have been developed, production of design solutions takes place. In this step, drawings, sketches, mockups and low fidelity prototypes are created to efficiently communicate design ideas with users. This prevents investing too much time and money into developing further any wrong ideas and designers can iterate quickly. When presenting the design solutions, users should be able to carry out tasks. The feedback gathered in this phase is valuable for the next iteration until the design objectives are met (ISO 9241-210, 2010). This process goes on repeatedly resulting in more and more refined solutions and higher fidelity prototypes until all usability issues have been resolved and users and stakeholders agree upon all presented assets.

3.2.4 Evaluation methods

According to literature review by Van Velsen et al. (2008), the researchers analyzed outcomes of many projects that employed UCD approach. The user-centred evaluation is defined as a

moment when users actively contribute to the creation process at all stages. They compared several tools there are for the evaluation:

Questionnaires

A method that can be very efficient for evaluating known variables. It is inefficient when exploring unknown area as it does not consider the interaction between users and a system. It has been reported that this method is a quick way to find out more about users' opinions but questionnaires are generally hard to design well and use afterwards.

Interviews

Interviews are good for collecting qualitative data. They can help answer questions adoption or rejection of a system and various usability issues.

Heuristic Evaluation

Heuristic evaluation also know as expert review does not always reflect users' reality or concerns. It is known to be good at assessing issues like usability or legal issues.

Data Log Analysis

Is a method that collects unobtrusive data which can point out some of behavioural patterns. When dealing with quantitative data, confirmation by qualitative analysis should be considered to be able to explain potential findings and understand them.

Think-aloud protocol

A method widely used to gather user behaviour and reactions to generate feedback on usability issues. The downside is that users might have to focus on verbalizing thoughts and their reaction which might make it not representative.

3.2.5 Benefits of Employing UCD

Employing UCD approach in design and development of software products has many benefits as state by Bias, Mayhew and Upmanyu (2003). Besides increased user satisfaction and system acceptance level, UCD prevents development teams to overdevelop a product and helps discover issues early on when fixing them is still relatively cheap. Thus reducing production costs significantly.

When a proposed system is designed intuitively, it requires less training and less user support as users are able to perform tasks independently. Documentation materials are reduced to minimum and the system design enables users to do their work tasks more quickly and efficiently (less keystrokes, less screens to go through, fewer errors, faster recovery etc.). With e-commerce systems and sites, higher usability might increase conversion rates, earnings and customer loyalty (Bias, Mayhew and Upmanyu, 2003). According to Beynon (2010), higher usability can have impact on safety and security of systems as well.

3.2.6 Usability

The term usability has two widely knows definitions. First one by Nielsen: "Usability has multiple components and is traditionally associated with five usability attributes: learnability, efficiency, memorability, errors and satisfaction" (Nielsen, 1993). Nevertheless, the ISO standard 9241-11 defines usability as "the extent to which a product can be used by specified users to achieve specified goals with effectiveness, efficiency and satisfaction in a specified context of use" (ISO 9241-11, 1998) and is now being used as the primary reference (Jokela et al., 2003).

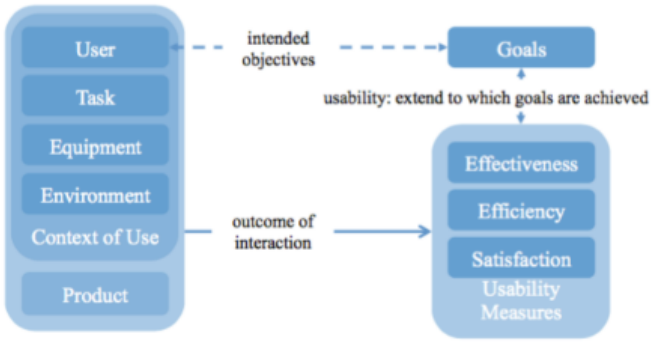

Figure 1: Usability Framework

Source: ISO 9241-11 1998.

The figure above shows usability framework diagram. The intended objectives derive goals of the users, i.e. what users are actually trying to achieve with the system. The users, tasks, equipment and environment affect the context of use of the system.

The number one aspect of usability of a system is whether people use it. Hence, users have to be specified and their characteristics such as knowledge, skills, age, physical, cognitive and perceptual abilities have to be described (Shneiderman & Plaisant 2009). Sometimes, it is necessary to define different types of users in order to adhere to their differences and roles, activities and tasks needed to be performed in the context of a system.

Usability measures are used to measure "the extent to which a product is usable in a particular context" (ISO 9241-11 1998) and hence they build the basis for comparing the relative usability of different products that are used for the same context (ISO 9241-11 1998). ISO standard's measures are:

Effectiveness

Determines whether users are able to perform tasks and achieve specified goals within the system. The interest lays in the accuracy and completeness of a goal achievement.

Efficiency

measures effectiveness to the effort and resources users have to spend to achieve specified goals. Time is often used to measure the efficiency of a product.

Satisfaction

Presents a subjective nature as the users can decide for themselves whether they like using a product and if they are satisfied with it. Hence, this measure refers to the users' opinion of the system expressed in the "freedom from discomfort and their general attitude to the use of the product" (Jokela et al. 2003).

While there are the ISO standard measures, there are also measures defined by Nielsen (1993):

Learnability

Determines whether the use of a system is easy to learn.

Memorability

Refers to how easy the use of a product can be remembered over a long time of not using it.

Errors

The amount of errors users make while using a system and how easily they can recover from found errors.

There is no general rule on which measures to chose, their level of detail or an importance of each one relative to identified goals. When objective measures cannot be obtained, users' perception as subjective measures can give a good indication of usability of a system (ISO 9241-11 1998).

3.4 Rapid Prototyping

Rapid prototyping is a methodology used in software design and development that holds potential to resolve some of the limitations of conventional instructional systems design (IDS) model. According to Tripp and Bichelmeyer (1990), rapid prototyping was introduced as a design methodology within the IDS model but different definitions of how it applies to development have appeared since then which led to an inconsistent view in literature.

Researchers like Tessmer (1994) and Northrup (1995) stated that rapid prototyping should be considered as a method of formative evaluation in design and development stages. Though, this statement was inconsistent with rapid prototyping role in other HCI and software design literature. Many people in the field, like Dorsey et al. (1997), Jones and Richey (2000) or Tripp and Bichelmeyer (1990), consider rapid prototyping as a paradigm on the instructional design methodology.

There have been two perspectives on how rapid prototyping fits the design field. First on is Simon's (1996) stating that “artificial science differs from natural science”. In other words, software design and instructional design both share the same design theory which presents design as problem solving process which uses optimization procedures. The second perspective of Schön (1987) who viewed design process as an iterative process of reflection in action. Design process should not be constrained and driven by predefined goals but instead, it should be a process that deals creatively with “uncertainty, uniqueness, and value conflict” (Schön, 1987, p. 6).

The main goal of rapid prototyping is to demonstrate possible solutions quickly and inexpensively by creating mockups so designers and researchers can collect feedback early and can respond to user requirements in an efficient manner. Rapid prototyping is appropriate for developing software designs (Dumas and Redish, 1993; Sugar and Boling, 1995), computer based instructions (Tripp and Bichelmeyer, 1990), it is useful in web design (Boling and Frick, 1997; Corry et al., 1997; Frick et al., 2005) and in collaborative learning systems (Goodrum et al., 1993; Tessmer, 1994). When looking at negative aspects of rapid prototyping, some opponents stated that it can lead to design-by-repair approach which ignores initial analysis and planning. In some instructional applications such as lectures, workshops and so on, rapid prototyping cannot be easily adopted as the efforts may be with regard to time and costs according to Tripp and Bichelmeyer (1990) and Tessmer (1994).

Frick et al. (2005) contributed to rapid prototyping by adding valuable thoughts. Their inquiry based, iterative process was created through formative research methods. It includes prototyping using pen and paper with usability testing part, further computer based rapid prototyping with more opportunities to assess usability, and creating and maintaining the designed product (Reigeluth and Frick, 1999, p. 21). Their research, focused on web design, demonstrates that even though rapid prototyping itself is needed in software development, equally important is to work consciously and well with intended users.

3.4.1 Definition of Rapid Prototyping

There has been many approaches to rapid prototyping in the area of design and development of software products. Examples like the participatory design (Goodrum et al., 1993), User-centred Design (Corry et al., 1997; Sugar and Boling, 1995), rapid collaborative prototyping (Dorsey et al., 1997) or context-sensitive design (Tessmer and Wedman, 1995). These all include some type of iterative tests and revision cycles paired with user participation which aims at shaping products until they are accepted.

Even though these examples share rapid prototyping methodology, clear definition of what the prototype is varies. According to Tripp and Bichelmeyer (1990), prototype should include a required database, the major program modules, screens and input and output for

interfacing systems. Jones et al. (1992) stated that prototype is executable version of a final product but can lack some parts. Tessmer and Wedman (1995) argued for definition in which a prototype is a quick and working portion of a final product. On the other hand, Dorsey et al. (1997) and Sugar and Boling (1995) looked at prototypes as tangible ideas of possible solutions with fidelity ranging from low to high. Their proposal was different in a sense that prototype could be symbolized by conceptual version of a final product.

Nowadays, there is a large number of commercial tools to prototype user interfaces. In the work of Beckman (2015), he reviewed milestones in the history of prototyping graphical user interfaces, screened publications published since 1988 in some of the main HCI conferences and studied 113 commercial tools available on the web. He made a brief comparison, showed how prototyping tools developed over time and provided insights for future research.

3.4.2 Prototyping Tools

When searching for most popular tools, I found an article published in 2015 on a popular site called Medium[1]. This article ("The best prototyping tools - User Experience Design", 2015), no matter how biased it might be, shows a list of popular tools widely used among designers and judging by my own experience, it is very accurate. Among others, there are tools like UXPin[2], Invision[3], Marvel[4], Balsamiq[5], Axure[6], Flinto[7] and Proto.io[8]. Each of these software tools offer slightly different set of features.

UXPin, for example, allows you to create wireframes by using your own images but there are also thousands of ready-made elements in their UI library. Multiple designers can create interactions simultaneously on the same prototype which can then be exported to several different formats.

Invision, a very simple and intuitive tool, allows designers to upload their static designs, or mockups, and make clickable interactive prototypes using gestures just like on mobile devices. Its most valuable feature, in my opinion, is the collaboration and sharing. It allows designers to share prototypes with users, display prototypes on users' devices and collect feedback from them easily.

[1] https://www.medium.com
[2] https://www.uxpin.com
[3] https://www.invisionapp.com
[4] https://marvelapp.com
[5] https://balsamiq.com
[6] http://www.axure.com
[7] https://www.flinto.com
[8] https://proto.io

Balsamiq offers mostly low fidelity prototyping, adding basic interactions and sharing prototypes in PDF format. The tool's learning curve is steep and it can be very useful as it is simple and does not have too many functions.

On the other hand, Axure might be the most complex prototyping application. It allows designers to create responsive websites and mobile apps from ready-made elements and various widgets. Its user interface is quite overwhelming as it offers many options. The software is quite expensive and Axure, on their blog and forum, offers a lot of tips and help to staring designers.

The choice of prototyping tool is difficult and always depends and the designer's work style, what he or she wants to achieve and so on. The best way might be just a pen and paper or some combination of tools mentioned above. As Reigeluth and Frick (1999) stated, the most important part in UCD is to work well with intended users no matter what choice of prototyping tool designer makes.

3.5 System's Impact on Organization

Organizations are complex systems that include several interlocked subsystems. Based on work of Cabrera et al. The key role of organizational culture in a multi-system view of technology-driven change (2001), we can distinguish technical and social subsystems which are followed by other levels such as organization's infrastructure, its capabilities and its strategy. Depending on the level of abstraction, we can look into an organization and recognize even more factors. When working on any change within a company (technical, cultural or organizational) it is recommended that people involved should have at least a broad systemic understanding of how their decisions might affect an organization and/or its subsystems (Cabrera et al., 2001).

These researchers state that successful technical innovations within organizations work in two different ways. Either the technology is designed so it fits the organization's current structure, culture and strategy or the organizational structure and other components require to be reshaped to fit demands coming from the new technology. Thus, an implementation of additional changes is required so all criteria for a successful implementation (Cabrera et al., 2001).

The integrative model Cabrera et al. (2001) present helps both administrators and designers to better understand and manage interconnectedness that lays between technology and human and organizational aspects of businesses. Their goal is to manage imposed changes efficiently to minimize human costs of the transition while maximizing potential of technology within an organization.

Figure 3. A Multi-system Framework of Organizational Performance
Source: Cabrera et al., 2001

Their model is a manifestation of a so-called sociotechnical systems perspective (Pasmore, 1988) where an organization consists of two intercoupled systems: the technical and the social. These two systems need to be designed so they respect each other as well as the outside aspects. The model by Cabrera et al. is expanded by establishing three levels of organizational performance: strategy, capability and infrastructure. It puts emphasis on aligning different subsystems along two complementary dimensions and highlights connection between all three levels.

When designing a system, people responsible for such projects should have an overall idea of what an organization consists of, how their design affect individual pieces, how does the process of implementation correspond with the organizational structures and interrelation and lastly, what kind of impact the resulting system will have on people's work practice.¶

4 Methodology

This chapter presents a description of the research design. In portrays the methodology used for the research part as well as the design phase of the project. In addition, it presents my perspective of knowledge, people and technology, the data collection methods and the methods for analysing the data. Further, I discuss my design position, the impact my project has on the organization and finally, the chapter closes with discussing some of the ethical considerations for this project.

4.1 Design Position

To better understand my approach and a mind-set within design research in this project, I used a Map of Design Practice and Design Research developed by Liz Sanders (Sanders, 2008). It also helps to recognize how my past training and experience has lead me to take certain direction in the exploration.

The map has been used by others as a scaffold to support conversation and spark thinking and doing. It shows spaces where designers and researchers can learn from one another. In order to bring clarity into the landscape of design research space, the map is defined by two intersecting dimensions. First one is defined by approach and the other one by mind-set.

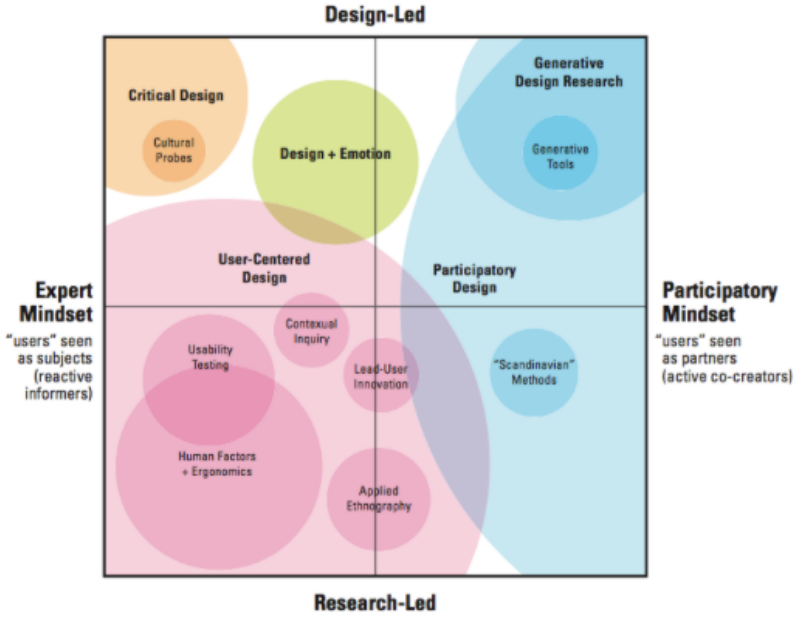

Figure 3. Map of Design Research - Research Type
Source: Sanders, 2008

Approaches to design research come from a research-led to a design-led perspective and the mind-sets come from an expert to a participatory as you can see in the Figure 3.

Where I see myself on the map is very important for further assessment. It sparks a realization of how I work with users, to which extent I involve them in the process and how I see myself as a designer.

To position myself is not about making the decision but rather reflecting on my thoughts and previous work. The reason why I involve users is because I design for them and I want to understand situations in which they use the learning system. It gives me, as a researcher and designer, a valuable and necessary information in order to make better design decisions and as I mentioned before, the user involvement increases the level of acceptance among them. Without getting user feedback, I would have no idea whether the system is meeting people's needs. I also strongly believe in using rapid prototyping and quick iterations in software development as this is one of key part of UCD. All this information allows me to understand pains and frustrations users might experience when they use the learning system and see problems or trends I would have otherwise missed.

The research-led approaches with an expert mind-set, which is where I see myself, are used to "collect, analyze and interpret data in order to develop specifications or principles to guide or inform the design development of product and services. They also apply their tools and methods in the evaluation of concepts and prototypes. The three large areas of activity in the user-centered zone come from the applied social and behavioral sciences and/or from engineering: human factors/ergonomics, applied ethnography, and usability testing." (Sanders, 2008).

Nonetheless, things are not as easy as they might seem. When receiving and working with user feedback, I set out a principle of not designing directly what users tell me to design. The reason stems mostly from my experience and it is that people in everyday life do not really know what they need. Sometime, they just say what they think they want but people do not always do what they say, and they rarely know how they will act in future.

Instead of doing what they ask for, it is important to figure out the root problem and why they make certain requests and essentially, why they want to change something rather than what they want to change. In this project focused on the role of the learning system in the learning and teaching processes there exist multiple, constructed realities rather than only one single true reality. These realities are subjective and influenced and shaped by the students' and teachers' experiences and perceptions, their social environment and the interaction between the individuals and me as the researcher (Ponterotto, 2005). In this respect, my focus in this project is on exploring such subjective realities by understanding interactions between the users through the use of OPEN LEARNING.

4.2 My Impact

When discussing the impact my project has on the organization as a whole, it is important to have a clear picture of where the organization is now and where I intend to move the organization. There is a reference to these states as a "as-is" and "to-be" (Cabrera et al., 2001). The picture of "as-is" state is key for understanding viability of the changes and corresponding weak spots or barriers. The difference of the two states helps to identify interventions in order to make the transition.

Technology

The change of technology itself rarely means a successful implementation. Organizations face innovation differently and those with a defender profile seek to provide their services more efficiently and tend to favor the development of a single, integrated core technology (Miles & Snow, 1978) which is also the case of Open Agency. In terms of functionality, the analysis aims to look closely at the existing processes to yield clear requirements for the design phase. One of the sparks that initiated this project was an aging infrastructure that is about to run out so the case is to fit the new system exactly within the needs of Open Agency. There has not been any indication of desire to radically change the learning system itself so the technological step is rather evolutionary than revolutionary.

Organization

New technology often causes significant consequences on processes within the organization. This part about the impact on Open Agency is important and something I as a designer need to be aware of. Though, managing the change is not in the scope of this project.

The secondary goal of proposed changes is to possibly automatize tasks, hence simplify some of the processes and thoroughly inform users about these changes but what Open Agency wants to avoid is changing responsibilities or fundamental processes as it would bring complication into the project and imply that they would need to invest into training.

People

The Open Agency's team is fairly small and there is a high chance of changes in the personnel. The aim for the design of the administrational end of the learning system is not to be closely dependant on knowledge of certain worker or his or her way or performing a task. Throughout the project, I mapped all persons that interact with the system and interviewed them to collect insights so by the end of the design phase they are aware of what will be changed. I was encouraged to keep everyone informed about the status of my project and where things were heading. By involving stakeholders in the prototype testing phase, they will be aware of all discrepancies might exist between the current state of affairs and the behaviors required by the to-be organization. During these interviews, I also try to gather

information about current strengths and weaknesses that identify how big of a step Open Agency can take to set up a realistic objectives.

4.3 Strategy for Research Inquiry

In respect to the focus of the project, this research aims to capture how workers, students and teachers interact with the learning system OPEN LEARNING in real-life context and to identify important aspects of the design of OPEN LEARNING. User-centred design is a methodology used for the design part of the project. The methodology that steers the research is design-based research.

Design-based research (DBR) emerged from the field of education and bridges theory with practice within the field of information system design. It is a relatively new approach to a discovery of how people learn. One of its most appealing aspects is the emphasis on users. This methodology is based upon the assumption that learning is situated in real-world context. Its uniqueness stands in combining multiple activities such as research, design and practice into one process. The exact boundaries of DBR have not been formalized, but the agreed upon broad description states: *"...packaging theory, design, and diffusion (or practice) into one methodological unit for the purposes of studying phenomena in complex social settings"* (Bowler & Large, 2008).

My research is driven by two broad goals defined in DBR. Firstly, to develop an educational product which works. And secondly, to build a theoretical framework for future designs which is a corpus of how people interact with the system.

When taking both roles - of a researcher and a designer, methodologies help as leading frameworks. They explain and defend decision I take in order to answer my research question. DBR's nature is iterative, interventionist and theory-oriented. It tests and generates hypotheses which can be verified later in the process. It produces messy, aggregated data and most importantly, it mixes methods and blurs the roles of researchers, practitioners and other together. The high level of engagement with users makes it possible to explore studies phenomenon from multiple perspectives. The spiral nature of DBR allows to see a problem from many different angles (Bowler & Large, 2008).

Unlike product design, which turns to users in the latter stages to see whether a product works, DBR advocates for properly defined user needs and problems a system needs to solve for users. The difficulty with product design is that even if the designs are preceded by user studies, the overall functionality is set by the designer.

Project Phases

1st phase	The first phase started by defining the project focus and discussing the desired outcome. A few observation sessions occurred in order to get an initial feel of the setting in which the system is being used. Then, the definition of the research objective and research question took place: What aspects do users identify as important in the design of OPEN LEARNING and are there any aspects that hinder the use of the system?
2nd phase	The second phase started with with crafting data collection procedures and developing interviewing guides. There was a discussion about who to interview, how and what kind of other data to collect based on the previous experiences with observation. Next step in the process was to enter the field and start collecting data.
3rd phase	The third phase started with interview transcriptions, analyzing, interpreting and discussing the data in order to draw out insights and recognize user needs and requirements. In our case of redesigning, the product was launched and we could use qualitative and quantitative methods to evaluate it.
4th phase	The fourth phase was the design phase where in the insights were translated into design ideas for the final product. A prototype was created in order to receive feedback from users and be able to iterate on it.
5th phase	As the phases progress, the final phase will be to systematically analyze the design's impact as it is a part of Design-based research methodology. This part will validate the design decisions made and allow for further design iterations if needed.

4.4 Perspective on Knowledge, People & Technology

Over the past years, Open Agency has been educating students and teachers while using OPEN LEARNING system to make further steps in integrating ICTs into learning of foreign languages at schools and companies.

From the experience gained throughout the years, the company has found out that the power of their system is in its simplicity. It does not have to serve as a tool for everything. It does not need to be a repository, nor a place where students meet. The goal has always been to start off with something simple and focus on developing teachers and their skills as they play the key role in motivating students and guiding them during learning. OPEN LEARNING is a piece of technology, an artifact, that mediates communication. It is not necessarily right in between students and teachers but rather an extension of their interactions that has potential

to enrich learning. This is how the technology is situated and how it relates to the company's values.

In the company, it is well known that the key to success is for the system to become a part of teacher's practice. It has not been designed as a standalone software product and the role teachers have in lesson is irreplaceable. Though, teachers need to understand this to better grasp how the system can help them.

OPEN LEARNING disturbs their practice in a way that it empowers them. It gives them set content for each lesson which creates boundaries, it offers features that simplify certains tasks and gives them information about their students. On the other hand, it also empowers students, giving them possibility to work from anywhere, receive instant feedback and so on. This severely influences users' activities as I later show in my project.

The goal of this project has been to understand the roles everybody plays and understand the their practice in order to identify important design component of OPEN LEARNING. The introduction of technology into practice of teaching and learning can be difficult and it is important to understand how and why teachers adopt it, use it and it if delivers on the promises Open Agency claims.

In the regular setting, teachers aim to transfer knowledge to students (objects) and the tool that mediates it is OPEN LEARNING. To understand the interactions, it is important to learn how the system affect teachers' practice and then, I can take the role of designer and design for it while being armed with this knowledge.

Over the course of my presence in Open Agency, I collected experience that influence my role as a researcher and a designer. There has been a discourse of exclusion in a sense that we design for users that believe in benefits on ICT in education and want to implement it in their practice. The software product can rarely convince users to make this step and it is extremely difficult to work with people that are sceptical and negative. This discourse of exclusion can be understood as the opposite of the scandinavian approach which is very participatory-oriented. Open Agency only gives power to those who desire it and the rest is excluded. However, the design process is then oriented towards users and is human-centered.

4.5 Data Collection

4.5.1 Participants

Participants of my research were students that have completed a course (one or multiple) offered by Open Agency during previous year, i.e. 2015, teachers that were certified by Open Agency and multiple workers from the company. The students who were chosen come from different schools and organizations spread out all over Czech Republic. They had different backgrounds and their highest achieved educational level also varied. This diversity of participants can potentially help to enrich the case and maintain different perceptions of usage of OPEN LEARNING.

All email addresses of participating were obtained from the internal Open Agency database. An email had been sent out to all students (n=753) with a request to participation in this research along with an information about their anonymity. To send out this email, I used a service called MailChimp in order to track the exact number of adreesees who received the email, clicked on the link to the online survey and to determine the open rate and click rate among adreesees. The email that was sent out can be seen in Appendix.

Then, 11 persons were chosen to participate in interviews. Among these, there was the CEO, the editor of OPEN LEARNING, the office manager and 8 certified teachers. These participants were purposely selected by following the maximum variation strategy of sampling provided by (Patton, 1990). This amount seemed appropriate as there were not many more teachers with relevant experience of using OPEN AGENCY to be added to this research.

4.4.2 Data collection methods

Researcher use many different methods to collect data in UCD projects. As I mention in my literature review, they include interviews, cognitive walkthroughs, empirical studies, observations, judging interfaces with usability heuristics, multi-choice questionnaires, memory tests, attitude questionnaires, semi-structured interviews, various evaluation forms and more.

To collect data in my project, semi-structured interviews with the participants and online surveys were used. The use of multiple sources of data allows addressing a wider range of behavioral issues. Also, using multiple sources of data helps to establish validity and reliability in case study research (Yin, 2009). I discuss my choices of data collection methods in a chapter 6 *Discussion*.

Interviews

To better understand the teaching dynamics and the use of OPEN LEARNING by teachers, a semi-structured interviews were conducted. All interviews were conducted in Czech language due to the ease of sharing experiences of interviewees. One interviewee was of a Russian nationality but spoke fluent Czech, others were of Czech nationality. These interviews took place during the interval of approximately two weeks between March 11 and March 25.

In order to collect relevant information, I prepared a *Teachers Interview Guide* (see Appendix) for these interviews to guide me through it and point the interview towards the right topics. When I found some of the answers short or not elaborated enough, I asked several follow-up questions. Each interview included:

- an introduction of myself and the focus of the research,
- asking for a permission to record the interview,
- explaining the form of the interview,
- starting the interview,
- asking follow-up questions and letting the interviewee to ask questions,
- thanking for his/her time.

I was unable to meet all participants, therefore some of the interviews were conducted via Skype. Though, three of the interviewees did not have a sufficient internet connection, hence an email with questions from *Teachers Interview Guide* was sent to them with a request to answer the question and send them back.

Online survey

The online survey was administered in order to measure student attitudes, beliefs and opinions about OPEN LEARNING, how students used the system and how the system can be improved. Also, it included questions about the learning process, the role teacher and the system play in learning (see Appendix).

753 participants were invited to participate in the online survey by an email (see Appendix X). Out of those, 227 had opened the email I sent out on March 21. Other statistics can be seen in the table below.

	Count	**Percent**
Number of recipients	753	100 %
Number of successful deliveries	736	97,9 %
Participants that opened the email	227	30,8% (Open rate)

Total opens	397	-
Participants that clicked on the link to online survey	122	16,6% (Click rate)
Open rate	-	30,8 %
Industry average Open rate for Education and Training (Statistic from MailChimp)	-	15,5 %
Click rate	-	16,6 %
Industry average Click rate for Education and Training (Statistic from MailChimp)	-	1,9 %
Participants who successfully filled out online survey	79	10,7 %

4.6 Methods for Data Analysis

When considering possible methods that can be used for my analysis, I looked closely at what I learned from my literature review.

Different projects require different data, different data collection methods and different approaches to analyzing them. In some cases, researchers start with blank page, some focus on evaluation of a certain system and some, for example, on designing a new version of system or of a prototype. These aspects predetermine what methods there are to use.

I have learned that usability testing with inspections of usability experts are a strong tool. Various accuracy measurements of task completion have been successful but these should be considered more for the following phase of my project. And as I mentioned earlier, the work on OPEN LEARNING will not stop with submitting this report.

What researchers use quite often when dealing with quantitative data is looking for correlation to visualize some interesting findings. Also, developing a list of problems with references to usability principles is a way of analyzing feedback collected from stakeholders.

Overall, researchers have been focusing on understanding the needs of users, their experiences and critical viewpoints, what they did in particular systems and what they wanted to be able to do. The research I conduct aims at understanding the use of OPEN LEARNING, users' attitudes toward the system and the role it plays within the process of learning as well as a

key part of the organization itself. Therefore, hermeneutical method for analysis was used to analyze the outcome of interviews. This analytical method focuses on the meaning of text which is, in my case, the transcripts and answers to open ended questions. It allows me to emphasize the users' experiences by explaining their words instead of mine (Ratcliff, 2008). Just as other researchers' work demonstrated, the understanding of their needs is the key.

The recommended steps for the qualitative data analysis process go as follows: re-reading the data, taking notes, coming up with comments and interpretations while keeping in mind the purpose of this research. These activities are done in order to capture interesting data which help to gain a deeper understanding of what the participants say. Next, the process involves creating a list of main themes and patterns that emerge from the previous analytical activities. Finally, these themes are categorized and prioritized while direct quotations can be used to preserve the voice of the participants (Stodel, 2006). Essentially, the resulting list translates into the users' requirements and needs which serve as the desired outcome of my analysis.

On the other hand, the online survey results were combined into a spreadsheet for a quantitative data analysis (i.e., answers to Likert scale and multiple choice questions) and for a qualitative data analysis (i.e., answers to open ended questions) which uses standard statistical test (e.g., correlations) to draw out insights.

4.7 Ethical Considerations

There are three areas of the ethical dimensions according to Parse (2001). They are scientific merit, protection of participants and integrity. There three dimensions steer the research to ensure the ethical conduct.

Scientific merit
I ensured that all steps during all phases of this research were well documented and demonstrated in this report. The merit is evident in the logical coherence of my research during exploration, mapping and conduction of it.

Protection of participants
Based on Callahan and Hobbs (1998), there are several parts of ensuring protection for participants of a research:

- Disclosure: I made sure participants were informed about the focus of my research and how the collected data would be used. If necessary, participants were kept anonymous.
- Understanding: A mutual understanding was established, all participants could ask questions when anything was unclear for them and could contact me.

- Voluntariness: There was an explanation and all participants contributed voluntarily in the research. No promises were made in order to collect data.

Integrity

Integrity includes clarity, accuracy and truthfulness for the research activities. Parse (2001) explains integrity as "essential in reporting the research question, the study design and the methodological nuances of the data gathering and analysis-synthesis processes." Any deviation from the facts violates standards and places the integrity of the report in question. Truthfulness refers to unreserved veracity in reporting -- it is the presentation of unaltered details (Parse, 2001).¶

5 Findings

This chapter presents results of the research analysis. My work has been inspired by results from the literature review. Overall, researchers have been focusing on understanding the needs of users, their experiences and critical viewpoints, what they did in particular systems and what they wanted to be able to do. The methods used highlight the importance of involving stakeholders and how important it is to focus on users when designing any kind of product for them.

I structure this chapter into several parts. I discuss the role teachers play in courses with OPEN LEARNING based on the collected data. I explore how the system influences teachers' practice, summarize students' experiences, opinions and positionings and lastly, I discuss the issues and demands raised by users throughout the research.

In addition to answering my research question, understanding the role of teachers and the system is key for the organization. As I described in chapter My Impact, organizations are complex systems that consist of several interlinked subsystems and by studying more than just the design of OPEN LEARNING, the company can adjust its social aspect, thus improve business processes, have impact on people and their behaviour and possibly adjust their strategy if found necessary. Hence, it is important to look at all of these aspect as pieces that have influence on each other.

5.1 Teachers' Role

With the statements from interviews I mention below, I aim to understand the role teachers play in the process of teaching and I explore the important aspects that are related to it.

5.1.1 Becoming Advisor

This first section focuses on data that describe the transition of teachers' role from the source of information into an advisor:

1. *"The role is to be advisor and coach. Students are given more space to talk, be creative and use the vocabulary."*
2. *"I don't need to be so active anymore and I really like it. If all teachers knew how easy this is, every one of them would adopt it."*
3. *"I only assist and encourage them if they need any kind of help."*
4. *"During regular classes I need to be the active one who generates everything but with OPEN LEARNING, these roles completely switch"*

5. *"I have never been an authority really. But there is a change because I mostly only advise and steer the focus."*
6. *"I do not advice much because I am not a dictionary. Students seek actively for answers, I only lead them and encourage them. Students are responsible for their own learning and they decide themselves whether they learn anything."*
7. *"I feel like me and my students are on a similar level. Meaning that they are in control of the activities."*
8. *"I do not need to generate many activities during teaching."*
9. *"The difference is that students are the active ones. They work during the class and it makes my job much easier."*
10. *"The fact that I have this control [...over students' activities] makes me feel more relaxed and allows me to plan better."*
11. *"Most of the activities and the creative process is transferred to the students."*

The whole idea for the concept of OPEN LEARNING was to have a place where teachers would not be the source of information. As the CEO of Open Agency explained earlier, teachers would not narrate and explain, nor they would check students' exercises but they would focus on becoming more of guides. Not only that the data confirms this premise but it shows that following this principle makes their job much easier as they do not need to be so active and are not in the center of all activities. The activities gravitate towards students and teachers can advise and control students' focus.

5.1.2 Importance of Teacher

This section highlights the importance of teachers and demonstrates their irreplaceable role in learning:

1. *"This allows me to focus only on students. When I find out that certain student has a problem with anything, I can plan the face-to-face meeting accordingly."*
2. *"When dealing with younger students, they usually are not familiar with planning their own activities and I need to communicate with them more often."*
3. *"I decide how much I can involve using the system while teaching. I always try to highlight the strengths of the system so even the most pessimistic students are eventually convinced to use it."*
4. *"I usually try to break down their results and plan the activities accordingly."*
5. *"Well, when I see somebody struggling, we try to focus on it during face-to-face lesson."*
6. *"And I check in the system whether they really work so I can encourage students and control their activities. The system helps quite a lot but my role as a teacher is still very important. I always need to make sure that they really learnt something."*

7. *"I always play the videos to my students then the dialog and even vocabulary if I feel like it's needed."*
8. *"I would usually check the students' results after a lesson to find out how they worked and to be prepared for next lesson."*
9. *"I often note that without the our guidance and mentoring to other teachers, the system can easily become another boring material."*
10. *"But something I noticed is that if students do not have face-to-face meeting, they lack motivation to work in the system."*
11. *"I use the system when I play the audio recordings and videos to my students. Regarding the audio, I use it differently depending on the level of my students."*
12. *"Teaching with OPEN LEARNING is quite nice. It does not require so much energy from me and I found that it motivates students."*

One of the goals of the company is to work closely with teachers, create a hub where they can meet, discuss and exchange their best practices and experiences. As the CEO pointed out, educational companies and organizations are only able to do so much without the teachers and they are rarely successful.

The data from the online survey that was distributed among students also confirms the CEO's statement that teachers are irreplaceable. 35% of students found teachers absolutely necessary during their course, 22% of students found them important, 23% of student were neutral and 17% could finish the course without a teacher. This last number points to the fact that some independent students like to take the course online. I look more closely on opinions of this group of students in one of the following chapters.

The interaction teachers have with OPEN LEARNING severely influence their activities. The system, as a tool, gives teachers data which they can then transform into actionable decisions and it is up to them to react. They analyze the results and can adjust their lessons to better meet students' needs and this is where their importance lays.

The data shows that teachers are the ones who decide to which extent to include the system. They can adapt to different learning styles of students and for example, the advanced students can work in the system during lessons if the teacher needs to spend more time going over parts with other students. An interesting finding is also that students might lack motivation when they attend the course only online. Apparently, there is a synergy between the system and teachers and to properly use it requires to understand how it can benefit teachers in their job.

5.2 System's Role

In this chapter, I analyze data that describe the role OPEN LEARNING takes in the process of teaching and I aim to understand why the system is considered to be important. I divide the data into multiple categories depending on the theme it describes.

5.2.1 Planning and Simplification

This section demonstrates some of the aspect that using OPEN LEARNING brought to the lessons and shows what teachers consider important when asked about the system:

1. *"I basically do not need to prepare anything. That is great. I'm used to prepare activities for each class, search for extra materials and it requires quite a lot of time."*
2. *"The planning has been reduced by about 70% so it only takes me like 6 minutes."*
3. *"The classes flow nicely because the structure is set. It gives me space to think of creative activities we can do, etc."*
4. *"[...] the autocorrecting feature in all exercises in the system saves me time which I can then invest into activities with students."*
5. *"It not only made teaching easier but actually allow me the use of CLIL in teaching vocational subject."*
6. *"I believe it is the technologies. The children like it. Even students who rarely do anything and are problematic. These ones pick up a tablet and start working."*

There seems to be a trend with reduced planning for each lesson. This causes teachers to have more time to create other activities for students. The key factor could be a combination of set content in the system and the usage of ICT. The set content frees teachers from developing any kind of materials, sets the course and they can focus on how to best exploit what the system offers. They clearly see OPEN LEARNING as a tool which can help them in fulfilling their goals and simplifies their work to certain extent.

Studying the system's role does not implicitly help answering my research question but this knowledge can have further implications on the organization. It can show the strengths and weaknesses and possibly the company can use these experiences as a persuasive piece of information for other teachers to help them self realize what they can do to improve their teaching process and how the system can affect it.

5.2.2 Working with Students' Results

The following section describes one of the most mentioned aspects - working with students' results - and its impact to teachers' activities:

1. *"I usually grade their tasks but I also look at how they work, how much attempts it takes them to finish the exercises and so on."*
2. *"I check my classrooms and see if they did all the work. I look at the dashboard to find out which classroom has most new events and is highlighted orange."*
3. *"It is great that I see how students work and before I go to the class, I can check if they finished everything they were supposed to finish. This means that I come so much more prepared because I know whether I can continue where we left off."*
4. *"If students don't have the tasks done, I look at their activity and try to figure out where the problem lays."*
5. *"I never knew if students really did their homework and then this actually changed the classroom activities dramatically."*
6. *"I can work with students' results."*
7. *"Usually, the students are responsible and work home. Then, I see if they struggle or not."*

The arching idea from the beginning was the following: *"They [the teachers] would see students' results in the system, they would know what was difficult for students and they could even predict and make the face to face classes more effective."* just as the CEO of Open Agency put it in our interview. It seems that the system established this practice of analyzing students' results and based on interviews with teachers, they find it very important and helpful.

It does not only allows them to grade and correct students' work but with the right approach, teachers can use this information to better plan activities in lessons, chose what to focus on during their lessons and ultimately help students to finish the course more effectively.

With such an important feature, it is sensible to find out as much as possible about its design and whether there is space for improvement. This kind of data will be discussed in following text, especially in the section that focuses on issues and demands. There, I describe the reported problems and demonstrate a possible solution.

5.3 Students' Feedback

This chapters focuses on capturing what students find important during courses with OPEN LEARNING. I use statements and data from the survey that captured their opinions to demonstrate their experiences, ideas and positions.

Firstly, the feedback from students was positive when they were asked to describe what they would like to change in the system:

1. *"No, I would not change anything in the system."*
2. *"I think the system is perfect."*
3. *"No, I'd like to participate in other courses."*

Over 60% of respondents said they had no problems when they were asked about the system's issues in two open-ended questions. The rest either experienced some minor problems, had ideas for improvements or complained and reported some errors which I mention below.

The survey results revealed some interesting findings:

- The overall experience with using OPEN LEARNING: 44% of respondents answered that they had a very positive experience, 32% had a positive experience, 19% had a neutral experience but none of the respondents has answered that the experience was negative even though that were people that reported errors.
- 75% of respondents answered that OPEN LEARNING had simplified their learning of foreign language.
- 53% of respondents answered that they made significant progress in learning with using OPEN LEARNING.
- 78% of respondents answered that the logic of the interface was fine but not perfect.
- 79% of respondents still used paper textbook.

The data do not prompt to making any major changes in the interface as that could possibly have a negative impact on the users' experience. There certainly is a space for improvement and the following chapters will reveal more.

The data confirms what teachers had previously stated about the importance of paper textbooks for students, and the system obviously has a significant and positive impact on students' learning. This is supported by following statements:

1. *"I think that the paper textbook was useful and I found it helpful that I could keep it."*

2. *"I liked the combination of online and face-to-face learning. It motivated me and I received continuous feedback throughout the course."*
3. *"Students still use the paper textbooks a lot. Usually, they prepare all the answers there, some of the part we even do together."*
4. *"Some of them even asked me if they can finish the course during summer. I was really surprised that they even care about working on it when they're not in school."*

Now let's have a detailed look at how students perceived the importance of their teachers. When looking at the group of students that found their teachers very important (35% of all respondents):

- None of these students rated OPEN LEARNING negatively.
- Over 80% of them claimed that OPEN LEARNING had simplified their language learning.
- All of them used paper textbook.

With this in mind, it is interesting to have a look at the opposite group of students. Those that did not find teachers to be important during courses. This group represents 16,5% of all respondents and here are the findings:

- 76% of them still rate their experience with OPEN LEARNING positively.
- Nearly 70% of them claim that OPEN LEARNING has simplified their language learning.
- Over 80% of them still use the paper textbook.

The findings between these two groups are very similar and show that using the system without a student being present in face-to-face lessons is a possibility and most of the students still find the system playing a significant role in their learning.

Next, I focused on the segment of students that did not see significant progress in their learning after taking the course. This segment consists of 13% of all the respondents and it overlaps with the group of students that did not find their teachers important:

1. *"Half of the course should be face-to-face meetings."*
2. *"Simplify the way of submitting oral tasks."*
3. *"The difficulty level was too low for me."*
4. *"It was really challenging. Maybe the first few lessons could be easier."*
5. *"All texts should be recorded by native speakers."*

The reason why I looked at this segment was to try to dig deeper and explore if there is any patterns that can be spotted. However, these findings are fairly random as some students

found the content of the course to be difficult and some thought the complete opposite. The rest was about the content which is up for discussion within the company.

To sum up, the overall feedback from student has been positive. Majority of them describe that having a paper textbook is an important part which might be surprising. The feedback did not reveal any major issues in the design of OPEN LEARNING, the structure of courses or the work teachers do. Though, the system requires a refreshment of its design and the parts that need to be changed and redesigned will be described in the following chapters.

5.4 Important Design Parts

This chapter presents what users found important in the design of OPEN LEARNING. The chapter is divided into parts based on the themes they describe. I explain and discuss reasons behind why certain aspects and parts of the design are considered to be important and demonstrate it by using direct quotations from the interviews I conducted.

When a possible solution to a certain issue does not require additional information or consensus, I prototype it or discuss further steps that need to be taken.

5.4.1 Sign Up & Sign In

Over the course of my research, I stumbled upon several hints in the data that point to a problem with the account registration process and signing in the application.

First of all, registering accounts in OPEN LEARNING is necessary to provide a customized experience and an access to resources for authenticated users. It is an important first interaction with the system and the design of the registration form needs to be easy, intuitive and painless for users. The common design patterns can increase the usability of such a component and decrease the common problems Open Agency has been facing such as:

1. *“Some students had difficulties logging into the system for the first time.”*
2. *“They either forget their password and don't know how to retrieve it ”*
3. *“[I had problems with...] Signing up.”*
4. *“Sure. Let's talk about the email you send them before the course begins. It includes the website where they can sign up and the classroom token for their course. I think students receive your emails but they don't care. They start to care when they're at school and their teachers asks them about it. At that point, they want to me send them the email again.”*

There have been students reporting issues related to sign up and sign in process but more importantly, a person from Open Agency that deals with these issues - the office manager - had extensively spoken about this during the interview and reported that this was one of the most common issues.

Signing up is a process that is required on many websites and by many information systems and it is arguably something users are familiar with. Hence, if the design is different and does not follow the recommended design pattern, it can easily hinder a successful registration and create the known problems (Smashing Magazine, 2008). The survey data revealed that 47% of users have not had any problems with registration but the other half either had some of think it could be simplified or just easier.

Another issue that is related to the sign up and sign in process and extensively discussed within the company was mentioned during interviews:

1. *"Also, it would be nice to only login at one place (website). I teach several courses of Russian and English and sometime, I forget I need to switch to a different website."*
2. *"Another change that would simplify my work tasks is if we could sign in to OPEN LEARNING from just one website. Now, when I go to Engineering technology in English, I sing in on different website than when I go to Basic chemical terminology etc. It really slows me down and some student struggle with it too."*

Currently, OPEN LEARNING is running on several different domains using separate databases. One instance is used for English for engineers and includes four different study modules, the rest goes in the same logic. In total, the company is running around 10 different instances of OPEN LEARNING. The reason for this is a legacy system design from times when the company's product portfolio was much smaller.

This division creates confusion and requires more attention from users when working with multiple instances of OPEN LEARNING. The currents design does not include a single sign-on feature, an access control to multiple but independent systems, hence requires users to create accounts for each instance if they need it. Such a design is no longer acceptable by the company and its change would make users' life much simpler as they find singing up and signing in very important.

Resolution

To resolve the issue described above, there are several possible answers:

- "Sign-in" and "Sign-Up" buttons are clear, easy to see and easy to access.
- Draw attention to crucial operations such as "Register new account" "Sign-in", and "I forgot my password" to ensure action buttons are appealing and encouraging new users to join.

- Discuss possibility to use AJAX to check for the availability of the username on every keystroke so that the user does not need to submit the entire form several times before he or she is allowed enter.
- Incorporate social sign in options such as “Facebook Login” and “Google Login” to avoid the entire new password paradigm.

One thing to keep in mind is a process of distributing Classroom Codes (unique access code for each course) for students to be able to access study materials after singing in OPEN LEARNING. It is currently distributed by emails and it is a question to discuss whether this process will remain unchanged or changes and thus will influence the design.

If the company decides to change the process, one possible solution is to display Classroom Code in OPEN LEARNING to a teacher of that particular course and let them distribute it among their students.

The screens below present the new registration form and a new welcoming screen in OPEN LEARNING for cases when student is not yet in any course. The main importance is to make action buttons clear, easy and communicate their actions evidently.

Design

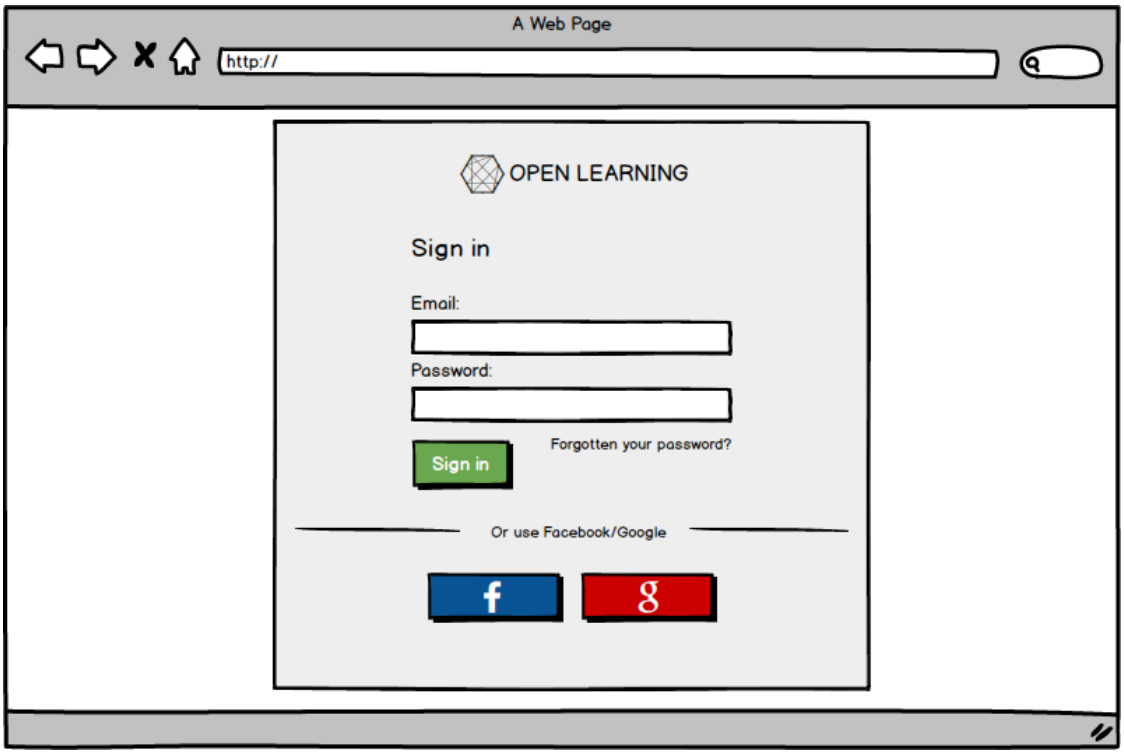

Figure 4. Registration Form

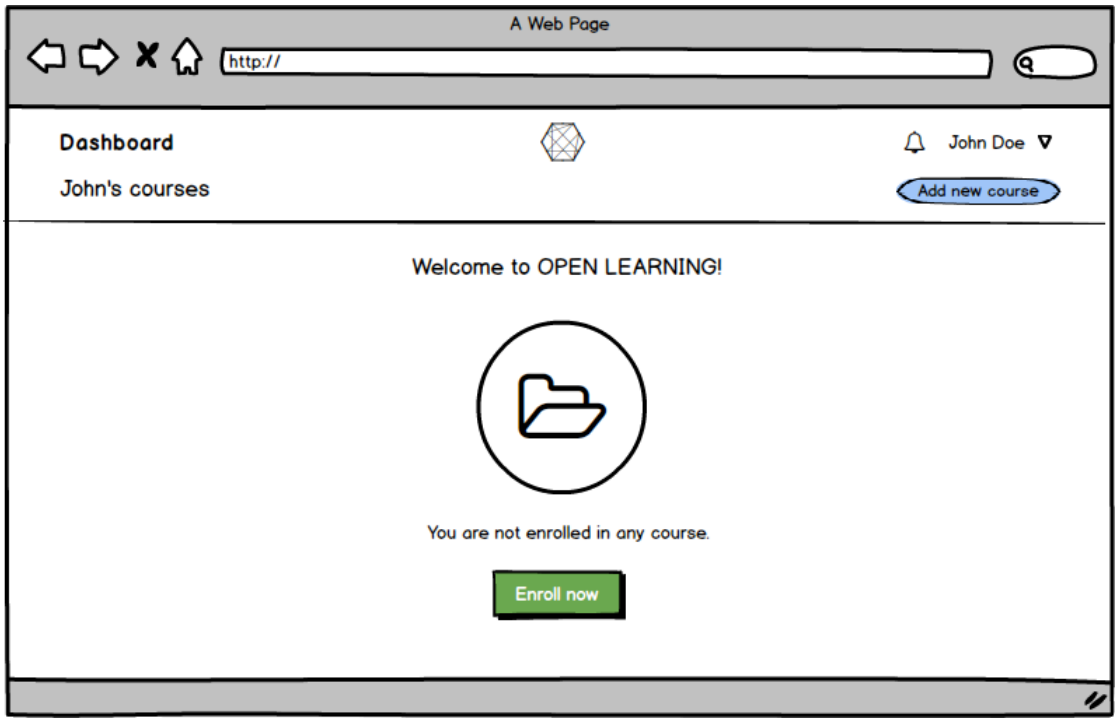

Figure 5. Empty Dashboard

5.4.2 Notifications and Messaging

Notifications and messaging have become a significant part of using ICTs and modern mobile phone is essentially just an always-on notification machine (Designmodo, 2014).

In my literature review, there are cases that demonstrate that communication is considered as an important aspect of modern learning management systems (Hamat et al., 2014). On the other side, a research study by Landry et al. (2006) suggests that students find course content much more useful than features for communication.

In the data I have collected, I saw that teachers find it important to be notified and to be able to easily communicate with their students. I pick statements that describe the users' needs in a clear manner:

1. *"There have been cases when some student submitted a task and was surprised that it was not graded right away. It simply waited for me to login and grade it. But this happens only on occasion. Maybe the message for students there could be clearer."*
2. *"Next, I'm not sure if students are somehow notified when I grade their tasks. I think that's very important and motivating for them."*
3. *"Another pain point is that I cannot send a message to a single student and I need to use my personal email in addition to OPEN LEARNING. I see that as a disadvantage."*
4. *"And lasty, it would be nice to have some sort of notifications."*

5. *"I don't have a tutor and if I just send him a message, I don't know where to expect the answer. If it appears in my email or in the system."*

To implement notifications right in a way can be tricky. The design cannot step over the line to annoy users, yet it needs to inform them, convey the message and catch their attention. There are two types of notification that would be in OPEN LEARNING:

- Users notifications: these are the messages that are sent directly by other users, or they are mentions in forum thread (if implemented).
- System notifications: these are the messages being sent by the system when the user is added to a course, the subscription period is about to expire, receives new grade, etc.

The messaging has been identified as another important part of OPEN LEARNING's design. However, the execution will require additional meetings within the company to decide what exactly they want to implement. There has not been any indication of need to have a chat so an implementation of a forum could be considered. Though, I, as a researcher and a designer, am not in a position to be able to make this decision.

To design notifications, I added a "Notifications" icon on the top right of the interface besides the logged in user's credentials as shown in the figure below. Just adjacent to it is a number indicating the number of unread notifications. When the user clicks on the notification icon, a drop-list will appear showing the notifications. Each of the notification will start off by displaying the image of the user who is responsible for sending the notification.

Design

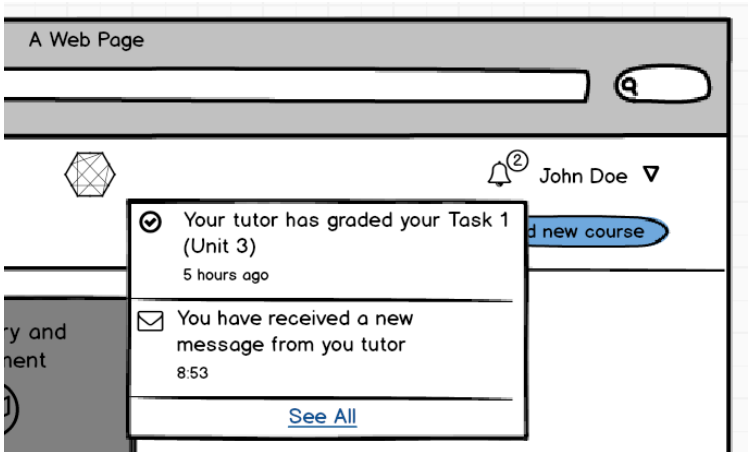

Figure 6. Notification Icon & Detail

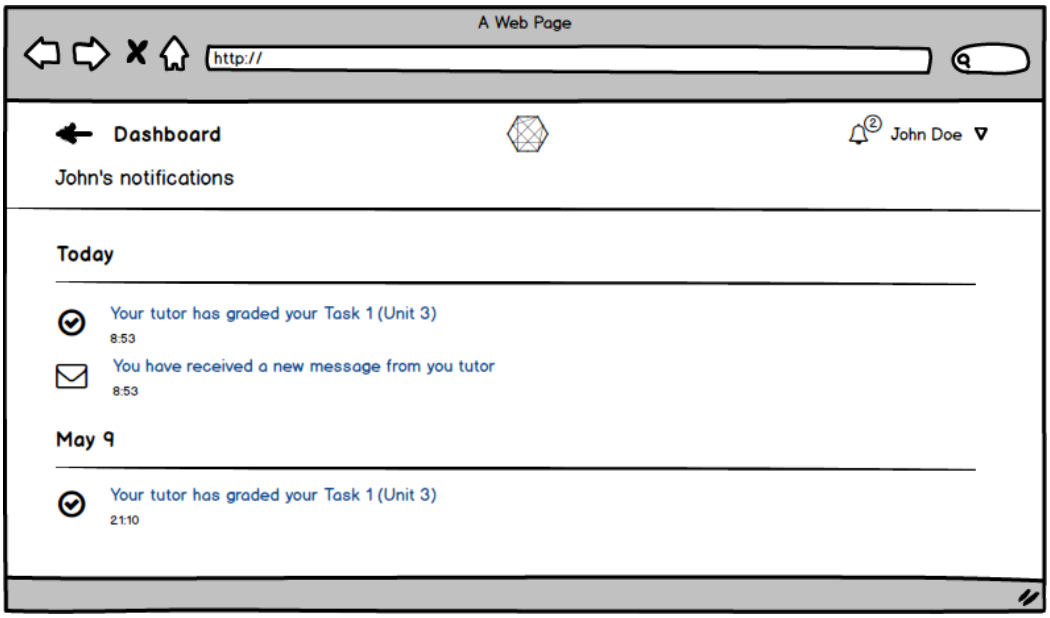

Figure 7. Notification Page (See All)

5.4.3 Tasks

There are two different kinds of tasks in OPEN LEARNING - written and spoken. Students are given one task per unit and are asked to write 150-200 words based on the task's description or to speak for 1:30 - 2:00 minutes about a given topic. They have to demonstrate that they not only obtained receptive knowledge but also productive knowledge and this is the reasoning behind including tasks in OPEN LEARNING. Depth of vocabulary knowledge is an essential part of the learner's language use (Read, 2007) but the receptive-productive dimension is equally important. This dimension reveals the ability of using the comprehended vocabulary knowledge. It is found that receptive learning contributes more to receptive knowledge, whereas productive learning more likely leads to increase in productive knowledge (Waring, 1997).

As the CEO of Open Agency stated, the couses are supposed to prepare students to use the foreign language in everyday job related situations. Hence, the tasks present an important component of OPEN LEARNING. Here are the reported issues and experiences with tasks:

1. *"Well, some adult students have had problems with recording oral tasks. The technical side of things is not a problem but it's probably their shame. For example, when I taught teachers, they did not want to be seen nor graded."*
2. *"Some of them have problems recording the oral task but others like how modern and fun it can be."*
3. *"Students don't like the oral task where they have to record a video. But I think that it would be too easy without it...I think it is just unusual for them and it has a lot to do with their self esteem."*

4. *"The system sometime timeouts before they submit their work. Also, some of them complain that when they write their text in Word but the formatting disappears when they copy and paste it in the system."*
5. *"When I copy text into the field, the formatting should remain the same - but now it all disappears and I need to do it again."*
6. *"I've heard from several teachers that it would be nice if we had some extended text formatting options when grading students' written tasks. They want to be able to highlight words, underline them or even cross them out."*
7. *"A task in each unit is very important for students."*
8. *"Submitting the spoken task is a problem"*
9. *"Video task"*
10. *"Submitting the spoken task into the system. It was difficult."*
11. *"From the beginning, I had problems recording the tasks."*
12. *"Submitting the spoken tasks."*
13. *"I only had one technical problem - submitting the spoken task."*
14. *"Please simplify submitting videos."*
15. *"I don't like the spoken part - recording video. I'd remove this part."*

One issue was reported regarding written task - formatting of text. The current formatting does not work well and especially teachers need extended options for formatting as they like to cross out, highlight and mark certain parts of student's task to explain mistakes when grading students' work. The feedback students receive is very important and should not be limited by the system's capabilities.

From the data samples, it is obvious that the spoken task is controversial among students. They tend to experience issues with recording and submitting it. During interviews with teachers, they often mentioned that the technical feasibility was rarely a problem for their students. Recording a spoken task was something students never experienced before and some of them were sceptical. From the company's point of view, the tasks hold an important function during learning and should not be taken away only because they create obstacles for some students. It is a key part in demonstrating that students were able to understand new vocabulary and could to use it actively. Though, the way of submitting can be discussed further within the company and if the decision is made to change it, testing of this part needs to follow.

5.4.4 Views for Different Roles

In this chapter, I divide the sections based on user roles in OPEN LEARNING. I discuss the themes described in the interviews and open-ended questions, their importance and if possible, I demonstrate how issues can be resolved by changing the interface design.

Teachers

Among others, working with students' results has been identified as one of the most important aspects OPEN LEARNING has to offer for teachers. Hence, any comment regarding this should be taken in consideration at least as a chance to possibly improve the design of this section of the system. These are comments tightly related to the teacher's interface:

1. *"When I have only one student in a classroom, it's easy but when there are a lot, I need to click on each one to look at their activity and work done. I don't see that right away or in some summary. I don't like that very much."*
2. *"I would like to have a clear overview of what is going on in my classrooms when I log in so I don't need to necessarily go through all of them"*
3. *"Sometimes, we use it together and I play videos for them. I don't do much more because in the tutor's profile they can see all the correct answers on the screen."*
4. *"teachers ask me how to generate a table with students' results etc."*
5. *"teachers don't know how to generate the table with students' results. Maybe the system could be clearer about that or maybe it's just that nobody tells the teachers about this feature."*
6. *"And then deleting of invalid test attempts, teachers don't know about it neither."*

The current Dashboard in OPEN LEARNING displays very little useful and actionable information. It should display the available courses in a clearer manner and should provide an actionable information e.g. new events that occurred (tasks waiting to be graded, information about student's activity etc.). The overview of a course (classroom) is currently only a list of students enrolled and teachers need to click on each one to see their results and activity. The possible solution is to completely overhaul the course (classroom) view so the teachers have a clearer idea and see some sort of an overview of students' activity and can easily learn what is important without clicking on each student. This is of course only my hypothesis since the teachers did not mention any implicit solutions. The design decisions that come from making this hypothesis would later be tested with real users.

The third statement above - a teacher mentions that in face-to-face lessons, they are not able to use their teacher profile to display an exercise for all students because the view only shows the exercise results. The decision for this was made some years ago after receiving a lot of feedback from teachers. The issue was that teachers wanted to project an exercise on a wall for all students to see. This led to obtaining wrong practice. Students are supposed to work on the exercises themselves and the role of the teachers in not to show them how to solve it but rather explain and encourage.

Hence, the solution in not to allow teachers to be able to fill out an exercise just like a student can. But a toggle button could be placed to the interface to allow for hiding/showing the correct results so the teacher can still work with the exercise while not showing the correct results to students.

Another issue that was mentioned is generating a table with student's results. The reworked view on a course (classroom) and students within that course should clearly show what options teachers have there. Since the system is simple enough, the probability of clustering the user interface is fairly low. In the current design, features for deleting invalid attempts in tests and generating results are hidden and unless teachers know about them, it is very difficult to find them.

Design

Figure 8. Teacher's Dashboard

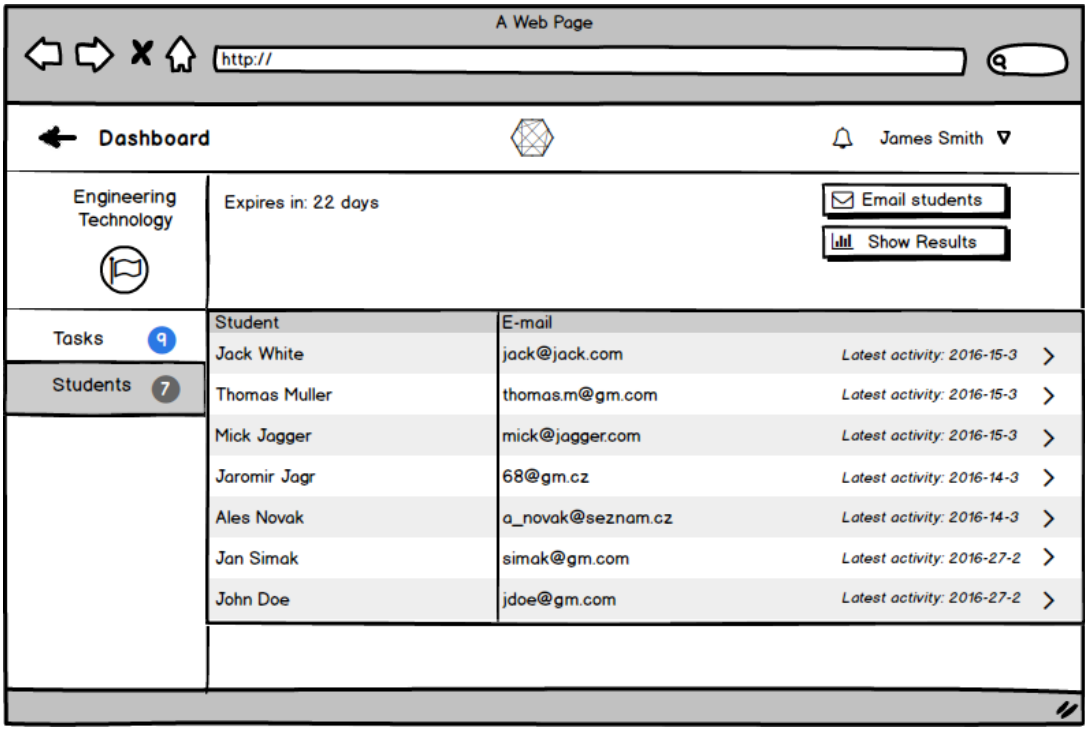

Figure 9. Students in a Course

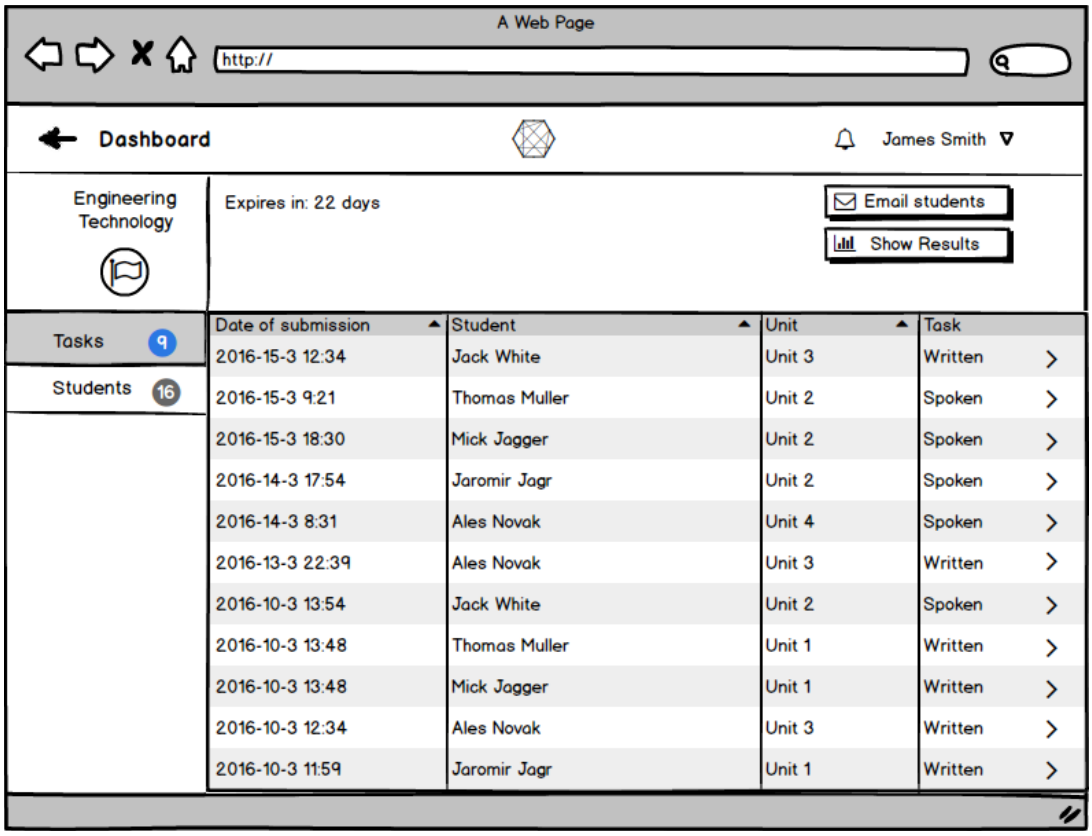

Figure 10. Ungraded Tasks in a Course

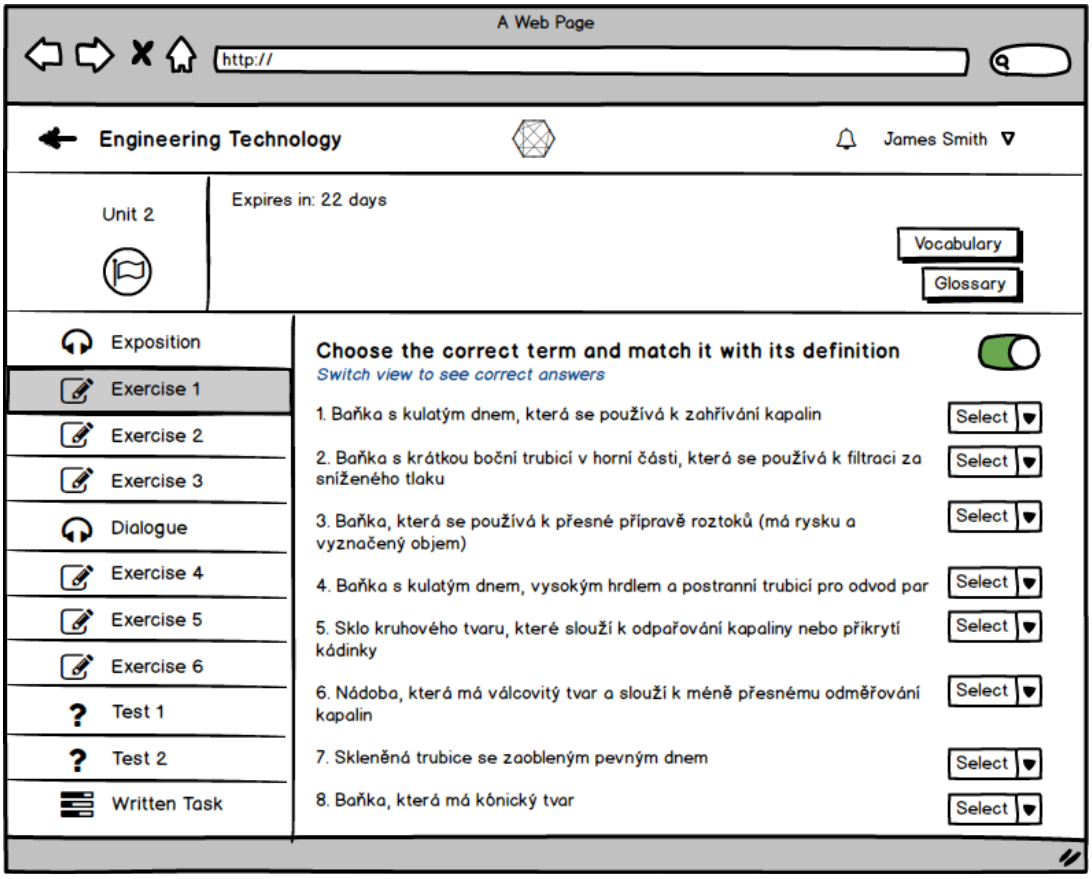

Figure 11. Teacher's View of Study Module

Students

One of the previous chapters looked at what students found important during courses with OPEN LEARNING and most of their comments were related to the teacher's role, the importance of paper textbooks, the impact system has on their learning outcome and so on. The comments did not reveal any major issues in the interface, though I identified some throughout the research and I also mention some that have been occurring and I know about them due my role and experience in the company:

1. *"Some students have had problems with the general navigation, moving between units and exercises so then I needed to show them how to do everything. There was a case when students did not simply understand that they had to click on the next unit when they finished one. Though, this has a lot to do with using computers in general."*
2. *"Each course has a access time period which is fine but when it expires and students try to sing in, the system gives them some weird error message like: "No modules available". They don't know what it means. Instead, it should say something like: "Your access has expired" or some clear message so they know what's going on."*
3. *"I don't know where I can look at all my results."*

The global navigation in the system now consists of a static navigation bar on top and a back button underneath it. The bar is not used to its full potential and assuming from the feedback, it could give a better sense of where users are in the system. They should be able to clearly see if they are on Dashboard, in a Unit, or in a particular Exercise, or viewing their Results. Then, it should be very easy for them to take a step back to a previous screen. I demonstrate a proposed solution in the design part below.

Then, there are the messages that contain a brief information the system gives to users. Currently, the messages can be confusing as for a case when the access period for a student expires. The system does not give them a clear message about what is happening and what user can do about it. This is also related to a case when student submits a task. Then, they need to be informed that the system does not grade the task automatically but it waits for their teacher to grade it. This message needs to be clearly communicated so it does not confuse users. It should also allow them to perform an action (request prolonging the access period, send message to administrator etc.).

The last important aspect that was not mentioned throughout the research in an inability to enroll into a course when a student has previously been in a course just expired. My assumption is that nobody mentioned it since this issue is usually very quickly resolved by Open Agency's technical support. It needs to be taken in consideration and resolved because it is important for the workers in Open Agency. This statement is not supported by any data but comes from my own experience and from informal talks with the company's workers. The current design of OPEN LEARNING simply did not include this flow and so there is a workaround for solving it. Though, the redesigned version of the system should support this functionality because Open Agency now cannot offer students being enrolled in multiple courses under one account.

Design

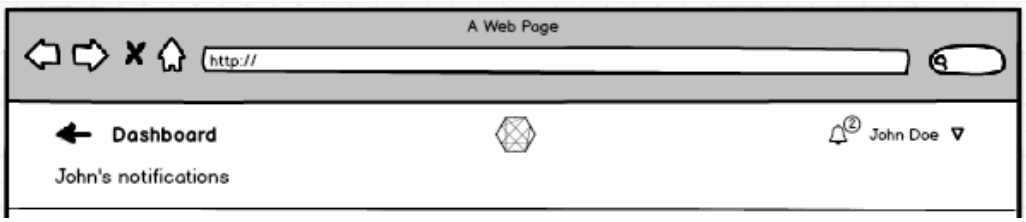

Figure 12. Dynamic Global Navigation Example 1

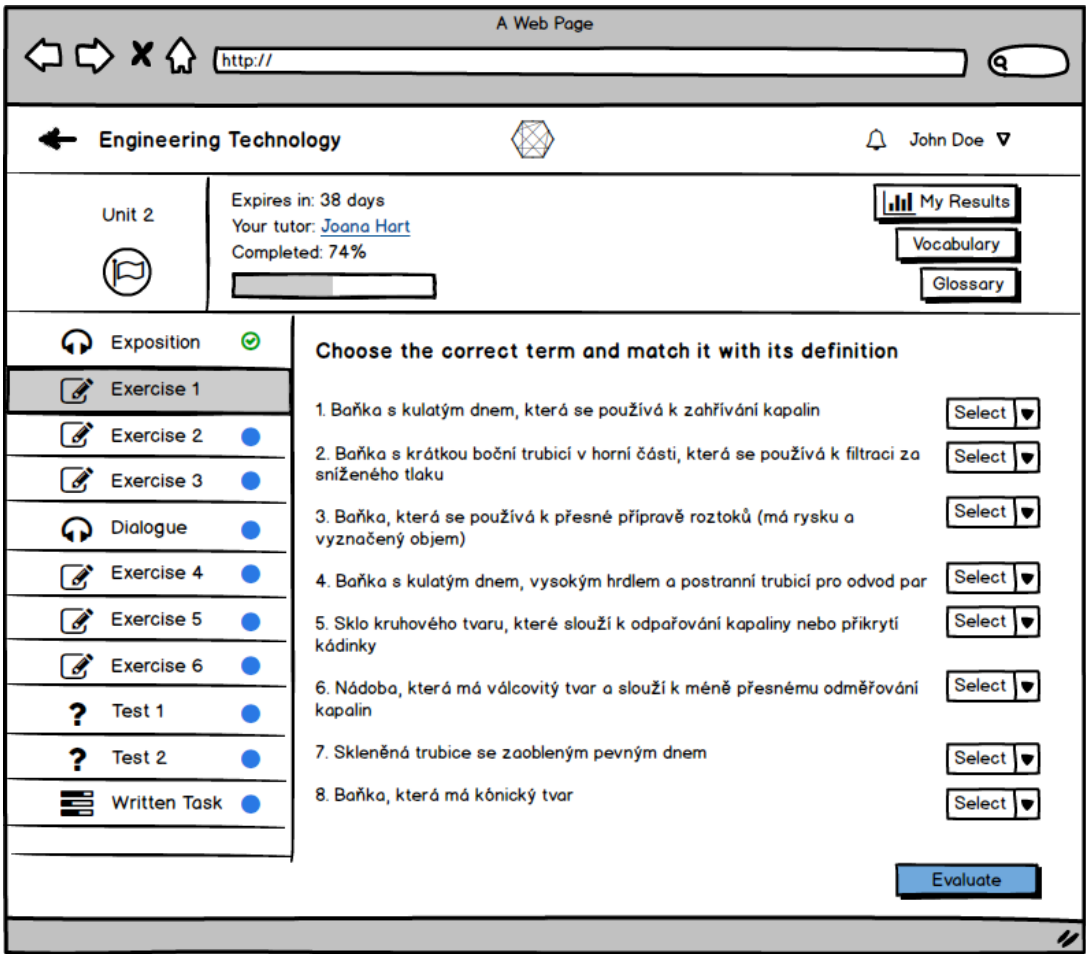

Figure 13. Student's View on Study Module

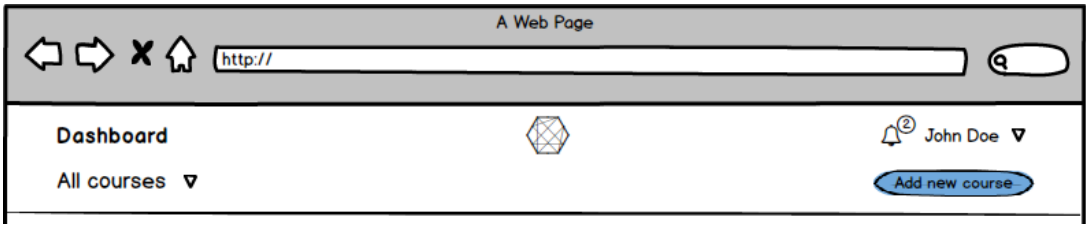

Figure 14. Enroll into a Course Button

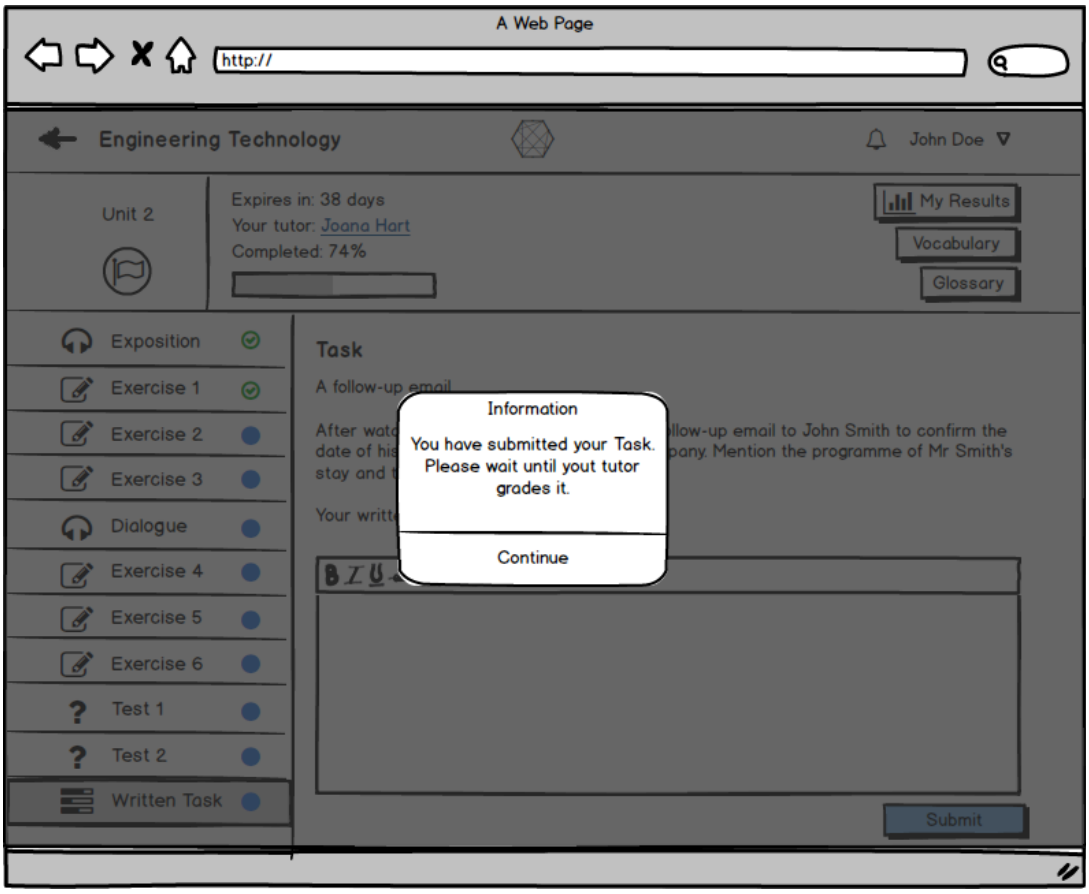

Figure 15. Clear Message - Task Submitted

Editor

The role of editor is to create modules in the system. OPEN LEARNING essentially offers very similar functionality as Content Management Systems. The units, exercises and tasks are created in a similar manner.

The interview revealed areas that do not work properly and features that would simplify the process of creating modules:

1. *"Another issue is importing of any media, like audio files. It is now broken and I need to ask our developer to put them in as well. It is another issues that makes everything very slow. I think he has some script because what I do is that I prepare a table where I map the names of the audio files with their position (the unit, etc.). He is then able to import everything."*
2. *"Next, the whole text formatting is broken. When I need to edit something in a previously formatted text, what happens is that I fix it, save it and everything breaks down. Then, I need to start over formatting the whole exerices. This is very annoying."*
3. *"When completing a module, there's usually around 300 words in the vocabulary section. To put in a word means to copy and paste the word itself, its translation*

and phonetic transcription. But sometimes it is up to 5 items for one word. That means that theoretically, I have to copy and paste something 1500 times. The workaround was to create a table with all this information and send it to our developer. He was able to import it into the system.

4. *But I think that the editor should not be dependant on other people. It'd be nice to be able to import such a table with given formatting to the system myself. In fact, it'd be nice to import all of the exercises this way."*
5. *"When somebody informs me about any mistake, I need to make sure the mistake really exists. The way I do it is that I log in as a student and check it there."*
6. *"Also, when I need to put in any kind of table or an image, I would appreciate if there was some sort of a HTML editor so I can format everything well. This would contribute to the independence of the editor role."*

The current state of OPEN LEARNING requires the editor to work closely with a developer who maintains the system. This creates various obstacles and delays the process. As the editor mentions, the completion of a module should not be dependant on another person's work.

The workaround that are mentioned in the interview point to possible solutions and shape their design. However, the technical feasibility requires additional meetings to agree upon what exactly is desired or if the creation of modules should be designer differently. Again, this data show what is important for the current role to complete all work tasks but it is not up to the designer to decide about the final design. The topics are need to be discussed and resolved include:

- How to map and import large amount of files?
- How to import large amount of file descriptions (name, translation, phonetic transcription etc.)?
- How to implement a HTML editor to format text, pictures and tables within an exercise or task?
- How to have an ability to switch between a student/editor view to see how an exercise is displayed for students, yet be able to edit it as editor?

Hence, the design can be made after these questions are answered and the company decides about the direction it will take.

Office manager

Based on the interview with the current office manager a few issues emerged that are tightly related to the current processes in the company:

1. *"Next, it would great for me to see students' results and be able to generate the tables myself. Sometimes people ask me for it and I need to get in touch with that particular tutor and ask them to generate it for me. And, if the course is expired, I need to contact you to prolong it, then I get in touch with the tutor and things just get complicated. The tutors shouldn't be the only people who are able to generate it, I don't think the current logic is correct."*
2. *"Currently, one of the weak spots is that I cannot see which students I am supposed to have in each classroom in the system. What happens is that I only see them after they login for the first time. Sometimes, I don't know how many students I'm supposed to grade or I even have empty classrooms. Then, I do not know who to contact, what is going on, how I can help them, etc."*
3. *Next, it would be nice if I saw which students have already logged in and which have not. When I receive an email, I don't have much information about their situation and I need to forward it to you. But this might me more about competencies and my current role.*

The issue is that when somebody (director of a school, CEO of a company etc.) requires to see students' results, the only person able to generate the results is a teacher of that particular course. This presents obstacles as the office manager explained. A possible resolution is for him to be able to generate results from any course even if it is already expired.

Also, the user management and course (classroom) management in OPEN LEARNING should be part of this role's work activities to reduce the internal communication and to be able to quickly resolve technical issues reported by users. The design of the administrative end of the system needs to be reworked too once the company agrees upon changing the roles. Currently, the office manager does not have an access to OPEN LEARNING and needs to communicate with an administrator regarding all of these matters.¶

6 Discussion

This chapter presents a discussion of the methods and empirical data sources I chose. It gives thoughts on some possible sources of error based on the execution of the research.

6.1 Sources of Empirical Data

Teachers and Company Workers

The composition of the interviewed group was very important for this project. Before the research started, I discussed the selection within the company to find out who could possibly share insightful information and who would be willing to participate in such a research. My aim was to interview diverse range of users to address the difference between fields where Open Agency operates. Therefore, among the chosen teachers, there were private tutors, school teachers and others with various experience. Though, I only included the ones who have had over 6 months of experience with using OPEN LEARNING to assure they knew the system well enough to assess it.

All of the people's prior experience with Open Agency has been positive as I was told in the initial phase. This prior experience could present a certain distortion of the nature of the data. Though, throughout the research the group did have negative comments as well so I considered the probability of distortion as low.

Students

Open Agency keeps a list of former students and as I had an access to it, I made a decision to collect feedback from all student from previous year - 2015. To chose students from years before 2015 would not be a smart decision as they could forget about their experience with the system and about the course itself. Also, the system has evolved since then. This list presented a large enough pool of potential participants. The composition was random and it included younger students from high schools, people from companies and other students from wide range of ages and backgrounds.

6.2 Data Collection Methods

Before deciding definitively of the methods for data collection, I organized a few observation sessions where I was a part of a lesson. In the beginning of the lesson, I explained the research goal to all of the participants and I wanted to observe what activities they did in classrooms, if and how they worked in the system and that I said I would give them space to reflect and talk to me about their experiences.

My expectation was that the lesson would go as planned and I would not present a disruption. I observed that my presence was invasive and it affected the lesson significantly. A combination of this finding and the fact that courses were spread across all Czech Republic led to a conclusion that I would not include observation as a method for my research. Other methods that were considered included think-aloud protocols, focus groups or recording the courses without me present but the organization would be lengthy and not feasible with only a few months timeframe.

However, I decided that data from a narrow range of students would not be as useful for my analysis. I wanted to observe whether there were global problems and issues across the user base and so a survey was the right method to pick. Surveys have its drawbacks but it suited my needs and the situation I was in the best.

Interviews

Looking back at the execution of the interviews, the physical presence of the interviewee made it much easier for me to conduct it. Some interviews conducted via Skype lacked a natural flow as they were disrupted when a signal dropped and some of the insights and thoughts could have been lost. I was expecting that with open-ended questions, I would collect more reflections about the user interface and when I did not strictly control the discussed topic, the conversation steered into discussion something marginal and less important. However, that could be partly caused by my inexperience as an interviewer.

During the interviews, most of the interviewees were happy to answer all of my questions and I was able to collect data that help me answer my research question. However, I got a feeling that it was difficult to collect ideas for improvements of OPEN LEARNING as teachers do not know what technology is capable of and rarely use the latest software products and services in their lives.

Survey

My expectation for the survey was to receive around one hundred answers. Using a service called MailChimp was a smart decision as it allowed me to track the click rate and open rate and had a precise idea of how many people were reached by my email.

Since I had the chance to address many students, the online survey was the right method to go with. I wanted it to be anonymous and expected to find out about the common problems and parts of the design that were considered as important across the whole user base.

6.3 Thoughts

The methods I chose provided me the the right data for further analysis and helped me answer my research question. However, for the complete UCD process, these two methods are

not sufficient. The scope of Open Agency's project is to finish a prototype to further test it with users, iterate and once the prototype is satisfactory, start a development. A think-aloud protocol, task analysis and observation could be the right methods for this phase as well as constant involvement of the users. It is important to use the designs from this project to validate the assumptions made based on the results from the analysis. This is the correct approach that leads to successful projects as I learned in the literature review conducted in the beginning of this project. In some cases, the collected data were not enough to make design decisions and further meetings and discussions with the company are required. This includes discussing the role of editor and the way how study modules should be put together, messaging in the system and others mentioned the previous chapter Findings.¶

7 Conclusion

The research objective was to explore Open Agency's custom learning system called OPEN LEARNING to answer the following research question: *What aspects do users identify as important in the design of OPEN LEARNING and are there any aspects that hinder the use of the system?*

Through the literature review, I explored the landscape around UCD and Learning Management Systems to gain a better understanding in order to meet the company's goal of redesigning the system. The literature review revealed how researchers studied these systems, what methods they used and how they approached their research.

The analysis revealed how important teachers still were during lessons. Most of students found them necessary as teachers could be a motivating factor, they analyzed students' results and planned activities in lessons accordingly. The system itself plays a key role as it enriches the interaction between teachers and students. The most important feature for teachers was working with students' results and being able to adjust activities and their focus. The data confirmed the CEO's vision of how she wanted teachers to exploit the system and benefit from using it. The system had influence on reducing preparation time for each lesson, the set study module freed teachers from developing additional materials and they could solely focus on working with students.

From the collected data, users were content with the system. Nobody rated their experience as negative and majority answered that it simplified learning a foreign language. An important finding was also how irreplaceable the paper textbooks were. Vast majority of users used them which was confirmed by the teachers' answers as well.

Regarding the design of the interface of OPEN LEARNING, several areas were identified as important. The registration form was poorly designed and users experienced difficulties signing in the system. The resolution is to follow common design patterns to present users choices they are familiar with. Another important aspect of the design that was identified was notifications and messaging. Users found it important to be notified about new events and to be able to communicate with teachers and vice versa.

Frequently mentioned part of OPEN LEARNING was the spoken task. Spoken tasks have been found as controversial among students and important among teachers. They serve its purpose in making students demonstrate their productive knowledge rather than only their receptive one. However, students complained about the submitting process being difficult etc. Though, the data point to the fact that the issue was not the technical feasibility but rather their willingness to work on such a task.

Based on the insights that came out from my analysis, the proposed changes in the system's interface include revised teacher's Dashboard with actionable information and a better overview of their courses. The global navigation has been reworked with the goal to better inform users about where they were it the system and to make is easy for them to go back. The proposition for the new flow of enrolling into a new course has been made to allow student to easily enroll into courses which was not possible before. Important aspects of the editor role in the system have been identified. However, they require further meetings in Open Agency since there are a number of possible solutions to the identified issues.

Finally, to finish the full UCD process circle, testing of the prototype will have to take place to verify assumptions and design decisions made during the project. Additional iterations will assure that the design is appropriate and the development will then be able to start.¶

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Appendix A. Interviews

A.1 Subject 1

Interview with the CEO of Open Agency, Jitka Kuncarova
Date: 24.2.2016
Language: Czech (later translated into English)

Interviewer: Looking back several years ago, what was the thought behind developing your current learning system?

Kuncarova: This is related to the fact that there was a need to create content to be used for language teaching based on what companies needed. We focused on getting the terminology right and we were looking for a way how to react to the developments in ICT, especially mobile devices and internet. At the same time, we wanted to be tackling the "playfulness" aspect, to make the learning easy and entertaining to some degree since the opportunities for students have changed greatly.

Even then, we knew that teachers were hindering the progress. So due to that, we came up with a system where teachers would not play the key role as a source of information because all the information would already be in the system and that would facilitate the transition of teacher's role. Teachers would not narrate and explain nor they would check students' exercises because the system could do that. But they would become more of guides. They would see students' results in the system, they would know what was difficult for students and they could even predict and make the face to face classes more effective.

When we look at costs of language teaching in Czech Republic, we see that 98% of all costs are going towards teachers. If we give them, and the students, a good tool that takes advantage of ICTs then students can achieve same results with much lower costs and the teachers will be happier as well. But this requires the change of teacher's role.

Interviewer: How would you describe your system called OPEN LEARNING?

Kuncarova: The uniqueness is in the ability to adapt to a change of content which is a key to a motivation for learning of foreign languages. This is a continuity of companies' requirements for workers' language skills. The system is designed as a tool for blended learning. It means that we anticipate that students work in the system during face to face classes as well as outside of the classes. This led us to a decision of creating textbooks that

correspond with the system. They both have the same content structure. This connection between our learning system and our textbooks in unique. What's unique is not only this but also the content and the way we approach teaching with these materials.

Nowadays, students want to be more and more autonomous and with that comes greater responsibility for what they learn and how they learn it. This is the change we see among today's children. Before, they used to listen to teachers and follow their instructions but now, they like to explore and that is what we call constructivism. The children are already familiar with many areas but they add new information to their knowledge foundation and create new links and context. This is how they learn. Not by teachers, telling them everything. The teacher's role is to make the kids explore context and build on top of their existing knowledge. This is the change in learning we are advocating and is tightly knitted with the role of teachers. Naturally, people explore and we want to give our learners freedom, autonomy and not have teachers hinder this process.

Interviewer: What does Open Agency offer?

Kuncarova: First of all, we do not offer just textbooks because we are aware that our mission is to not only to create and sell but rather support the transition of teachers' role and that's the key part. We try to gradually explain to teachers that internet and mobile devices are there and they will not be able to do anything about it. It all already exists and as banks had to adjust their business to these trends, schools have to do the same. And these changes go as far as to the process of learning. Children are the driving force and they are demanding the change but sadly, schools in Czech Republic have not reacted adequately yet. It might be changed by the pressure from children, from their parents, it is hard to guess.

Anyway, we offer development of study materials which we then sell. We offer courses to teachers in a form of methodological sessions but also various practical workshops. Just like a figure skater does not learn how to jump on skates by watching a video hundred times, nor a teacher learns how to change something by only listening someone talking about it. So we make teachers use these materials and then reflect on format of their lectures, how they used it and make them reflect on following workshops and have them see the benefits.

They will not learn anything by reading theory. I was the one who had to read it. To know how to structure units, modules, what kind of exercises to put in, etc. This was at least six years ago. But today, we offer them a complete tool, concept and support. We have to ensure certain integrity and lead the transition but not in a way that they feel like they have been doing everything wrong until now. There needs to be a continuity between past and future. We bring a disruption. Without that, teachers will not explore further their possibilities in teaching and how they organize the interaction between them and their students.

Interviewer: How does Open Agency react to the popularity of various ICTs in schools?

Kuncarova: We would like to be close to students as much as possible but sometime it is difficult as they are sometime not allowed to use their mobile devices in school. They are put into a position where they can only work in our system when they are outside of school. Teachers tell us that students only study at school and are never willing to do anything outside of classroom. But this is simply not true from what we see. We would like to do more but we need teachers on our side. We are only able to do so much without them. The role of teachers is irreplaceable.

Interviewer: Do you know of any issues with the current system? Or have you heard anyone complain about its functionality or bugs?

Kuncarova: I can tell there have been some issues with tasks in the system. A task in each unit is very important for students. It is that our students' language skills vary and with a unified task description we sometime put them into an awkward and complicated position. When teachers know their students, they should be able to modify the description of a task. When a teacher demonstrated the ability to adapt to students' needs, he or she could also be able to change the sequence of units in a module. The situation now is that there are 10 units in each module and students need to go from the first to the last. But not only their language skills but also motivation should lead to the possibility of changing the sequence of units. When students learn about what they can relate to, they are much more motivated to do so.

Interviewer: And what about merely technical issues? Have you heard of any?

Kuncarova: For example the written task. The system sometime timeouts before they submit their work. Also, some of them complain that when they write their text in Word but the formatting disappears when they copy and paste it in the system. But not a lot of complaints get to me. I mostly hear positive feedback about the intuitiveness and user friendliness of the system and that there is no need for manual. For me, it is logical that when I learn, I start with reading exposition, I watch videos, etc. Then I go through exercises and continue to tests. But I hear that some teachers tend to test students first and I don't think that is correct.

Interviewer: Last question, why is it worth to invest into developing your own learning system when there are open source LMSs?

Kuncarova: Our highest value is in the content of the application. I feel like if we put it into a common Moodle-like system, it would be impaired. I do not know if we could keep the control over how many users use our materials. Worst of all, we would lose the control over who accesses the materials. The idea I had in the beginning was to find a strong partner who would finance our activities so that we could offer this for free to all schools in Czech Republic. This does not mean we would lose control over who uses these materials and with

what results. But these thoughts and ideas are far ahead from what the Ministry of Education in Czech Republic has done so far. They have no idea this could be the next step.

Interviewer: Thank you.

A.2 Subject 2

Interview with an English teacher
Date: 26.3.2016
Language: Czech (later translated into English)

Interviewer: Can you please talk about your experience as a teacher and describe the type of courses in which you use OPEN LEARNING?

Interviewee: Sure. I've been teaching for the past 18 years. I taught at a secondary school for 2 years. Then, I became independant. I teach at various companies and organizations so my students are children, policemen, managers etc.

Interviewer: Great. So the spectrum of students you teach is very wide.

Interviewee: Yes. I mostly teach in private sector but I taught my first OPEN LEARNING course at a university, it was one of their requirements.

Interviewer: Ok, so that is how you came across Open Agency?

Interviewee: I'm not completely sure. I remember I received an invitation to some weekend course. Considering the fact that I never really used ICT in my teaching before, it seemed appropriate and appealing. I wanted to learn something new and modern and implement it to my teaching. Since that course I cooperate with Open Agency.

Interviewer: Great. Could you describe if and how the system and the materials simplified your job?

Interviewee: It surely simplified things for me. When students take the online course, I basically do not need to prepare anything. That is great. I'm used to prepare activities for each class, search for extra materials and it requires quite a lot of time. When using OPEN LEARNING, I can skip this part. The class is self regulated in a way. Everybody knows what to do.

Teaching with OPEN LEARNING is quite nice. It does not require so much energy from me and I found that it motivates students. I really do not need to prepare anything. The classes

flow nicely because the structure is set. It gives me space to think of creative activities we can do, etc. I just always felt nice after using OPEN LEARNING.

Interviewer: Wow, great. Did you observe any changes on your students? You mentioned their motivation.

Interviewee: After finishing the course, children told me they actually liked it. I think it is cause by using ICT, computers and such. That's their thing. This way, I could search for other entertaining activities on internet. The students did not experience any troubles, it was very natural for them.

Interviewer: Have you noticed any shift in your role as a teacher?

Interviewee: I don't really teach at schools. The role there is kind of given. My roles changes with the environment in which I teach. When teaching policemen or people from management, I need to adapt to their requirements.

I have never been an authority really. But there is a change because I mostly only advise and steer the focus.

Interviewer: Did your students like that the structure of the courses is fixed and clear from the very beginning?

Interviewee: They like it. They don't expect any surprises or tricks. I felt they were comfortable with it. If they had any problems or questions, I was there to help.

Interviewer: Okay. What are the most common activities you do in the system?

Interviewee: I go there when I need to grade their tasks. Sometimes, we use it together and I play videos for them. I don't do much more because in the tutor's profile they can see all the correct answers on the screen. On occasion, we use somebody's profile to go through the exercises together but only if the person agrees.

So when I login, I usually grade their tasks but I also look at how they work, how much attempts it takes them to finish the exercises and so on.

Interviewer: Thank you. If you had to be critical, is there anything you would mention about the system of the course in general?

Interviewee: Well, some adult students have had problems with recording oral tasks. The technical side of things is not a problem but it's probably their shame. For example, when I taught teachers, they did not want to be seen nor graded. But other than that, I find the system very nice. Everything works very quickly and the technical support is great.

Interviewer: Thank you for your time. That's it.

Interviewee: You are welcome.

A.3 Subject 3

Interview with an English teacher
Date: 21.3.2016
Language: Czech (later translated into English)

Interviewer: Can you describe your experience with OPEN LEARNING?

Interviewee: Sure, about 70% of my work consists of online tutoring. The rest is a combination of teaching other teachers in schools, teaching in companies and even teaching some individuals. Considering this, I have experienced multiple kinds of course.

Interviewer: How does the OPEN LEARNING system affect your role as a teacher?

Interviewee: It fundamentally affects my role. Basically, the given structure of the course serves as a plan for a duration of 3 to 6 months. I don't need to think about the content of the course nor the planning of activities. This allows me to focus only on students. When I find out that certain student has a problem with anything, I can plan the face-to-face meeting accordingly. Whether it is reading, understanding the vocabulary or anything else. I don't need to come up with topics for lessons and think about how much time I can spend on them thanks to the system.

It is great that I see how students work and before I go to the class, I can check if they finished everything they were supposed to finish. This means that I come so much more prepared because I know whether I can continue where we left off.

During different courses, I never knew if students really did their homework and then this actually changed the classroom activities dramatically. The fast that I have this control makes me feel more relaxed and allows me to plan better.

Interviewer: How would you describe your role in OPEN LEARNING courses compared to any other course?

Interviewee: I feel like me and my students are on a similar level. Meaning that they are in control of the activities. When I see they did not finish some part and had some struggles, we know what to focus on together. It is all based on interaction.

When I think about different courses, I'm in the center of everything. I share the schedule and topics with my students but they don't know what to expect exactly. They don't realize the time frame of the course and sometime don't come prepared for lessons.

Interviewer: What are the most common activities you do in the system?

Interviewee: I check my classrooms and see if they did all the work. I look at the dashboard to find out which classroom has most new events and is highlighted orange. I go there because I know there will be some tasks for me to grade. If students don't have the tasks done, I look at their activity and try to figure out where the problem lays.

When I have only one student in a classroom, it's easy but when there are a lot, I need to click on each one to look at their activity and work done. I don't see that right away or in some summary. I don't like that very much.

Interviewer: Great, so we're getting to the issues you've had with the system.

Interviewee: Yes. In the system, I see if a student finish particular exercise but I don't know how many times he or she played the video or even the audio recording. I'd like to have this detailed information but maybe I'm asking too much.

As a matter of fact, it was a topic of a discussion with other teachers. We talked about what blended learning is us and what we'd like in the virtual environment.

Next, I'm not sure if students are somehow notified when I grade their tasks. I think that's very important and motivating for them.

Interviewer: Okay. Would you say the system simplifies your job?

Interviewee: Yes, definitely.

Interviewer: Well, is there anything else that caused issues for your students? And how do they react to some of our rules as a 100% success rate when completing the exercises?

Interviewee: There have not been any problems with that. They click and click until they have everything correct.

Interviewer: Ok, thank you. Do you have any question?

Interviewee: No, thank you. I don't have any other comments.

A.4 Subject 4

Interview with an office manager in Open Agency
Date: 11.3.2016
Language: Czech (later translated into English)

Interviewer: Can you please describe your role in Open Agency and your daily activities?

Interviewee: Sure, I'm an office manager. When I come to work in the morning, I collect all the information about what happened the previous day. I look at the online forms we have on the company website and I go through my emails. I usually find people asking for help regarding the system. They either forget their password and don't know how to retrieve it or teachers ask me how to generate a table with students' results etc. I take care of that first because these courses usually occur after lunch so I want to resolve all issues beforehand.

Interviewer: And what about your other activities?

Interviewee: I have marketing related tasks. I create all kinds of leaflets, edit the existing ones and so on. I take care of invoicing, I communicate with companies and I'm also responsible for the storing of all textbooks in the office. I call to various schools and offer our courses and services. Talking to companies takes up a lot of my time but I also spend some hours organizing the courses - students and teachers need to know when and where to be.

Interviewer: Okay. How would you describe the impression you have from all the feedback you receive?

Interviewee: Well, I don't have any indications that the system is fundamentally wrong, does not work or is poorly designed. People do experience problems. Maybe the system isn't intuitive enough or maybe it's cause by the fact that everything in the system, including the instructions, is in foreign language. People sometimes don't even look at the instructions and read the information that's right in front of them. They prefer to send me an email and ask.

I'd say that if students in schools experience any problems, they complain to their teachers and the teachers then send me emails. Our tutors usually don't have these problems.

Interviewer: That's interesting. Why do think that is?

Interviewee: Students at schools usually don't care and don't worry about anything. That's my impression at least. They don't want to deal with anything. Regarding the retrieving their lost password, I absolutely don't understand that they're not able to do it themselves. Some teachers even send me same question multiple times.

Interviewer: Hm. Earlier, you mentioned you had some list of the most common issues you experience daily. Could you talk about it?

Interviewee: Sure. Let's talk about the email you send them before the course begins. It includes the website where they can sign up and the classroom token for their course. I think students receive your emails but they don't care. They start to care when they're at school and their teachers asks them about it. At that point, they want to me send them the email again.

Next, teachers don't know how to generate the table with students' results. Maybe the system could be clearer about that or maybe it's just that nobody tells the teachers about this feature. And then deleting of invalid test attempts, teachers don't know about it neither.

Another change that would simplify my work tasks is if we could sign in to OPEN LEARNING from just one website. Now, when I go to Engineering technology in English, I sing in on different website than when I go to Basic chemical terminology etc. It really slows me down and some student struggle with it too.

Next, it would be nice if I saw which students have already logged in and which have not. When I receive an email, I don't have much information about their situation and I need to forward it to you. But this might me more about competencies and my current role.

Next, it would great for me to see students' results and be able to generate the tables myself. Sometimes people ask me for it and I need to get in touch with that particular tutor and ask them to generate it for me. And, if the course is expired, I need to contact you to prolong it, then I get in touch with the tutor and things just get complicated. The tutors shouldn't be the only people who are able to generate it, I don't think the current logic is correct.

Another little comment, each course has a access time period which is fine but when it expires and students try to sing in, the system gives them some weird error message like: “No modules available”. They don't know what it means. Instead, it should say something like: “Your access has expired” or some clear message so they know what's going on.

And lastly, I've heard from several teachers that it would be nice if we had some extended text formatting options when grading students' written tasks. They want to be able to highlight words, underline them or even cross them out. The system should allow this. Their workaround is that they copy and paste the text into an email, do it there and send it to the student.

Interviewer: Okay, thank you very much. Anything else you want to add?

Interviewee: I'd really appreciate the possibility to generate students' results. That would help me so much.

Interviewer: Sure. Anything else?

Interviewee: No. I hope this help you.

A.5 Subject 5

Interview with an English teacher submitted by an email
Date: 25.3.2016
Language: Czech (later translated into English)

Interviewer: Please describe the type of courses in which you use OPEN LEARNING?

Interviewee: I use OPEN LEARNING mostly for grading online students but I also taught a few courses which included a combination of online activities and face-to-face sessions.

Interviewer: What is your experience with using OPEN LEARNING?

Interviewee: I'm not completely sure. I certainly taught some younger students. I also taught a course in a company where we had face-to-face meetings twice a week over a period of 12 weeks. During past few years, I taught nearly 80 teachers in various courses.

Interviewer: How does the system affect your role as a teacher?

Interviewee: It varies based on the course. In general, the autocorrecting feature in all exercises in the system saves me time which I can then invest into activities with students (conversation, imitation of various work situation and role playing etc.).

When teaching teachers, courses include parts dedicated to methodology and I often need to explain them the professional aspects of the studied module.

When dealing with younger students, they usually are not familiar with planning their own activities and I need to communicate with them more often.

When teaching in companies, other aspects come to play. For example a hierarchy in the workplace, teaching supervisor and his employee can be tricky.

I would usually check the students' results after a lesson to find out how they worked and to be prepared for next lesson.

I cannot say that the dynamics change with the usage of OPEN LEARNING. Some students preferred to work with a paper textbook, some of them complained about using ICT in a language course. Usually, younger ones perceived it differently and usually did not have many

problems. The advantages are that students can't watch videos and listen to audio recording with paper textbook.

Interviewer: What are the most common activities for which you login the system?

Interviewee: Most of it is just checking of students' work and grading their tasks.

Interviewer: How would you rate your experience with using OPEN LEARNING?

Interviewee: My experience varies depending on the type of course and the students. I prepare differently for each case and I decide how much I can involve using the system while teaching. I always try to highlight the strengths of the system so even the most pessimistic students are eventually convinced to use it.

Interviewer: Can you mention any problem that occurred during using the system?

Interviewee: Currently, one of the weak spots is that I cannot see which students I am supposed to have in each classroom in the system. What happens is that I only see them after they login for the first time. Sometimes, I don't know how many students I'm supposed to grade or I even have empty classrooms. Then, I do not know who to contact, what is going on, how I can help them, etc.

Another pain point is that I cannot send a message to a single student and I need to use my personal email in addition to OPEN LEARNING. I see that as a disadvantage.

Then, the spoken tasks. Some students do not like them and for some older students, it is a serious issue which leads to failure.

A.6 Subject 6

Interview with an English tutor submitted by an email
Date: 29.3.2016
Language: Czech (later translated into English)

Interviewer: Please describe the type of courses in which you use OPEN LEARNING?

Interviewee: I use OPEN LEARNING in corporate courses teaching employees and in courses for teachers who want to be certified. I also started using our new course of Mathematical Terminology to try out new and innovative approaches to teaching.

Interviewer: What is your experience with using OPEN LEARNING?

Interviewee: I am certified in three different modules so far. I taught more than 10 other teachers. I also taught two complete courses which was about 240 hours in total. In addition, I partially taught one course which was about 125 hours of teaching. Also, I lead several workshops focused on use of OPEN LEARNING.

Interviewer: How does the system affect your role of a teacher?

Interviewee: The role is to be advisor and coach. The whole curriculum is clearer and more straightforward than regular setting with classic textbooks. Students are given more space to talk, be creative and use the vocabulary. The planning has been reduced by about 70% so it only takes me like 6 minutes. Most of the activities and the creative process is transferred to the students. It is about using minimum of resources to maximize the outcome.

Interviewer: What are the most common activities for which you login the system?

Interviewee: Thanks to the fact that every unit has the same structure, I do not need to generate many activities during teaching. I can work with students' results. I do not advice much because I am not a dictionary. Students seek actively for answers, I only lead them and encourage them. Students are responsible for their own learning and they decide themselves whether they learn anything. I usually try to break down their results and plan the activities accordingly.

Interviewer: How would you rate your experience with using OPEN LEARNING?

Interviewee: OPEN LEARNING is certainly a working system. It adds to blended teaching experience. I often note that without the our guidance and mentoring to other teachers, the system can easily become another boring material. However, if teachers understand the advantages and the sophistication, it is an amazing tool.

Interviewer: Can you mention any problem that occurred during using the system?

Interviewee: I have a super simple answer. It all starts with users IT skills and a magical sentence: Read the instructions until the end and 99% of your issues will disappear.

A.7 Subject 7

Interview with an English teacher submitted by an email
Date: 31.3.2016
Language: Czech (later translated into English)

Interviewer: Please describe the type of courses in which you use OPEN LEARNING.

Interviewee: I use OPEN LEARNING in a secondary technical school for the third year in row. It is a supplementary educational material for teaching the subject of engineering technology to students from first to third grade.

Interviewer: What is your experience with using OPEN LEARNING?

Interviewee: Each year, I use OPEN LEARNING with two groups. Both have about 15 students.

Interviewer: How does the system affect your role of a teacher?

Interviewee: The system definitely influenced my role as a teacher. It not only made teaching easier but actually allow me the use of CLIL in teaching vocational subject. Planning involves assigning homeworks and determining what we will go through in certain period of time. Especially the younger students favour the system and use the system for mutual competition.

Interviewer: What are the most common activities for which you login the system?

Interviewee: Checking students' test scores.

Interviewer: How would you rate your experience with using OPEN LEARNING?

Interviewee: So far, my experience with OPEN LEARNING has been very positive.

Interviewer: Can you mention any problem that occurred during using the system?

Interviewee: Some students had difficulties logging into the system for the first time.

A.8 Subject 8

Interview with an editor of OPEN LEARNING
Date: January 2016
Language: Czech (later translated into English)

Interviewer: Could you please describe your role in Open Agency and your activities?

Interviewee: Sure, I am the editor and my main task always consists of putting together the modules. This is the most time consuming part of creating study materials in OPEN LEARNING. Basically, I would have a lots of text files from which I needed to create the required exercises, tests, expositions etc. First of all, I had to create a new module, then all units and everything else within those units. To create a module, it would take about two full

days of work. It is not difficult nor it requires intellectual skills. It's just time consuming and repetitive.

After completing a module, my job was to always fix all mistakes other people found. It was things like fixing answers in tests, correcting words etc.

If you want to know, I have a list of recommendations. There is not many, but I have some.

Interviewer: Yes, sure. I was expecting you would have something like that.

Interviewee: Well, there's a list of things that could be optimized or fixed.

When completing a module, there's usually around 300 words in the vocabulary section. To put in a word means to copy and paste the word itself, its translation and phonetic transcription. But sometimes it is up to 5 items for one word. That means that theoretically, I have to copy and paste something 1500 times. The workaround was to create a table with all this information and send it to our developer. He was able to import it into the system.

But I think that the editor should not be dependant on other people. It'd be nice to be able to import such a table with given formatting to the system myself. In fact, it'd be nice to import all of the exercises this way.

Interviewer: Yes, that sounds great. We should certainly discuss the technical feasibility.

Interviewee: Great. Another issue is importing of any media, like audio files. It is now broken and I need to ask our developer to put them in as well. It is another issues that makes everything very slow. I think he has some script because what I do is that I prepare a table where I map the names of the audio files with their position (the unit, etc.). He is then able to import everything.

Next, another important note. When somebody informs me about any mistake, I need to make sure the mistake really exists. The way I do it is that I log in as a student and check it there. But if the mistake is in, let's say, unit 8, I first need to fill out all the prerequisites to have access to the unit 8. This can be very time consuming. Also, when I need to put in any kind of table or an image, I would appreciate if there was some sort of a HTML editor so I can format everything well. This would contribute to the independence of the editor role.

Next, the whole text formatting is broken. When I need to edit something in a previously formatted text, what happens is that I fix it, save it and everything breaks down. Then, I need to start over formatting the whole exercise. This is very annoying.

Interviewer: Thank you. Anything else? I think I'm getting an accurate picture of what needs to be fixed and what the interface should include. But there certainly are technical matters that need to be further discussed.

Interviewee: Great. I think I shared everything that I had prepared. To be honest, the system is very intuitive and does not need any major changes.

Interviewer: Okay, thank you for your time and your insights.

Interviewee: Thank you.

A.9 Subject 9

Interview with an English tutor
Date: 21. 3. 2016
Language: Czech (later translated into English)

Interviewer: Let's start with the experience you have with OPEN LEARNING. Can you describe it?

Interviewee: I actually never taught any course. I stumbled upon OPEN LEARNING course when the company was piloting the module of engineering technology. I was part of that. The structure of the course caught my attention, I liked it and continued learning another modules. So I can only share my experience as a student.

It was something new and very different as opposed to any other online course. I think that the paper textbook was useful and I found it helpful that I could keep it. This way, I could remind myself some of the vocabulary after the course was over. What I also found helpful what the possibility to reach out to the teacher, discuss and receive feedback.

Interviewer: Okay, so you only completed our courses as a student.

Interviewee: Yes, I never taught.

Interviewer: Oh, that surprised me. I was told that you also taught in some courses. Nonetheless, I can ask you some of the questions that I ask other students via an online survey.

Interviewee: Okay, that will be more relevant.

Interviewer: Has the system facilitated your process of learning?

Interviewee: I liked the combination of online and face-to-face learning. It motivated me and I received continuous feedback throughout the course. Also, another way of receiving feedback is the tasks - that's where you get grading and comments from your tutor. That was helpful.

I also like making the videos. Written tasks are important too but I really liked it. Over past 15 years of teaching, I never used this part of recording video of me talking and basically learning individually. I tried it for the first time in OPEN LEARNING course. I understand that some people might struggle or are worried that somebody will see them but it is a nice way of seeing your own mistakes and actually moving forward in learning a language. It was very motivating.

Interviewer: Have you had any issues with the system? Or was anything unclear to you?

Interviewee: Only from the beginning. Some of the descriptions were unclear but the goal of piloting was to find these mistakes and unclarities. Everything was resolved after a discussion. After that, I don't think I had any problems.

Interviewer: How would you describe the importance of your teacher throughout the course?

Interviewee: I had all of the meeting online. I prefered it that way and I did not miss the face-to-face contact. I could complete everything online but I understand that other students might prefer to meet physically and work in face-to-face setting. It is nice that option was there.

Interviewer: And how much did you actually have to spend learning?

Interviewee: The vocabulary was new to me. Some of the modules were easier than other. But in general, if I completed all of the exercises, tests and tasks, I felt like I knew the vocabulary and knew how to use it.

Interviewer: Do you have any reservations about the system? Or do you have any recommendations?

Interviewee: I cannot very well recall everything. It has been some time. Thought, I remember having troubles logging in for the first time. But the support worked well and no issues remained unresolved. I cannot say I perceived any aspect of the course negatively.

Interviewer: Okay, thank you. Do you have any questions you would like to ask me?

Interviewee: No, thank you.

A.10 Subject 10

Interview with an English tutor
Date: 5. 2. 2016
Language: Czech (later translated into English)

Interviewer: What are the most common activities for which you login to the system?

Interviewee: I use the system when I play the audio recordings and videos to my students. For example, in the module of engineering technology it is very useful and demonstrative. Some of the videos in other modules are less fun, people only sit in office and talk to each other.

Regarding the audio, I use it differently depending on the level of my students. When the group consists mostly of beginners, the options are limited and then, it is mostly about what I can come up with. In this case, I did not find it useful to use the system during face-to-face meetings.

Interviewer: So would you say you rarely use the system in face-to-face setting?

Interviewee: Yes, very little. I try to minimize it. Usually, the students are responsible and work home. Then, I see if they struggle or not.

Interviewer: Can you describe a bit more your experience with teaching groups with different language skills?

Interviewee: Well, when I see somebody struggling, we try to focus on it during face-to-face. My style is not to let students figure everything out by themselves. Sometimes, they complain about using ICT in language course because they sit by a computer all day long. In this case, they work with the paper textbook.

Interviewer: Have you ever had any issues with the system?

Interviewee: No, I never had any major issues. It is mostly the opposite and people like the system. Some of them have problems recording the oral task but others like how modern and fun it can be. I once had a student who really enjoyed the course, she was funny and everything. On the other hand, I also had the complete opposite. That student did not like anything, she was always sending emails complaining and asking about everything in the system.

Interviewer: Do you think it would help if students had more instructions in the system?

Interviewee: I don't think so. There have been cases when some student submitted a task and was surprised that it was not graded right away. It simply waited for me to login and grade it. But this happens only on occasion. Maybe the message for students there could be clearer.

Interviewer: Is there anything in the system that bugs you or slows you down?

Interviewee: Some students have had problems with the general navigation, moving between units and exercises so then I needed to show them how to do everything. There was a case when students did not simply understand that they had to click on the next unit when they finished one. Though, this has a lot to do with using computers in general.

Also, it would be nice to only login at one place (website). I teach several courses of Russian and English and sometime, I forget I need to switch to a different website. And lasty, it would be nice to have some sort of notifications.

Interviewer: Like emails?

Interviewee: No, not emails. That would bother me. But I would like to have a clear overview of what is going on in my classrooms when I log in so I don't need to necessarily go through all of them.

Interviewer: Can you talk a bit about your role in OPEN LEARNING courses?

Interviewee: It is always about the extent to which I involve the system in the face-to-face setting. When working with beginners I always spend time explaining everything. But something I noticed is that if students do not have face-to-face meeting, they lack motivation to work in the system.

Interviewer: Ok, thank you for your time. Do you have any questions?

Interviewee: No, thank you.

A.11 Subject 11

Interview with an English teacher
Date: 24. 3. 2016
Language: Czech (later translated into English)

Interviewer: Can you please describe the type of courses in which you use OPEN LEARNING?

Interviewee: I am a teacher at secondary school. I teach services and gastronomy related subjects and that is where I used one of your modules. I have a 2-hour class with my students. We usually spend the first one brainstorming and doing activities while during the other hour students work in the system. In this second part, I only assist and encourage them if they need any kind of help. I also teach in other courses outside of school where I use OPEN LEARNING.

Interviewer: How did you come across Open Agency?

Interviewee: I heard about it in our school. Even before that, I took a course in England and actually tried to put together some materials so I could teach my students something unique by using the CLIL method. I did that for about a year but when I learned about OPEN LEARNING, I was amazed. The materials I prepared were not so great, sometimes they were too difficult for students etc.

Interviewer: Did OPEN LEARNING simplify your job in any way?

Interviewee: It showed me new methods of teaching. It is based on working in groups, in pairs etc. The classes are conceptually different from regular English classes.

Interviewer: Could you elaborate on this a bit more?

Interviewee: The difference is that students are the active ones. They work during the class and it makes my job much easier. I sometimes prepare extra activities but for example, during regular classes I need to be the active one who generates everything but with OPEN LEARNING, these roles completely switch. At least this is my experience.

Interviewer: Can you tell what causes this exactly?

Interviewee: I believe it is the technologies. The children like it. Even students who rarely do anything and are problematic. These ones pick up a tablet and start working. And I check in the system whether they really work so I can encourage students and control their activities. Some students try to cheat but there is not much I can do about it. Nevertheless, the system helps quite a lot but my role as a teacher is still very important. I always need to make sure that they really learnt something.

Interviewer: Can you describe your typical class?

Interviewee: Students still use the paper textbooks a lot. Usually, they prepare all the answers there, some of the part we even do together. Then, they login and work in the system. This way it is much easier for them. But the paper textbook is ideal because of one more reason. When we need to switch rooms, everybody can still continue working in their book.

Interviewer: What are the most common activities you do in OPEN LEARNING?

Interviewee: I always play the videos to my students then the dialog and even vocabulary if I feel like it's needed. Then I look at students' results and grade their tasks. So I use the system both during and after the face-to-face teaching. We usually have time when we have conversations and time when everybody works in the system. Some students also use the system at home but it's up to them.

Interviewer: Has your role as a teacher changed in any way?

Interviewee: It did. I don't need to be so active anymore and I really like it. If all teachers knew how easy this is, every one of them would adopt it. The children changed too. There's less problems with their concentration and their behaviour.

I would really like if there were more materials like the Trade and marketing module. When we finished the module, there was nothing else we could continue with.

Interviewer: Ok, I understand. You are talking about the content of the system. However, were there any issues with the system itself?

Interviewee: No, not really. It is put together very well.

Interviewer: Okay. Has there been anything illogical or confusing or anything that slows you down?

Interviewee: Students don't like the oral task where they have to record a video. But I think that it would be too easy without it. Some of them even asked me if they can finish the course during summer. I was really surprised that they even care about working on it when they're not in school.

Interviewer: Oh, great. But do you think they had problems with it because it might be technically demanding?

Interviewee: No, that has never been a problem. I think it is just unusual for them and it has a lot to do with their self esteem.

Interviewer: Okay, thank you for your time. Do you have any last question?

Interviewee: No, thank you.¶

Appendix B. Students Online Survey

The online form that came with the email contained following fields.
`(English version / Czech version below)`

1. What is your experience like with using the OPEN LEARNING system?

- 1 (positive)
- 2
- 3
- 4
- 5 (negative)

2. Has the OPEN LEARNING system simplified your learning of professional foreign language?

- Yes
- No
- I do not know

3. How do you perceive your progress in learning?

- 1 (substantial progress)
- 2
- 3
- 4
- 5 (no progress)

4. How would you assess the clarity of the OPEN LEARNING system?

- 1 (very easy)
- 2
- 3
- 4
- 5 (very difficult)

5. Please rate the following activities in the system:

(1 - very simple, 2, 3, 4, 5 - very difficult (I needed help), does not apply)

- Understanding the accompanying e-mail before the first sign up
- Login into the system
- Changing my password
- Intuitiveness and logic of the system navigation
- Filling exercises
- Submission of written assignment
- Submission of oral assignment
- Clarity of my results

6. Which kind of exercise was the most difficult for you?

- Selecting the correct answer
- Assigning English / German / Russian equivalents to Czech expressions
- Joining parts of sentences
- Assigning phrases to professional situations
- True / false - finding the right statements

7. Have you used the paper textbook in addition to learning in the OPEN LEARNING system?

- Yes
- Very rarely
- No

8. How important was your teacher during the course?

- 1 - He/she is a very important
- 2
- 3
- 4
- 5 - I could finish the course without a teacher

9. How would you assess the feedback the system gives when working on the exercises and the tests?

- 1 - Everything was clear to me
- 2
- 3

- 4
- 5 - I do not know what I had wrong

10. Did you have any problem regarding the system?

11. Would you change anything about the system?

--- Czech version ---

1. Jaká je Vaše dosavadní zkušenost s využitím systému?

- 1 (pozitivní)
- 2
- 3
- 4
- 5 (negativní)

2. Zjednodušil Vám systém OPEN LEARNING učení odborného cizího jazyka?

- Ano
- Ne
- Nevím

3. Jak vnímáte svůj pokrok v učení?

- 1 (výrazný pokrok)
- 2
- 3
- 4
- 5 (žádný pokrok)

4. Jak hodnotíte přehlednost systému OPEN LEARNING?

- 1 (velmi jednoduchá)
- 2
- 3
- 4

- 5 (velmi obtížná)

5. Zhodnoťte prosím tyto aktivity v systému:

(1 - velmi jednoduché, 2, 3, 4, 5 - velmi složité (potřeboval jsem pomoc), nevztahuje se)

- Porozumění průvodnímu emailu před prvním přihlášením
- Přihlášení do systému
- Změna hesla
- Intuivita a logika ovládání systému
- Vyplňování cvičení
- Odevzdávání písemného úkolu
- Odevzdávání ústního úkolu
- Přehlednost mých výsledků

6. Který typ cvičení je pro Vás nejsložitější?

- Vybírání správné odpovědi
- Přiřazování anglických/německých/ruských ekvivalentů k českým výrazům
- Spojování částí vět
- Přiřazování frází k profesním situacím
- True/false - vybírání správných tvrzení

7. Využíváte při učení kromě systému OPEN LEARNING také papírovou učebnici?

- Ano
- Velmi zřídka
- Ne

8. Jak důležitou roli hraje Váš učitel při průběhu výuky?

- 1 - je velmi důležitý
- 2
- 3
- 4
- 5 - zvládl bych vše bez učitele

9. Jak hodnotíte zpětnou vazbu, kterou Vám systém dává u cvičení a testů?

- 1 - vše je mi jasné
- 2
- 3
- 4
- 5 - nevím, co jsem měl špatně

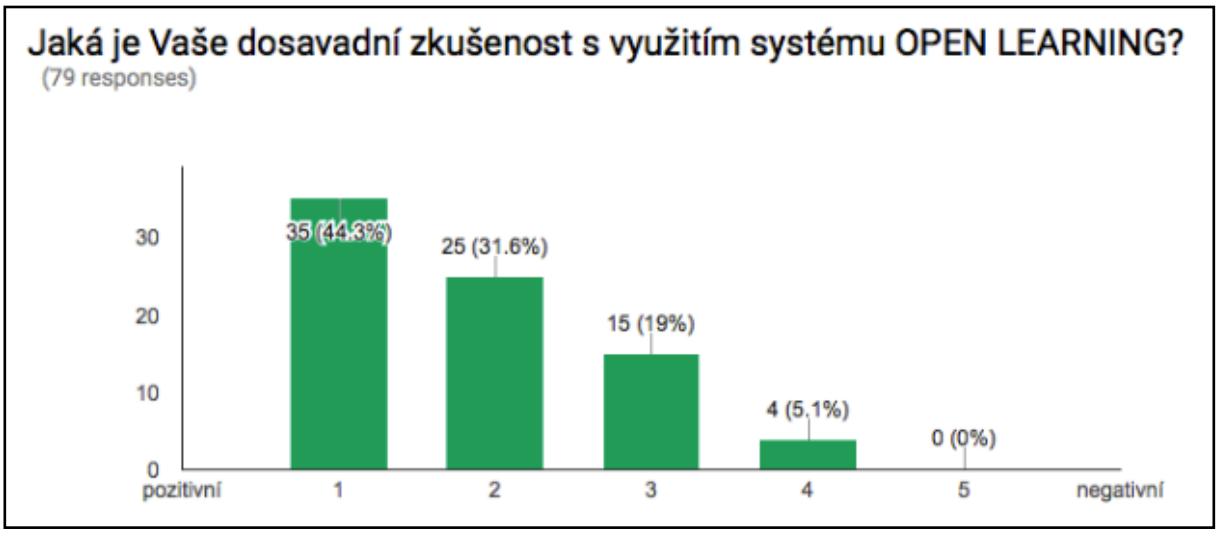
10. Měli jste/Máte v systému s něčím problém?

11. Chtěli byste v systému něco změnit?

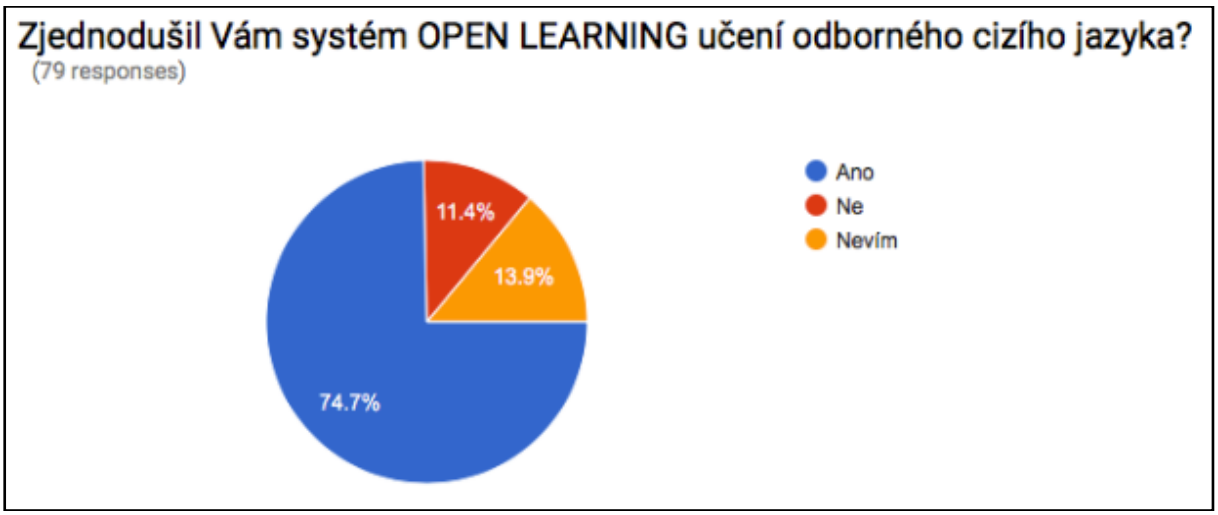
Appendix C. Students Online Survey Results

The answers are in Czech language. I put the original data in the appendix and translate only those that are directly used in the body of my thesis.

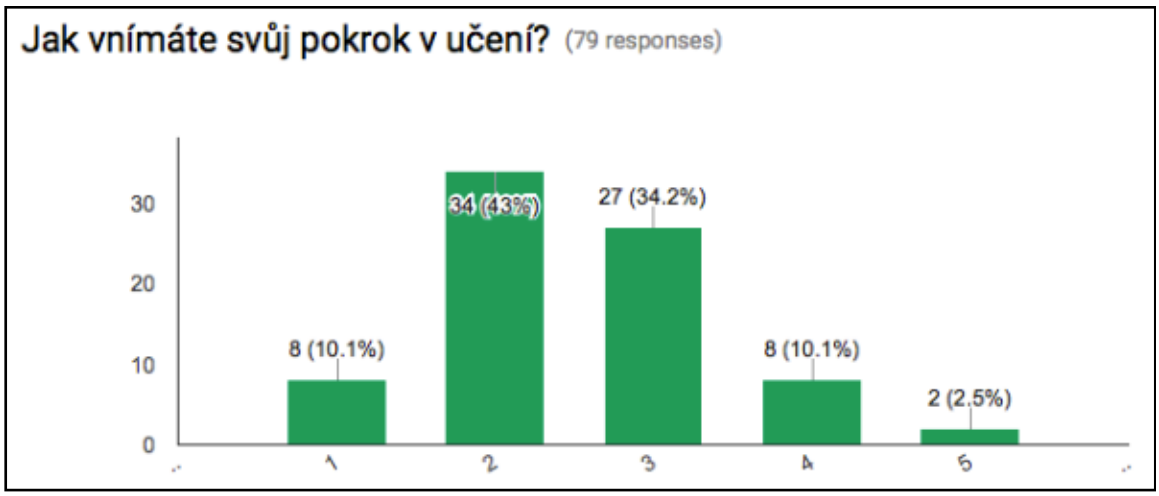
1. What is your experience like with using the OPEN LEARNING system?



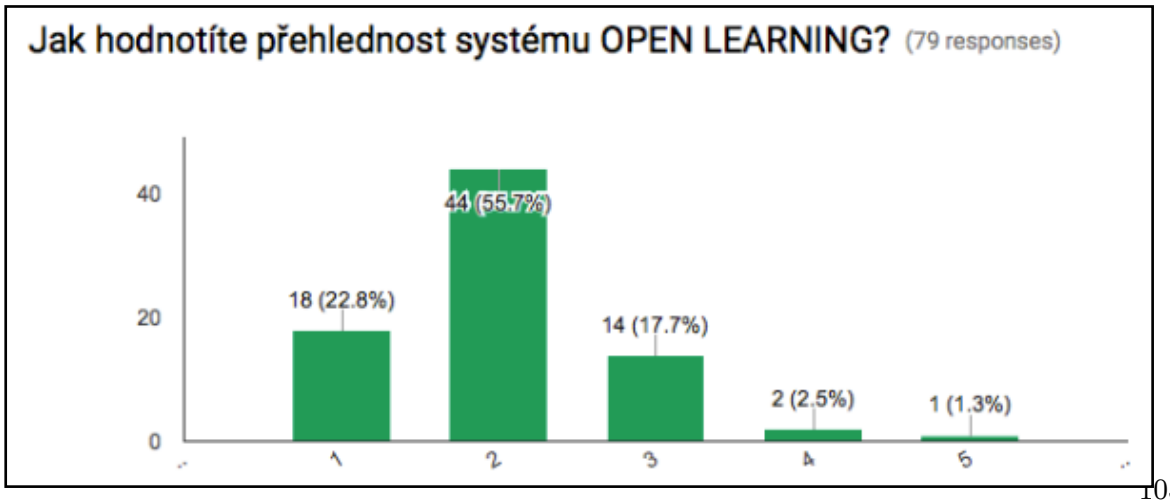
2. Has the OPEN LEARNING system simplified your learning of professional foreign language?



3. How do you perceive your progress in learning?

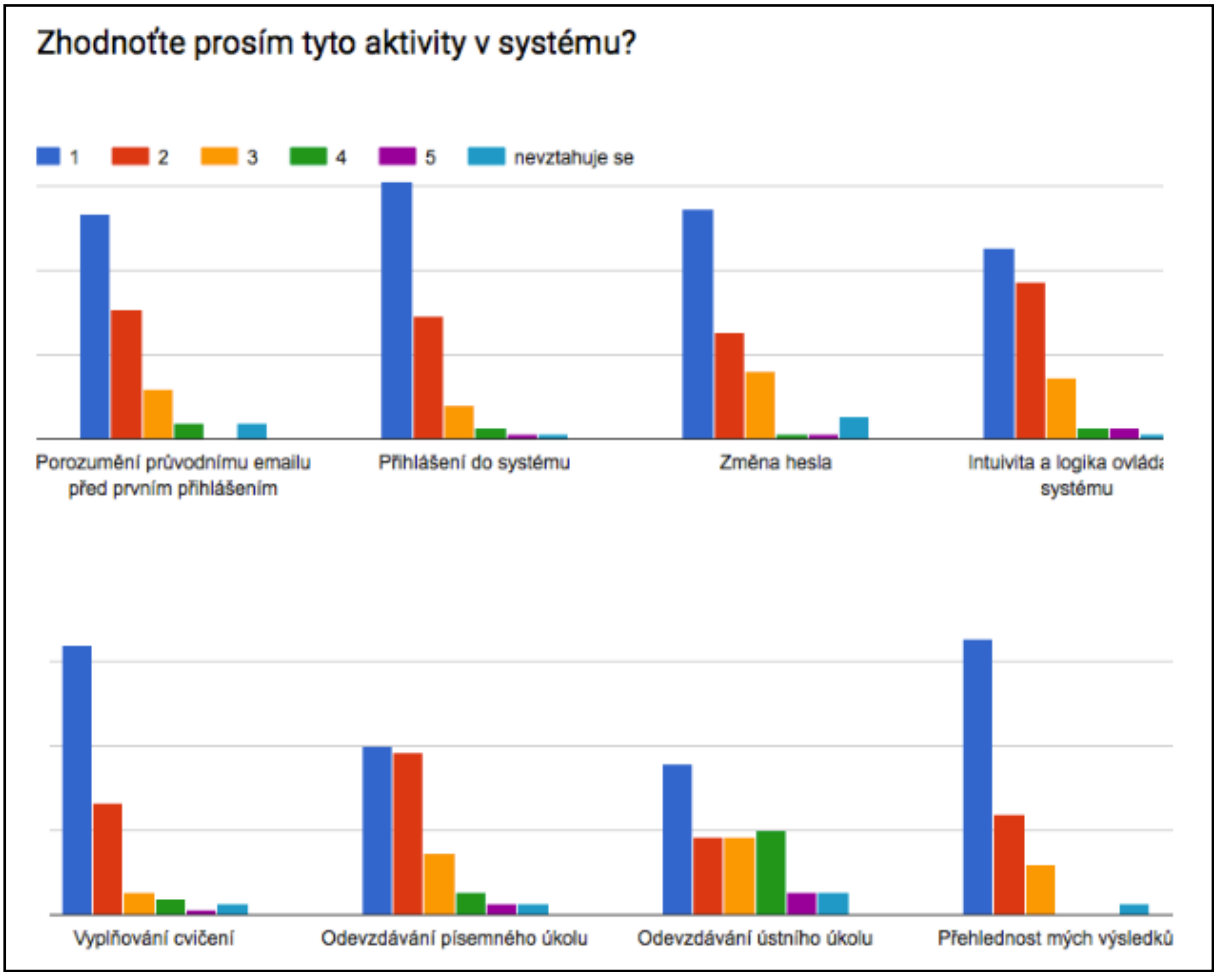


4. How would you assess the clarity of the OPEN LEARNING system?

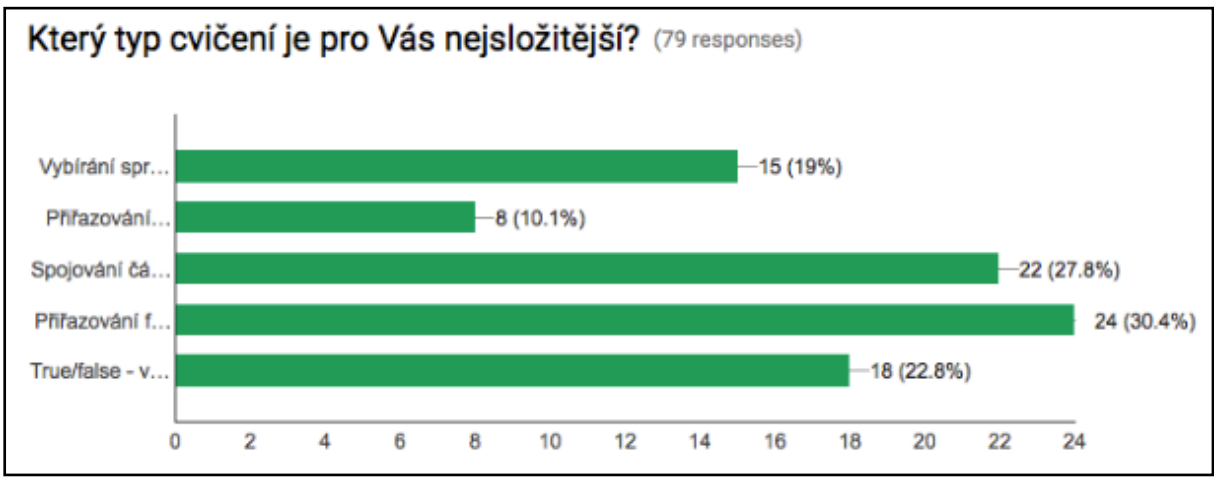


5. Please rate the following activities in the system:

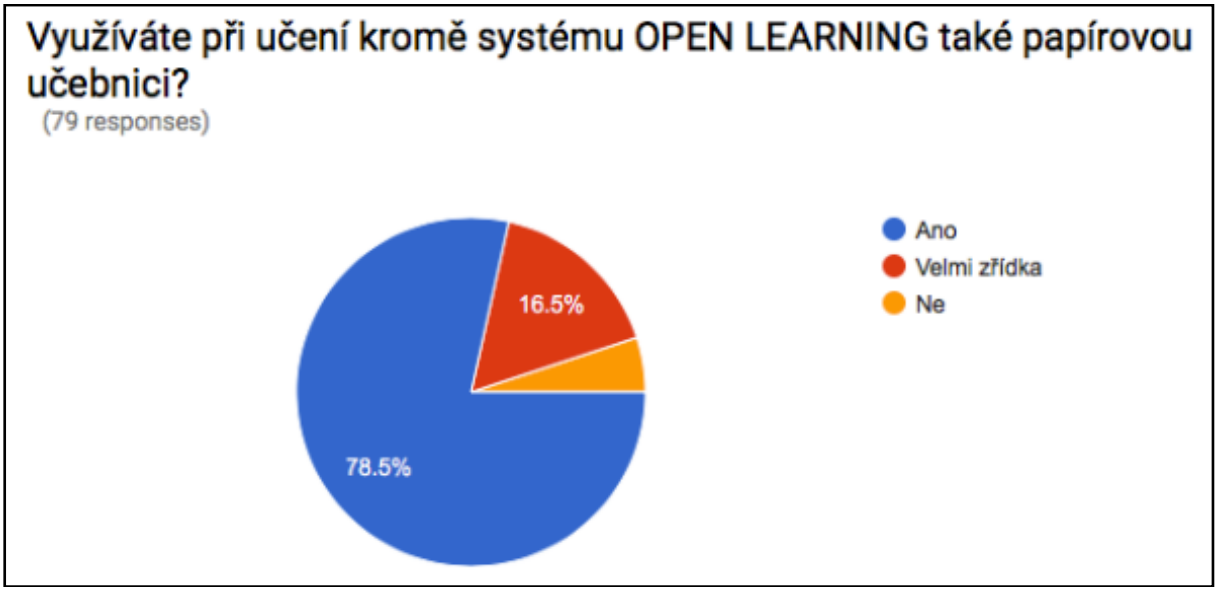
(1 - very simple, 2, 3, 4, 5 - very difficult (I needed help), does not apply)



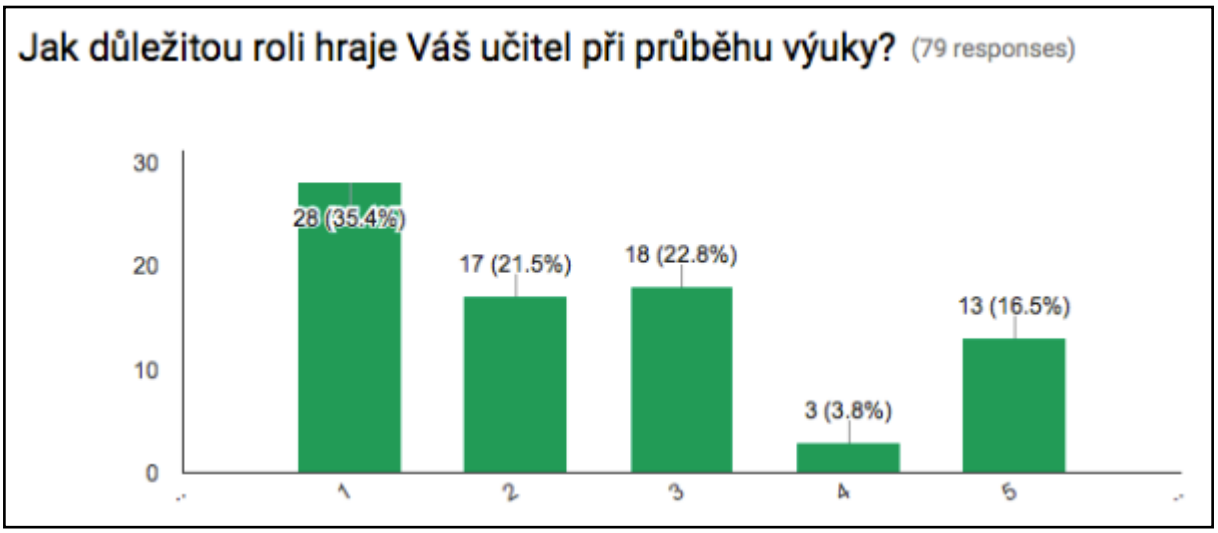
6. Which kind of exercise was the most difficult for you?



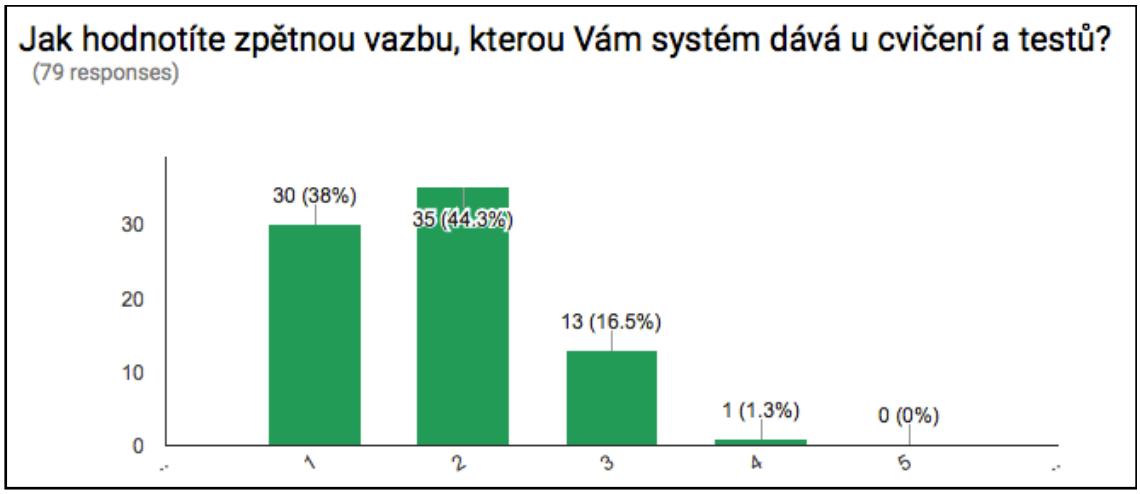
7. Have you used the paper textbook in addition to learning in the OPEN LEARNING system?



8. How important was your teacher during the course?



9. How would you assess the feedback the system gives when working on the exercises and the tests?



10. Did you have any problem regarding the system?

Answer number	Answer
1	ne
2	Ne.
3	Ne
4	Prvotní nezvyk na interaktivní styl výuky, jelikož jsem starší ročník.
5	ne
6	video úkoly. nemám na to techniku
7	Problém mám s celým tímto systémem výuky, aneb zahrajeme si sportku s odpověďmi
8	Ne
9	ne
10	NE
11	Nejsem vyučující cizího jazyka!
12	Systém absolutně nerespektoval mé znalosti. Pokud bych vedle sebe neměla pokaždé dceru, která anglicky umí a vysvětlila mi o co jde a které pravidlo platái při které odpovědi, abolutně bych se nenaučila nic. Myslela jsem, že pokud odúpovím něco špatně, systém to rozpozná a vrátí mě zpět k výuce na daný level. Podobně jako třeba programy na psaní na stroji. Rozpoznají, v čem děláte chyby a pak Vám nastaví výuku.
13	Ne

14	Ne
15	Při opakování cvičení z důvodu chybného vyplnění se stornovali správné odpovědi!
16	U některých cvičení chyběly nahrávky
17	Ne a pokud ano, nebyl vážný
18	Ne
19	Ne
20	Ne
21	Bohužel jsme měli menší znalosti NJ a s úkoly jsme se dost prali.
22	ne
23	ne
24	V nahrávkách nemluví rodilí mluvčí
25	Nezobrazovali se mi správné výsledky
26	Ne
27	Nahrávání ústních cvičení do systému.
28	video task
29	ne
30	ano testy nejsem dostatečně připraven po projití lekce
31	Ne
32	Ne
33	nemohu si zatím nic takového vybavit
34	Objevilo se pár chyb.
35	Ne, pouze jsem si Å¡patnÄ› naplÃ¡novala Äas projÃt celÃ½ program
36	Ne
37	Se špatnými odpověďmi, které nebyly přes upozornění opraveny.
38	Né moc ne
39	ne
40	Nemyslím si
41	ne
42	Ne, ale stále mi nejvíc vyhovují prezenční kurzy s rodilým mluvčím (lektorem)
43	ne

44	ne
45	video
46	At the beginning i had problem to find way to exercise
47	V případě, že je odeslán písemný nebo ústní úkol, nelze už ho pak upravovat, dokud není opraven učitelem.
48	ústní úkoly a nahrávání do systému. Bylo to velmi složité.
49	Ne
50	Mimo technických problémů ne.
51	ne
52	Ne
53	složité vkládání videoúkolu
54	ne
55	Ze začátku s nahráváním ústních úkolů.
56	v obchodní ruštině byla spousta gramatických chyb, občas ve cvičeních nebylo možné přiřadit všechny možnosti tak, aby byly správně
57	Ne
58	ne
59	Systém byl uzavřen o 1 den dříve než bylo avizováno, s čímž jsem nepočítal.
60	S ničím jsem problem neměl
61	Ne
62	ne
63	ne
64	No problem
65	Ne
66	NE
67	ne
68	Ne
69	Ne
70	Ne.
71	ne, snad jen - technický- s ústním cv.
72	ne

73	Přihlášení se
74	S videem
75	ne
76	neměla
77	Ne, s ničím jsem v systému problém neměl.
78	ne

11. Would you change anything about the system?

Answer number	Answer
1	neměnila bych
2	Nahrávky by měly být od rodilých mluvčí.
3	Ne
4	Více ústní komunikace s učitelem v angličtině.
5	ne
6	aby v učebnici nebyly ty samé úkoly jako za domácí úkol
7	doporučil bych zrušit tento zbytečný rodinný podnik na ždímání peněz poplatníků z ČR a EU
8	Ne
9	ne
10	Více prostoru při vkládání písemné práce, v tišněné učebnici překlad slovíček do češtiny
11	Nejsem vyučující cizího jazyka!
12	Od základu by se mělo změnit vše. A to - výuka, procvičování, test, vyhodnocení a opět nácvik chyb, aby došlo k porozumění a fixaci. Na internetu je k dispozici mnohem více kvalitnějších výukových programů.
13	Rychlý skok ze zcela triviálního na složitější učivo.
14	Ne
15	Zanechat správné odpovědi při opakování cvičení.
16	Ne
17	Nemohu odpovědět, nemám dostatek zkušeností
18	Ne
19	Ne

20	Ne
21	ne
22	ne
23	ne, ráda bych se zúčastnila dalších cvičení
24	Zjednodušit systém vkládání videí
25	Ne
26	Ne
27	Vyšší odbornost + větší procvičování.
28	zrušit video tasky
29	úroveň jazyka byla pro mě příliš jednoduchá
30	Chtěl bych změnit přehlednost systému a zadání úkolu v aj je promě velmi sloité pochopit dejte to do čj alespon něco díky moc
31	Ne
32	Ne
33	I fráze by mohly být s možností poslechu anglické verze
34	Ne.
35	Možnost prodloužit čas na vypracování cvičení
36	Ne
37	Formulaci otázek. Pokud je otázka formulovaná nejednoznačně, je těžké na ni správně odpovědět. Někdy to ani není možné, viz odpověď výše. Pak nastává situace hledání "správné" odpovědi podle Vás, ale špatné z pohledu, v našem případě, strojařských pojmů.
38	Asi ne
39	ne
40	Vadí mi ústní část - nahrávka videa.... odstranit tuto část
41	ne
42	Polovina kurzu by mohla probíhat v rámci prezenčních kurzů.
43	poslech - TxF, měnit otázky, jinak na podruhé má každý 100procent
44	ne
45	nevím
46	nope

47	Aby byla možnost měnit písemné a ústní úkoly, i když už byly odeslány ke kontrole. V případě, že si student uvědomí, že udělal v úkolu chybu, nemůže ji už zmenit, dokud není původní verze opravena a případně neschválena.
48	Mít možnost digitálního slovníčku.
49	Ne
50	Nejsem schopna posoudit.
51	ne
52	Ne
53	v poli pro odeslání úkolů tutorovi by se mělo zachovávat formátování tak, jak je text vkládán - vžy se zruší a je nutno vše ručně opravovat
54	ne
55	Ne.
56	ne
57	Ne
58	méně ústních úkolů
59	Učivo je opravdu náročné, možná by mohly být úvodní lekce lehčí.
60	Není co
61	Ne
62	nevím
63	ne
64	No change
65	Všechny úvodní texty by měly být namluveny rodilými mluvčími.
66	NE
67	ne
68	Ne
69	Ne
70	Ne.
71	vynechat ústní cv.,
72	ne
73	Dílčí hodnocení s certifikáty
74	Rozdělení podle jazykové úrovně

75	ne
76	Myslím, že systém je dokonalý.
77	Ne, nic bych v systému nechtěl změnit.
78	ne

Appendix D. Teachers Interview Guide

Interviewee information

- Name (voluntary)
- Date of the interview

Introduction to the interviewee + brief "warmup" conversation

- Asking for permission to record, start recording
- Talk about the purpose of my project
- Mention the reason why I talk to them
- Explain how the interview will go and that they can ask questions at any time

Questions:

- The settings in which they use OPEN LEARNING (school, company, etc.).
- What is their experience with using OPEN LEARNING (how many taught courses, etc.).
- Does the system have any influence on the role as a teacher? Please explain.
- Has the system simplified their job in any way?
- How do they plan before/after class/face-to-face activities?
- What are their most common activities in the system?
- How would they rate their experience with the system?

Optional questions:

- How do the materials and textbooks differ from what you have used before?
- What they like the system to be more flexible?
- Do they have experience with any other learning system/application and how do they compare it to OPEN LEARNING?

Appendix E. Email to Students

The following email was sent on March 21, 2016 to all 753 participants via MailChimp.
`(English version / Czech version below)`

Hello,

During the last 12 months, you have participated in one of the language courses offered by Open Agency. Your feedback is very important to us and therefore we turn to you with a request to fill out the following questionnaire:

Link to the questionnaire here.

To fill it out will not take more than a few minutes. The collected data are anonymous and will serve for purposes of my Master thesis at Aalborg University in Denmark, to modify the educational system OPEN LEARNING according to your wishes and requirements.

Thank you,
Zdenek Kunčar

`--- Czech version ---`

Dobrý den,

V posledních 12 měsících jste se účastnili jednoho z jazykových kurzů nabízených Open Agency, s.r.o. Vaše zpětná vazba je pro nás velmi důležitá a tudíž se na Vás obracím s prosbou o vyplnění následujícího dotazníku:

Odkaz na dotazník zde.

Vyplnění Vám nezabere více než pár minut. Získaná data jsou anonymní a poslouží, v rámci mé diplomové práce na Aalborg University v Dánsku, k úpravě výukového systému OPEN LEARNING dle vašich přání a požadavků.

Děkuji,
Zdeněk Kunčar

Appendix F. Email to Teachers

This email was sent out on March 18 to teachers I previously chose.
`(English version / Czech version below)`

Hello Mr. / Ms. XXX,

I'm currently working on a new version of the OPEN LEARNING system within the scope of my Master thesis at Aalborg University in Denmark. I am writing to you because of two things.

1. I would like to ask you for about 30 minutes of your time during next week. Monday, Tuesday, Wednesday, or Friday. The time does not matter to me. I have prepared a few questions for you and I would like to record our interview. I'm interested in your experience with teaching and using the OPEN LEARNING. The aim of my thesis is to adapt the system according to your ideas and feedback so there are no right or wrong answers.

2. In case you are interested, you can check the questionnaire which I will be distributing to students who have completed one of our language courses. Here is the link:

Thank you.

Best regards,
Zdenek Kuncar

`--- Czech version ---`

Dobrý den, pane/paní XXX,

pracuji na nové verzi OPEN LEARNING v rámci své diplomové práce na univerzitě v Aalborgu v Dánsku. Píšu Vám kvůli dvěma věcem.

1. Udělal/a byste si na mě čas (cca 30 minut) někdy příští týden? Pondělí, úterý, středa, nebo pátek. Na čase nezáleží. Mám pro Vás připravených několik otázek a rozhovor bych si nahrál. Jde mi primárně o Vaše zkušenosti s výukou a systémem OPEN LEARNING. Cílem je upravit systém podle Vašich představ a zpětné vazby, takže neexistují správné a špatné odpovědi.

2. Pokud máte zájem, můžete zkontrolovat dotazník, který budu rozesílat studentům, kteří prošli některým z našich kurzů. Zde je odkaz:

Děkuji.

S pozdravem,
Zdeněk Kunčar