Up2U

Techno-pedagogical aspects of the Up2U learning ecosystem

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TNC - Trondheim, June 2018
Up2U Objectives

The key Up2U objective is: 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 facing in universities

Objectives

1. To assess the use of public and private cloud-based infrastructure services

2. To design and develop a scalable and flexible integrated “application toolbox” on top of the abovementioned cloud-based service infrastructure

3. To build and train the learning community for the specific learning context

4. To test the infrastructure service components and the application toolbox through very large-scale pilots

5. To define an effective sustainability and exploitation framework
School vs. University

High School vs. University

Your parents and teachers will remind you of your responsibilities and help you manage them.

You must balance your responsibilities and set your own priorities.

School days are Monday to Friday, 9am to 3pm (30 hours a week).

Class times vary throughout the day, and you usually spend 12--16 hours in class per week.

Teachers approach you if they believe you are falling behind.

If you need assistance, you should initiate contact with your lecturer or tutor.

Teachers provide you with class notes or the reading material when you miss a class.

Lecturers expect you to locate and catch up on any notes or information you missed when you miss a class.
Up2U Consortium

18 partners
• Universities
• NRENs
• Infrastructure providers
• Commercials

12 countries
• EU
• Switzerland
• Israel
Containerized Education by the Up2U Consortium
Metaphor... Container schools

Microservices architecture

Modular deployment

TNC18 Intelligent networks, cool edges?
Up2U Ecosystem

Formal Learning Space
- LMS
- SIS
- Assessment
- LOR

Informal Learning Space
- Attend
- Search
- Create
- Share

Interactive Learning Path

Infrastructure
- eduOER aggregation
- Sync&Share ownCloud
- WiFi eduroam

To University

‘Always-on’ education
- at school
- in library
- on the go
- in museum
- at home

TNC18 Intell
Next Generation Schooling

1. Personalized
2. Strong teacher support
3. Close community links
4. Broad and diverse curriculum
5. Outside and inside school involvement
6. Create the right conditions and children will learn!
Key stakeholders

• Local governaments
• Universities
• Education Ministries

• Commercials
• Service providers
• Publishers
• Policy makers

...
What’s my objective?

- Try out new things
- Experiment with new methodology
- Know more about my students
- Improve certain skills
- Engage better
- Collaborate

How to get there?

- With the minimum efforts
- With the minimum disruption
- Self-motivated students
- Suitable tools
- Flexible frameworks

What’s my impact?

- Do my class perform better
- Do I know what to change
- Where are my students compared
- Engagement levels
- Interaction level
- Success
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From LMS to NGDLE

From a Walled Garden...

...to an Open Garden.
From LMS to NGDLE

LMS-based architecture
Tools are integrated into the LMS via specific plug-ins or lately LTI. Learning Analytics is happening inside the LMS.

Transitional architecture
LTI becomes the predominant Learning Tool Integration method. More tools are interacting directly with each other. LA is getting information from connected tools.

NGDLE architecture
Ecosystem of integrated, interoperable set of tools. LMS is not that important, if exists at all. Learning Analytics is an externalized function collecting all learning data from tools.
Growing Digital Ecosystem

Enterprise LMS Choices
- WebCT
- Prometheus
- Blackboard
- eCollege

New World of Available Technologies and Consumer Expectations

Late 1990s
- Google
- Blogger

Present
- Sakai
- Moodle
- Canvas
- Brightspace
- Blackboard

Free Applications for an Enhanced Social and Education Experience
- flickr
- vimeo
- LinkedIn
- Skype
- Picasa
- Digg
- WordPress
- Facebook
- Digg
- YouTube
- Dropbox
- Ning
- Piazza
- Box
- slideshare
- Google Plus

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• Open Technology
• Standard APIs
• Value-add
• Scalable
• Modular
• Portable (Docker images)
• INTEROPERABILITY
Intelligent networks, cool edges?

State-of-the-art federated WebSSO & group management

Extended Learning Analytics and recognition system

Learning Locker

OpenSource

Experience

API

Pan-European GÉANT network substrate: Content Distribution Network, WiFi access

https://up2university.eu
Intelligent networks, cool edges?

**Tools and Services (ecosystem)**

- **CERN USERS**
  - LRS
  - Moodle Prod
  - SWAN
  - CERNbox

- **3RD - PILOT**
  - Paella Player
  - OpenEdX TELTEK
  - LTI Toolbox

- **PSNC**
  - LRS
  - Moodle Prod
  - SWAN
  - CERNbox

- **ALL USERS**
  - SSO
  - ownCloud

- **Repositories**
  - eduOER GRNET
  - dSpace GRNET

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13/06/2018
Tools (Up2U ecosystem)

- **Moodle**: Learning Platform or Course Management System (CMS)
- **eduOER**: Open Educational Resource (OER) metadata aggregation hub and portal service
- **Up2U DSpace**: An open source digital archives system focused on long-term storage
- **SeLCont**: Synchronized e-Learning Content
- **CERNBOX**: The Sync and Share solution for Science
- **SWAN**: The Platform for Interactive Data Analysis in the Cloud
- **H5P**: Easy creation, sharing, and reuse of HTML5 content and applications
- **KnockPlop**: Simple and instant P2P Video Meetings
- **Personal Recorder**: Video Recorder
INTEROPERABILITY
Build as needed – MVP methodology

• Rapid prototyping
  • Start with something existing quick
  • Consolidation functions
  • Develop what we need

• Build a platform (fit for purpose)
  • Mobile
  • HTML5
  • Cloud
  • Interoperability
Pedagogy and Skills Survey

173 university teachers from 9 countries

281 school teachers from 8 countries incl. 33 school principals from 7 countries
Promoting Up2U skills

<table>
<thead>
<tr>
<th>Promoting Up2U Skills</th>
<th>u</th>
<th>s</th>
</tr>
</thead>
<tbody>
<tr>
<td>IT</td>
<td>0.52%</td>
<td></td>
</tr>
<tr>
<td>language</td>
<td>2.06%</td>
<td></td>
</tr>
<tr>
<td>discussing</td>
<td>3.09%</td>
<td></td>
</tr>
<tr>
<td>open-mindedness</td>
<td>3.09%</td>
<td></td>
</tr>
<tr>
<td>curiosity</td>
<td>3.61%</td>
<td></td>
</tr>
<tr>
<td>motivation</td>
<td>4.64%</td>
<td></td>
</tr>
<tr>
<td>information management</td>
<td>5.67%</td>
<td></td>
</tr>
<tr>
<td>learn to learn</td>
<td>6.19%</td>
<td></td>
</tr>
<tr>
<td>creativity</td>
<td>7.22%</td>
<td></td>
</tr>
<tr>
<td>writing and reading</td>
<td>9.28%</td>
<td></td>
</tr>
<tr>
<td>collaboration</td>
<td>10.31%</td>
<td></td>
</tr>
<tr>
<td>autonomy and responsibility</td>
<td>20.62%</td>
<td></td>
</tr>
<tr>
<td>critical thinking</td>
<td>23.71%</td>
<td></td>
</tr>
</tbody>
</table>
The necessary and effective skills for the academic learner, are:

- Critical Thinking & Problem Solving
- Communication & Collaboration
- Information, Media & Technology Literacy
- Self-Direction
- Learning to learn

By using the appropriate teaching models, the learner may improve these skills and this process will even encourage the development of necessary digital competences for better and successful functioning in the technological world of the 21st century.
Up2U supports Modern Teaching Models and methodologies

- Project Based Learning (e.g. Trello, wikis)
- Place-Based Learning Education (e.g. Treasure hunt)
- Experiential Learning (e.g. CernBox)
- Flipped Classroom (e.g. WebRTC, SeLCont, eduOER)
- Scenario-based learning (e.g. H5P)
Table summarizes selected teaching models helping students to acquire the required skills from the academic learner in the 21st century
<table>
<thead>
<tr>
<th>Teaching models</th>
<th>21st century skills for the academic learner</th>
<th>Technological solution</th>
<th>Technological tools</th>
</tr>
</thead>
</table>
| Project Based Learning (PBL) | • Critical Thinking & Problem Solving  
• Communication & Collaboration  
• Information, Media & Technology Literacy | • Mind maps  
• Project management  
• Content management system | • Wikis (core)  
• Trello (LTI)  
• Group assignment (core) |
| Flipped Classroom | • Self-Direction  
• Information, Media & Technology Literacy | • Interactive  
• Presentation | • WebRTC  
• SelCont  
• EduOER  
• H5P |
| Experiential Learning | • Critical Thinking & Problem Solving  
• Communication & Collaboration  
• Self-Direction | • Remote & online labs  
• Educational online labs  
• Simulation  
• Reflection | • EJS Remote LABs  
• H5P  
• CERNbox/SWAN |
| Place-Based learning Education (PBE) | • Critical Thinking & Problem Solving  
• Communication & Collaboration  
• Self-Direction  
• Information, Media & Technology Literacy | • Maps/ GPS  
• Social and community  
• Augmented reality  
• Mobile | • Treasure hunt (M) |
| Scenario-based learning | • Critical Thinking & Problem Solving  
• Communication & Collaboration  
• Self-Direction  
• Information, Media & Technology Literacy | • Wikis  
• Timeline | • Lesson (storyline scenario)  
• H5P |
Decision points for the teacher who is planning for his students a new learning path
Up2U Roadmap

Year 1
- Pre-pilot
  - Kick-off
  - Subject Matter Committee
  - Surveys
  - Trainings & Community Workshops

Year 2
- MVP
  - 1st GA Amsterdam
  - Technical Workshop
  - Surveys...
  - EC Review

Year 3
- Pilot
  - Final EC Review
  - Technical Workshop
  - Review Preparation

MVP

Production...

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Memorandum of Understanding (MoU)

- Agreement with pilot schools
- Roles and responsibilities
- GDPR-compliance
- Online consent & assent forms
Up2U Professional Development Model in three Phases

• Three main Phases for the Up2U Professional Development
  • Phase One - Introduction to ecosystem
  • Phase Two - Hands on Experience and students involvement
  • Phase Three - “Train the Trainer”

• Nine pilots in Up2U Professional Development program
  • Combination of technology and pedagogy
  • Combination of skills, educational needs, technological tools

• Four pilot on board for the first Professional Development phase
  • Greece
  • Italy
  • Poland
  • CERN
The Professional Development Model – Phase 1 (Greek Case)

- Teachers were divided in two groups based on their skills
- First Phase, March 20\textsuperscript{th} to May 10\textsuperscript{th} 2018
- 80 teachers from 8 schools attended the first module for 5 weeks, 2 days per week, f2f training organized by NTUA and GRNET
- The pedagogical techniques experienced during the training:
  - Collaborative learning
  - Learning-by-doing
  - Role taking
The Professional Development Model - Phase 1 (Italian Case)

- The first phase in Italy started late April and ended end of May
- 11 teachers from 5 schools
- 5-weeks of online activities

- In the Moodle platform teachers had 9 forums to use:
  - 1 forum for course news
  - 1 forum as a space for presentation and socialization between teachers
  - 2 Forums for discussion on skills in daily professional practice sharing
  - 1 Forum for collect ideas on the subject of the pedagogical scenario - brainstorming activity
  - 2 Forums to discuss about the scenario implementation
  - 1 forum to guide teachers in the implementation of their scenarios
  - 1 forum to provide teachers with technical support
The Professional Development Model - Phase 1 (CERN Case)

• A 16-year-old student, from the United Kingdom, had the opportunity to visit CERN experiment facilities and run hands-on physics experiments at Physiscopel laboratories of the UniGE for one week

• The student experienced on CERBox
  • either using the auto-upload capability of the CERNBox mobile application for photos and videos or via the desktop synchronization client

• and on SWAN compiling both:
  • a descriptive notebook, being a storyboard of her experience collecting pictures and videos;
  • a scientific notebook covering the physics phenomenon of Superconductivity and analyzing the collected dataset
Some of the Up2U Use Cases

• An authenticated course creation in Up2U platform
• Recording a lecture
• Uploading a lecture & Making Assignments
• Interactive video creation and exercises
• Creation, storage and usage of open educational content in up2u repository
• Virtual room communication
"We strongly believe that all the tools and services the project is going to use and/or make available (i.e. incorporate, design, develop and test) must be sustainable after the lifetime of the project."

- business plans and investigate appropriate business models using the expertise of the Small Medium Enterprise and National Research and Education Network partners and their contacts with third-party business actors

- make it easy for new schools to join the Up2U infrastructure and ecosystem that will form a federated market-place for the learning community
How to engage

1. **Come and experiment with the Up2U NGDLE in the cloud**
   Distributed private cloud installation at PSNC-Poland, GWDG-Germany and GRNET-Greece.

2. **Integrate components and functionalities into your LMS**
   Github & Dockerhub images, automated deployment and configuration, documentation and support

3. **Take the entire open-source platform and deploy it on-prem or in your preferred cloud**
   Integrated software stack in Docker containers

**Up2University.eu**
Some teasers....
A few steps to higher education

We believe that advanced digital skills are essential for students entering university. Up2U portfolio provides the tools to revolutionize your teaching method and motivates students to benefit from the latest technology during learning. Let us help you unfold the regular classroom and make learning fun.

Techno-pedagogical workshop
Read more...

Containerized education
Platform overview

Early project results
Read more...
Welcome
Select an authentication source

Federated Login
Use the federated EduGAIN AAI to log in. After selecting your affiliation you will be redirected to login page of your school.

LOGIN WITH EDUGAIN

Social Network Login

Up2U Login
The Up2U login is for users from schools that don't participate in the EduGAIN AAI. You can register here for a new account.

LOGIN WITH UP2UID
Are your students university-ready?

Check out our Up2Universe portfolio for tools that can help you get your students digitally equipped for university.

Next Generation Digital Learning Environment

Up2U makes available a specific Next Generation Digital Learning Environment (NGDLE) that integrates the formal and informal learning spaces for secondary school students and teachers who wish to develop and enhance their teaching and learning skills up to the university standards.
Welcome to the eduOER Portal

Channels

Health and Medicine
Legal and Social
Technology
Summary of Video from eduOER

General
- Section name: Custom
- Summary

Restrict access

Add eduOER video
- Provider: Any
- Subject: Any
- Language: Any
- Year: Any
- Duration: Any
- Format: Any
- Search term: cats

Total search results: 9

2014
- Wire free and worry free - Session 16A - TNC 2014
  - HE - TNC
  - Recorded: 21/05/2014
  - Viewed 5 times

- The introduction of predators such as cats in islands ecosystems
  - HE - CAMPUSDOMAR
  - Recorded: 24/03/2014
  - Viewed 2 times

2013
UP2U DSpace
UP2U DSpace preserves and enables easy and open access to all types of digital content including text, images, moving images, mpegs and data sets for K12 educational level

UP2U DSpace repository

UP2U DSpace instance
Welcome to our digital repository of UP2U!
More exciting news to appear here.
To Casper

First H5P test

Yey it works, does it?

yes

no
Intelligent networks, cool edges?
Intelligent networks, cool edges?
Intelligent networks, cool edges?
In [143]:

```python
# Remove the very slow outliers from the duration histogram
q = df["duration"].quantile(0.95)
df[df["duration"] < q]["duration"].hist(bins=50)
plt.title("Request Durations < 95th percentile")
plt.show()
```
Intelligent networks, cool edges?

**LMS**
Learning Management Systems consist in a software application for administration, documentation, tracking, and delivery of educational courses online.

**CONTENT**
Up2U provides access to content repositories where students and teachers can search and find for educational materials in form of audio, video, and multimedia animations.

**COLLABORATIVE EDITING**
Collaborative editing tools make teamwork easier letting a group of people to work together in real time on documents, notebooks, code, equations, plots, pictures, and videos.

**LEARNING ANALYTICS**
Up2U will provide several tools to help teachers and educators to process, analyze, measure and collect data about learners and learning activities.

**SOCIAL INTERACTIONS**
Online social interactions can be used as an educational tool in formal and informal spaces to capture students attention and participation.

**REAL-TIME INTERACTIONS**
Up2U provides a set of tools that allow synchronous communication between students, teachers, members of activities and workgroups.
Thank you
Any Questions?

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