The concept of DIY as a base for teaching approach in ICT teacher education how to improve pupils’ digital literacy

Innovation in TE within a Global Context

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Base 1: LEARNING THEORY

CREATION
(J. Slavík et al., 2013)
- as a way of cognition/
- cognitive process

LEARNING
- Activity
  + Feedback
  + Auto-Reflection

ASSESSMENT
(P. Black, D. Wiliam, 2001)
- What is inside of a black “box”?

Base 2: WFATE IDEAS for DIYLAB

INNOVATION IN TEACHER EDUCATION
- Formal learning
  + informal learning

GLOBAL CONTEXT
- Digital technology
- DIY concept / communities
Transitions in society and a swift evolution in digital technologies (DT) are reflected in school education all over the world.

Young people frequently publish their digital artefacts on social networks, and visualize their ideas, procedures, and thinking through photos, videos, and animations. They publish how to do what they did and learned.

Such activities are not integrated into school assessment. Teachers do not understand these spontaneous learning processes. These creative activities give evidence about learning process and progress.

This corresponds to the concept of DIY (Do-It-Yourself).
LEARNING OF YOUNG PEOPLE WITH TECHNOLOGY and DIY

• In 90th, the idea of DIY penetrated into Fine Art, Arts and Crafts and into digital technology.

• “Online adolescent youth have a good time and enjoy new opportunities to create, to remix and share digital contents” out of school.

  (Lenhart, Madden, 2005, p. 1)

• DIY starts to dominate in a curriculum content, it gives educators and learners an opportunity to create, share and learn through collaboration (in virtual space).
DIY in Action

LEARNING OF YOUNG PEOPLE WITH TECHNOLOGY and DIY

In the Czech Republic

- **Ondřej Staněk** (age 26)
  - Counter of bats SnowStation
  - Company **OZOBO**
    (www.ozobot.com)
In the Czech Republic

- Marek Liška (age 18)
- Marek Fanderlich (age 18)
  - **Textbook of Mathematics for his schoolmates**
    - Math for schoolmates,
    - Online problems to be solved

*This textbook differs from whatever similar on the Czech book market. It is not scholarly textbook full of mathematical definitions, axioms or proofs. The textbook struggles in a natural student vocabulary to explain some mathematical phenomena or situations And to show a meaning and importancy of Math for life.*

Mgr. Leoš Bílek, učitel G
DIY in Action

LEARNING OF YOUNG PEOPLE WITH TECHNOLOGY and DIY

In the Czech Republic

• Hana Šaldová (ICT student teacher)
  • She enjoy computer programming. (national songs, storytelling), Literacy from Scratch
  • Activities for pupils and teachers how to learn SCRATCH
  • Idea to organise the National competition SCRATCHCup
LEARNING OF YOUNG PEOPLE WITH TECHNOLOGY and DIY

• The significant aspect of DIY is a process of creation (or production) which is appropriate, and obvious, and natural for students in their usage of digital technology, and which aims to support their learning broadly (Jocson, 2012, p. 299).

• In DIY activities in schools, pupils can apply knowledge and skills from different subjects, discover inter-disciplinary contexts (Sancho-Gil, J. M. et al., 2015) and organize their work, and manage their own learning.
EU project Do It Yourself in Education: Expanding digital competence to foster student agency and collaborative learning (2014-16)

http://diylab.eu/
http://hub.diylab.eu

Spain, Finland, the Czech Republic

Aim to implement the idea DIYLab

- in school education (pupils aged in 6-16)
- in teacher education
  - ICT teacher education at the Faculty of Education (Charles University)
  - Pedagogy at the Faculty of Arts, Faculty of Pedagogy (Universitat de Barcelona)

DIY based on the idea “Building new tools and paths to help all of us learn” (Kamenetz et al., 2011)

217 DIYLab objects publishes on the HUB
DIYLab in Practice

Goals:

• To contribute to *digital literacy development*
• To implement DIY philosophy into (school) teaching practice and learning
  » to interconnect *after-school creativity with curriculum*
  » to bring *students ideas to school*
• To establish and develop *DIYLAB* (hub) to support network collaboration based
  » on a cloud technology (at schools and out of school)
  » on experiments with various types of technology

The most important outcomes is not an artefact as such but visualisation and description of a process how the artefact was produced, how the problem was solved, how we learned to do it.
DIYLab in Practice

**AFTER-SCHOOL ACTIVITIES IDEAS PROBLEMS**

**WHAT I LIKE TO DO**

**INTERESTS, CURIOSITY IDEAS PROBLEMS**

**WHAT I ENJOY DOING**

**DIYLab in Practice**

**THROUGH DT**

**A PROCESS TO VISUALISE BY A „MANUAL“ HOW TO DO IT**

**SCHOOL:**

- COLLABORATION
- CURRICULUM
- INTERDISCIPLINAR RELATIONS
- STUDENTS DISCOVER HOW TO SOLVE PROBLEMS

**A PROCESS HOW I LEARN TO DO IT**
TASK 1: TO RESEARCH WHAT STUDENTS LIKE TO DO (OUT OF SCHOOL)?

METHODS:
focus groups with pupils, parents, teachers, student teachers

RESULTS:
• Ideas for activities to be implemented to school education
• Young people – digital natives (teachers not yet)
• Connectivity, life style, DT as a commonplace part of life and learning
• A virtual environment offers a space for unlimited differences and ways how to differ from others.
• ICT student teachers focus primarily on technology, how technology works, what technology allow and permit, not on content, on details, on design a new product, …
TASK 2: TO DESIGN DIYLAB ACTIVITIES

6 requirements:

1. Cooperation and collaboration of all who is involved into DIY activity (including teachers)
2. Inquiry Based Learning
3. Cross-curricular dimensions
4. Digital Literacy improvement
5. Curriculum
6. Autonomous/Self-regulated learning
## TASK 3: TO IMPLEMENT DIYLAB ACTIVITIES

<table>
<thead>
<tr>
<th>DIY activity</th>
<th>Departments</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>How I am becoming a teacher</strong></td>
<td>IT + Art</td>
</tr>
<tr>
<td>Collection of examples of problems which human cannot solve without computers (tomography, ...)</td>
<td>IT</td>
</tr>
<tr>
<td><strong>Bird house</strong></td>
<td>Biology + IT</td>
</tr>
<tr>
<td><strong>Little Dances in Scratch</strong></td>
<td>IT</td>
</tr>
<tr>
<td><strong>Animated stories</strong></td>
<td>IT</td>
</tr>
<tr>
<td>Digital objects for IWB</td>
<td>IT</td>
</tr>
<tr>
<td><strong>Divers LogBook</strong> (Apps for mobile)**</td>
<td>IT</td>
</tr>
<tr>
<td>Tablets in classroom teaching</td>
<td>IT</td>
</tr>
<tr>
<td>Wiki of teaching activities</td>
<td>IT</td>
</tr>
<tr>
<td>Digital teaching objects</td>
<td>IT</td>
</tr>
<tr>
<td>Robot project</td>
<td>IT</td>
</tr>
</tbody>
</table>

**DIYHUB** ([hub.diylab.eu](http://hub.diylab.eu))
Aim:
To understand factors and effects which contribute and participate in a process of how I am becoming a teacher (city, people, environment, ...)

Target group:
Teacher students of Primary Education (Year 4)
ICT Student teachers (MA, 1 Year)

Problem:
To create animation based on a set of photos which show a process of my changes how I am becoming a teacher.

Procedure:
2 Weeks collect photos (about 100 photos)
4 weeks of photo analysis; mindmaps; tags; main ideas; storytelling; scenarios; auto-reflection
1 week – learning to use SW for animation
2 weeks – animation development
1 week – English subtitles, music

Typology of outcome:
Animation (GIF Animator, WeVideo) + self-reflection

LEARNING = ACTIVITY + FEEDBACK + AUTO-REFLECTION
COLLECTION OF EXAMPLES
WHICH HUMAN CANNOT SOLVE WITHOUT COMPUTERS

Aim:
To understand importance of computer technology for life, practice, science, art etc. and progress in society development

Target group:
ICT students (MA, 1Year)

Problem:
To elaborate an example of problems which human cannot solve without using computer.

Procedure:
To find an example and describe it, explain it.

Product:
Vocabulary in Moodle

LEARNING = ACTIVITY + FEEDBACK + AUTO-REFLECTION
## Collection of Examples

Which human cannot solve without computers

<table>
<thead>
<tr>
<th>Branch/Field/Domain</th>
<th>Specialization/Example</th>
</tr>
</thead>
<tbody>
<tr>
<td>CS and Telecommunication</td>
<td>GPS, Internet, Video-conferencing</td>
</tr>
<tr>
<td>Transport</td>
<td>GPS</td>
</tr>
<tr>
<td>Physics</td>
<td>Astronomy, Meteorology, Distributed calculations/computing, Simulations</td>
</tr>
<tr>
<td>Medicine</td>
<td>Robotics in surgery, Tomography, Sequestrotomy for DNA, Hearing defect, Cybernetic Leksell gamma knife</td>
</tr>
<tr>
<td>Technology</td>
<td>Technology Motion Capture</td>
</tr>
<tr>
<td>Manufacture</td>
<td>Bar code</td>
</tr>
</tbody>
</table>
ANIMATED STORIES

• Milan Žemlička: O chytrém Jeníkovi
• Miloslav Khas: Story about a little car
TASK 4: TO GET FEEDBACK
WHAT WE HAVE DONE WITH (ICT) STUDENT TEACHERS

<table>
<thead>
<tr>
<th>courses</th>
<th>Number of students (Bc., MA, Part/Full Time)</th>
<th>Number of departments</th>
<th>DIYLab objects</th>
</tr>
</thead>
<tbody>
<tr>
<td>18</td>
<td>242</td>
<td>3</td>
<td>141</td>
</tr>
</tbody>
</table>

METHODS:
questionnaires for student teachers/teachers
focus group with student teachers

RESULTS
LEARNING = ACTIVITY + FEEDBACK + AUTO-REFLECTION

DIYLab in TE

TASK 4: TO GET FEEDBACK
WHAT WE HAVE DONE WITH (ICT) STUDENT TEACHERS

METHOD: questionnaires for teachers

1: collaborative
2: IBL
3: transdisciplinary
4: digital competency
5: relation to curriculum
6: autonomous/ self-regulated learning
TASK 4: TO GET FEEDBACK
WHAT WE HAVE DONE WITH STUDENT TEACHERS

METHOD: questionnaires for teachers

Q6 - Character of 12 activities (from teachers point of view)
TASK 4: TO GET FEEDBACK
WHAT WE HAVE DONE WITH (ICT) STUDENT TEACHERS

DIGITAL LITERACY DEVELOPMENT

• Photo-visual Digital Skills
  » It helps users to intuitively and freely ‘read’ and understand instructions and messages that are presented in a visual-graphical form.

• Reproduction Digital Skills
  » The ability to create new meanings or new interpretations by combining preexisting, independent shreds of information in any form of media (text, graphic, or sound).

TASK 4: TO GET FEEDBACK
WHAT WE HAVE DONE WITH (ICT) STUDENT TEACHERS
DIGITAL LITERACY DEVELOPMENT

• Branching Digital Skills
  » To have a good metaphoric thinking and the ability to create mental models, concept maps, and other forms of abstract representation of the web’s structure, which help them overcome disorientation problems in hypermedia environments.
  » The ability to create knowledge in a non-linear way

• Information Digital Skills
  » Information skills act as a filter: They help identify false, irrelevant, or biased information, and avoid its penetration into the learner’s cognition.

TASK 4: TO GET FEEDBACK
WHAT WE HAVE DONE WITH (ICT) STUDENT TEACHERS

DIGITAL LITERACY DEVELOPMENT

• Socio-emotional Digital Skills
  » To understand “principles” which have been employed in a cyberspace and their applications in a virtual communication

• Real-time Digital Skills
  » The ability to process a big volume of initiatives arriving simultaneously (video-games, on-line education, ...)

CONCLUSIONS

• DIY concept as a progressive teaching method in TE is implemented into didactic theory for teaching practice

• Problems in school practice:
  • with interdisciplinary collaboration
  • Time
  • Timetable in schools (lessons 45’ minutes)
  • How to motivate pupils, How to motivate teachers
  • How to identify and define DIY activities? Who will do it?

• Problems in university TE:
  • with interdisciplinary collaboration between departments
  • Time
  • Timetable at faculty of education (seminars, credits, ...)
  • How to motivate student teachers
  • How to motivate educators

CONCLUSIONS

**MOTIVATION WHY TO IMPLEMENT DIY INTO EDUCATION?**

<table>
<thead>
<tr>
<th>Kids + real problem</th>
<th>Kids’ Solution</th>
<th>Improved world</th>
<th>Empowered people</th>
</tr>
</thead>
</table>

Education to Better Their World
Book of Marc Prensky (SITE 2016 in Savannah)

WELCOME ON

http://diylab.eu/

http://hub.diylab.eu/
THANK YOU FOR YOUR ATTENTION

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RESOURCES


RESOURCES


RESOURCES
