UP TO UNIVERSITY PROJECT PILOT OUTCOMES FROM LITHUANIA: ANALYSIS OF GATHERED DATA AND LESSONS LEARNT

G. Cibulskis, A. Urbaityte
Kaunas University of Technology (LITHUANIA)

Abstract

The project “Up to University” (Up2U) funded by EU programme Horizon 2020 aims to bridge the gap between secondary schools and higher education and research by better integrating formal and informal learning scenarios and adapting both the technology and the methodology that students will most likely be faced in universities. Project consortium is developing Next Generation Digital Learning Environment (NGDLE) for Schools - an innovative ecosystem that facilitates more open, effective and efficient co-design, co-creation and use of digital content, tools and services adapted for personalized, collaborative or experimental learning by students preparing for university. Created platform and services are tested in the large-scale pilot activities across the Europe. Development of national Up2U infrastructure for Lithuania is implemented by Kaunas University of Technology and Lithuanian Research and Education Network LITNET. To leverage Up2U national infrastructure an online Continuing Professional Development (CPD) program for teachers was designed with the aim to provide with opportunity to all interested educators to learn how to use developed services regardless of living place and at more flexible time schedule. First iteration of CPD Module 1 attracted 166 participants from 102 schools and proved to be successful with completion rate of 62%. A lot of interesting data has been gathered during this first iteration of CPD with more than 1,4K posts created in discussion forums and ~4K statements on average created daily in the Learning Record Store. Every active participant spent 15 min. on average during one visit and made 21 actions per visit. Different methods and tools are employed and tested for statistics and learning analytics data gathering. Those endeavours are aimed at analysing pilot data and at creating solutions that would be useful to ordinary teachers and school administrators. Work is still in progress, but some insights are already available and will be presented at the EDULEARN conference.

Keywords: Next Generation Digital Learning Environment, Up2U, course, distance learning.

1 INTRODUCTION

Project “Up to University – Bridging the Gap between Schools and Universities through Informal Education (Up2U)” is offering Next Generation Digital Learning Environment (NGDLE) to schools, that would help teachers to provide students with knowledge, skills and attitudes necessary for successful studies at University. Development of national Up2U infrastructure for Lithuania is implemented by Kaunas University of Technology (KTU) that serves as a technical centre of Lithuanian Research and Education Network LITNET. Initially, seven schools were invited to join the project and pilots, but the ultimate goal is to develop a national infrastructure for Up2U services, that would allow every school to get its own virtual learning environment with integrated tools from the Up2U Application Toolbox. This has been discussed in several meetings with representatives from the Centre of Information Technologies in Education at the Ministry of Education and Science and is confirmed to be in line with another national project where eduroam WiFi and identity provision (IDP) services are planned to be developed for Lithuanian schools. As far as Internet services are provided to schools according to signed agreements with the KTU LITNET technical center, it is agreed that the Up2U services are incorporated into a separate addendum to the standard agreement to minimize administrative efforts. The national Up2U infrastructure will be integrated with a developed IDP portal via Single Sign-On, which is planned for the second half of 2019. A national infrastructure has been launched with a multitenant Moodle as a core service integrated with H5P, Knockplop, eduOER and PersonalRecorder. Few other tools are planned when IDP portal will be ready and SSO service will be available.

The goal of NGDLE in the learning process is to help integrate non-formal and formal learning and to develop students’ self-learning skills. Independent self-learning is important, as the development of technologies and tools opens up opportunities to use teaching and learning organizational forms that
allow to learn at a distance by applying interactive activities and innovative learning tools. The success of the proposed NGDLE in the training process depends on the teachers' ability to use the various offered tools and to combine different learning methods and scenarios. In order to promote Up2U national infrastructure, an online Continuing Professional Development (CPD) program for teachers has been developed to enable all interested teachers to learn how to use NGDLE purposefully and to gain knowledge and skills they need, regardless of their living place and enabling them to learn at a convenient time and pace. At the same time, it intends to create conditions for teachers to test and practice themselves and evaluate NGDLE from the learners’ perspective. The aim of the curriculum is to provide the knowledge and skills needed to organize and manage the learning process (preparation and delivery) in a digital learning environment by selecting appropriate learning scenarios and appropriate tools. The application of NGDLE in the learning process is relevant to educators from all over Lithuania, therefore the CPD Module 1 of the teachers was carried out in face-to-face and later – at a distance.

The aim of this study is to present the experience of the Up2U pilot group in Lithuania on the training course infrastructure based on statistical and learning analytics data. The study consists of data from virtual learning environment, user’s activity indicators, results analysis, and quantitative survey of participants.

2 ORGANIZING ONLINE LEARNING PROCESS

The teaching process focuses on individualized learning, reflecting the integrative links between subject programs and the relationship between subject and student life environment, i.e. the learning process should include learning objectives that match the learning experiences and needs of each learner, allow and encourage students to learn independently from place and time [3], developing individual skills. In the learning process, the teacher must be the organizer of the learning process, the consultant, but not the knowledge provider. 21st century learning competencies include relevant curriculum content, the development of different levels of thinking abilities, the integration of learning content with other subjects, continuous learning, but the most important competencies being developed are learning to learn and developing personal competences [4], i.e. ability to learn independently.

Learning through Information and Communication Technologies (ICT), as well as distance learning, creates particularly favorable learning opportunities, developing key competences as learners’ ability to work independently i.e. their ability to learn because, in distance learning, there is no direct contact with teacher who organizes all the learning. Therefore, the proper organization of the educational process, the choice of appropriate methods and tools to achieve targeted competence development is important [7] [4].

Scientist M’Naught (2001), with regard to distance learning, distinguishes the following criteria for the quality assessment of distance learning:

- meeting the needs of learners with different learning styles;
- promoting effective learning;
- responsible teamwork for designing learning content;
- cooperation and problem-solving plans and activities for organizing learning;
- a modular, segmented learning content design model, where students need to demonstrate the expertise of each model.

Quality assessment criteria for distance learning can be divided into three main groups: development and maintenance of distance learning organization system, composition of e-learning content and various additional tools, the role of the distance learning curator.

Scientists point out, with regard to MOOCs, the importance of integrating appropriate learning objects in online courses. Properly selected and presented learning objects helps to improve the learning process and provides much more informative, memorable and responsive learning material [1]. Good delivery requires a proper model of communication with the participants [2]. However, scientists, often criticize MOOCs for overwhelming student dropouts - about 90 percent of all participants usually do not complete the course. All this leads to a negative quality of the provision and evaluation of the MOOCs.
To sum up, in order to achieve an effective learning process through the use of ICT while developing learners’ key competences (self-study, learning to learn, continuous training), it is important to create conditions for interactivity between the participants and with the teacher, which ensures comprehensive support and human connectivity and also takes into account the attraction and retention of participants course factors, meeting the needs of participants, and taking into account motivational approaches and actively using them.

3 LEARNING PROGRAM AND REALIZATION OF TRAININGS

In order to increase teachers’ motivation and engagement, CPD Module 1 was developed and accredited as an official teachers’ Qualification Improvement Program named “Organization and Management of the Learning Process in the Digital Learning Environment”. Based on this program, the online MOODLE course is designed. That’s 30 hours curriculum that aims to improve teachers’ competences through the use of ICT learning tools in educational process and to develop skills for delivering and organizing learning process in a digital learning environment, by integrating both traditional and non-traditional learning methods. The program aims to familiarize teachers with the design of the digital learning content, it’s application and the design of learning process in a digital environment, with a particular focus on practical work: how to anticipate and apply learning scenarios, how to create learning materials, use self-assessment and assessment tools and how to choose right tools for specific purpose.

The program is designed so that teachers have to practice themselves by learning to use various tools in the digital learning environment and would be able to independently identify advantages and disadvantages of learning process offered by NGDLE and to apply it purposefully. The program is relevant to educators from all over Lithuania. Therefore, its delivery is planned in advance both face to face and at a distance. Training is organized on CPD dedicated Moodle instance (https://mokymai.vma.lm.lt) of Up2U national infrastructure where participants were able to get acquainted with NGDLE and test its features and tools.

The first trainings of participants took place in 2018. November – December in the form of six face-to-face training sessions. The trainings were conducted in the traditional way: teachers listen and repeat lecturer’s demonstrated actions on their computers. For practicing with NGDLE, each participant had to create their own practice course - an environment in which they could successfully construct their learning process and then apply it in their classroom.

The second trainings were conducted on 30 January - March 1 of 2019 as a fully online course. In this online learning experience teachers were provided with materials, examples of learning activities as well as with assignments and detailed instructions on how to implement them in NGDLE. Teachers acquired knowledge and practical skills through intensive and consistent work: 10 hours of virtual meetings via Adobe Connect and 20 hours were dedicated to independent analysis of theoretical material and implementing practical assignments (realization of the learning scenario) in a digital learning environment. Consistent consultation via private and group messages as well as forums with the program tutors – e-learning experts and with the peers. There were 43 activities and 97 resources used for the learning in the online course (Fig. 1).

Figure 1. Activities and Resources in the Online Course
The online course is composed from four main parts - learning topics. Each topic is implemented as follows:

- Discussion forum, where participants can discuss on the various questions of this topic and consult with peers or course;
- Presented learning materials by using activities and resources: “Book”, “File”, “Page”, interactive content – H5P and etc.;
- Active practical training activities, incl. testing of various tools from the learners’ perspective in a variety of simulated situations, and performing practical tasks for each participant's practice course, i.e. by developing and testing different tools for realization of his own learning scenario;
- Recordings of live webinars where the learning materials are provided by presenting the core principles of the topic, explaining assignments, collecting the feedback and answering questions of participants;
- Self-assessment test, which allows participants to test their understanding of the learning topic.

In order to achieve effective self-study, the completion tracking has been activated for all 55 activities in the course. This is an automated completion marking when certain operating conditions are met, such as a test done, an entry posted, assignment uploaded, and so on. The completion fact of the acquaintance with resources could be marked by the participants themselves after the resource was opened. Not all course material was opened from the beginning: every week a new topic was unveiled together with practical activities related to it. Some of the activities could only be accessed by the participants after the completion conditions of previous activities are met. To successfully complete the course, course participants had to mark 85% of all tracked activities and resources and set up their own practice course, which at the end of the course had to be shared with other participants for peer review and feedback. Creating a course of practice and realizing learning process by using activities and resources described in the theoretical part is the result of successful completion of the course and CPD Module 1.

The use of various learning activities and resources together with recordings of live webinars allowed participants to learn in a flexible way on their own time, space and pace. Limitations applied, completion tracking, and proactive learners support system have led to higher engagement and consistent learning. At the same time, the realization of this learning process also revealed the potential of this online program and allowed participants to test out possible learning scenarios for NGDLE immediately.

4 ANALYSIS OF THE DATA OF THE LEARNING PROGRAM

4.1 Face to face delivery of learning program

The first group of participants was gathered only from Kaunas region, so that everyone could come and participate on-site. 15 teachers from 10 different schools participated in the trainings. We couldn’t accept more participants as the training took place in a computer classroom with 15 computerized places. Pedagogical experience of the participants ranged from 11 to 35 years. There were 11 teachers from secondary schools and 4 from primary schools.

Average attendance of participants was 72%. 14 participants successfully completed trainings. Results of the survey showed that the trainings were useful for the participants, they gained a lot of theoretical knowledge and practical. Training was rated as 5 - very good - 61.5% of participants, good - 30.8%, average - 7.7% of participants, (average assessment 4.5 on a 5-point Likert scale).

Besides good evaluations some shortcomings where mentioned: "Inconvenient time of training sessions", "There could be a slight slower pace of teaching", "Taking into account the level of computer literacy of learners, not always succeeding in keeping up with teaching pace", "Need more time for going through learning materials", "I'm satisfied with these teachings, it is only a pity that they were organised at the end of the working day, when a person is already tired and it is difficult to get the maximum attention". The shortcomings expressed by the participants indicate that distance learning is a better way for them to learn, which allows participants to learn at their own pace and at a convenient time.
4.2 Delivering of online learning program

There were 166 teachers from 106 schools in different Lithuanian regions enrolled in the online delivery of the program (Fig. 2).

4.2.1 Participants data

Teachers aged between 26 and 64 years attended the training, with an average age of 47 years. 86% of women participated in distance learning, 14% - men. Most teachers (70%) have 15 to 30 years of teaching experience working in secondary and primary education, of which 4% also work in other types of educational institutions or work in several different types of institutions. Most of the participants are teachers of Informatics technology - 52% of all participants and mathematics teachers - 24%, fewer other subjects - teachers for Natural Science, Primary Education, Language, Economics, History and other formal or informal teachers (Fig. 3). This distribution of teachers by subject was determined by published training information. The invitation to online program was shared only with the Math and IT Teacher Groups on Facebook.

On average, one participant in the last 5 m. has completed ~ 9.8 pedagogical competencies and 8.9 ICT competence development courses. This shows that teachers consistently develop their competencies and actively participate in pedagogical and ICT courses in order to improve and learn new teaching methods.

4.2.2 Analysis of training course data

The online learning course was active for 4 weeks. Every active participant spent 15 min. on average per one visit and made 21 actions per visit. 1463 posts were posted in discussion forums, including 14 course announcements published by course tutors. However, the course participants were given the opportunity to discuss and communicate with other tools, including: interpersonal messages, synchronous communication tools like Chat or KnockPlop, comments block, and course group messages. Communication was active in most of the tools, e.g. group messages includes 230 entries, of which 182 course participants communicate in a common course group.
Table 1 shows that the course participants were active in other activities, including 114 entries in the Database tool, and 149 concepts in the Glossary. 856 attempts were made in self-assessment tests, which shows that on average one test per participant was 1.2 times the total number of teachers involved in the course. It can be said that such successful course activity was determined by the intensity of the course, the use of active learning tools and methods.

<table>
<thead>
<tr>
<th>Number of Activities Used</th>
<th>Number of activities</th>
<th>Amount of posts in forums</th>
<th>Forum (not News)</th>
<th>Forum (not News) posts</th>
<th>Quiz attempts</th>
<th>Questions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of forums and posts</td>
<td>Number of forums</td>
<td>12</td>
<td>Amount of posts in forums</td>
<td>1463</td>
<td>Forum (not News)</td>
<td>11</td>
</tr>
<tr>
<td>Quiz</td>
<td>4</td>
<td>Quiz attempts</td>
<td>856</td>
<td>Questions</td>
<td>39</td>
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<tr>
<td>Glossary</td>
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<td>Entries in Glossary</td>
<td>149</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
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<td></td>
</tr>
<tr>
<td>Database</td>
<td>1</td>
<td>Added entry</td>
<td>114</td>
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</tr>
</tbody>
</table>

The training course was successfully completed by 106 teachers, of whom 31 expressed their wish to become a member of the CPD Module 2 and become an initiator of NGDLE at their school, through training and counseling with colleagues.

4.2.3 Data analysis of the participants' practice courses

The aim of the training is to develop the competencies of teachers by successfully using the tools and tools of NGDLE to develop, organize and manage the learning process. Whether the goal is achieved we can determine by their practice courses, which teachers have consistently constructed during all training sessions. Participants have been consistently learning in each part of the course how to develop learning contents, what activities and resources to use, what possible scenarios can be implemented, etc. Each participant initiated his own course in the learning environment and then, following by learning topics consistently learn how to add specific content, include resources, create activities and organize communication. At the end of the course, some examples of possible learning scenarios were provided to the participants to adapt or improve their courses and to organize the learning process with their learners. During the online delivery, a total number of 125 practice courses were created and implemented in the learning environment, where over 25 different digital tools offered by NGDLE were used for the realization of the learning process. In total, 825 activities and 860 resources (Figure 4) were created in the practice course. The activities were mostly tested and created by discussion forums, which were used 208 times (24% of all activities), 79 of them used Forum, H5P - 19%, Assignment and Quiz - 15%, Choice is a least used activity - 1%, Wiki and Feedback - 3%. For the presentation of learning materials, the most commonly created File - 28% of all resources used and URLs - 21%, at least - Folder (3%) and IMS Content (0%) (Fig. 4). Activities are reflected in the activity records: 41 – Glossary with 93 concepts included; Tests included 393 test questions and 101 attempts to take those tests; 74 posts posted in discussion forums.

Figure 4. Activities and resources of the practice course for training participant
Selection of activities and resources in practice courses shows that teachers mostly see Digital Learning Environment as a tool for learners testing, organising submission of assignments, giving tasks to the learners and implementing interactive content for activities and self-assessment. Presentation of learning material reveals the importance of sharing learning materials with learners.

4.2.4 Empirical research results

In order to clarify the use of digital technologies and tools for learning participants in the learning process before starting training and at the end of training, and in order to assess the effectiveness of the Up2U system offered, participants were provided with a survey at the beginning and end of the training.

Analysing the difference between the levels of self-efficacy perceived before and after the Module in the areas investigated, results show that teachers think their competences are generally improved (Likert-scale 1-5).

More specifically, they feel they have enhanced their competences in efficiently selecting and integrating media and technologies to improve their teaching practices (from 4 to 4,13 and from 3,75 to 3,95) (Fig. 5).

![Figure 5. Pre- post-difference in perception about integrating technologies in practices](image)

In addition, after the Module there was an increase in teachers’ confidence in their ability to adopt all the pedagogical approaches that are crucial for a student-centered learning environment (Fig. 6).

![Figure 6. Pre- post- difference in teachers’ confidence with didactical strategy/pedagogical approach](image)

Regarding Up2U skills, which were a crucial component of Module 1, teachers who participated feel more competent in supporting and enhancing each and every of students’ four core Up2U skills (Fig. 7). In the teachers’ opinion, using NGDLE learners would effectively improve ICT literacy, but most
saw that learners can improve competences such as self-study, communication and collaboration skills, critical and problem-based thinking.

![Figure 7. Pre-post difference in teachers' confidence regarding enhancing students' skills](image)

Regarding the confidence with the specific technologies presented in the Up2U ecosystem, teachers reported feeling more confident in using the Up2U tools presented, with their confidence increased particularly for H5P (from 1.9 to 3.6), SWAN/Jupyter (from 0.7 to 2.2), SelCont and KnockPlop (from 1.3 to 2.7), eduEOR (from 1.5 to 2.7), PersonalRecorder (from 1.5 to 2.6) (Fig. 8). Though the increase is quite good, we cannot say the same for the final average reached regarding each tool (maximum 3.9 point for Moodle, minimum 2.2 for SWAN/Jupyter). This distribution of teachers answers shows that MOODLE is the most well-known and familiar tool for teachers, but during the training the participants got acquainted with other possible tools adopted for Up2U environment and saw possibilities to apply those tools in the learning process.

![Figure 8. Pre-post difference in confidence with Up2U tools](image)

Teachers' suggestions to improve the course regards primarily the intensity and its duration, perceived as too short (“More hours of learnings and activities completed would be needed”). Some teachers also suggest sessions on less days during the week. In terms of learning content, participants as a drawback saw a language barrier and need for more detailed instructions in Lithuanian as well as more examples how to use available tools.

Apart from these aspects, teachers gave a positive global assessment to the Lithuanian CPD Module 1 (average assessment 4.8 on a 5-point Likert scale), 75% will recommend this CPD to their colleagues and 21% - not decided (Fig. 9).
After evaluation of successful experience and seeking for wider adoption of Up2U infrastructure in Lithuania a 2nd iteration of online CPD Module 1 has been started in March – April, 2019. There are 351 Lithuanian teachers from 179 educational institutions successfully started learning in this new iteration. More than 62% of participants completed this first online Module, and it is expected that second iteration will be succeeded by a similar percentage of participants.

5 CONCLUSIONS

Organising learning process on NGDLE provided by Up2U, learners not only learn specific subject provided online, but also develop self-learning, problem-solving, communication, collaboration, ICT literacy and other competencies important for 21st century.

The experience of Lithuania in the implementation of Up2U online CPD demonstrates that high completion rates and overall success can be achieved thanks to the combination of right motivation, effective organisation of the learning process and good learners support. The research carried out showed that the choice of appropriate methods and tools allows effective communication among learners and tutors and is capable to replace traditional face-to-face with fully online learning. According to the method of provision of training, Lithuanian teachers ranked the online learning option as more efficient: according to the Likert scale, the traditional way of providing training was evaluated at 4.5, while online option - 4.8 out of 5.

The success, efficiency and quality of the online learning course was determined by the proper design and maintenance of the online learning process, taking into account needs of the learners, meaningful content and assignments, variety of support tools, as well as continuous interaction with course learners to ensure a human connection.

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