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

DIY in Action

SCHOOL EDUCATION

ICT literacy

ICT in curriculum

ICT cross curriculum

E-learning

…

Digital literacy

Computational thinking

Transitions in society and a swift evolution in digital technologies (DT) are reflected in school education all over the world.

YOUNG PEOPLE

YouTube, …

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).

Not only for fun, but also for learning.

DIY in Action

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
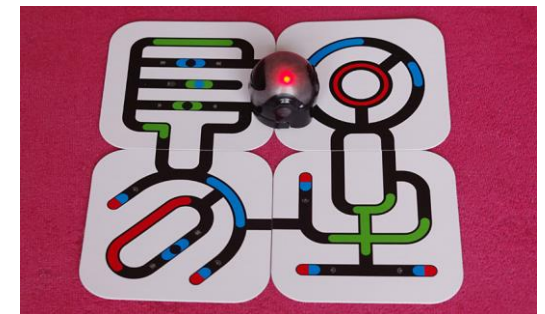 **to create, share and learn through collaboration (in virtual space).**

Not only for fun, but also for learning.

DIY in Action

LEARNING OF YOUNG PEOPLE WITH TECHNOLOGY and DIY

In the Czech Republic

- Ondřej Staněk (age 26)
    - Counter of bats SnowStation
    - Company **OZOBOT** (www.ozobot.com)

Not only for fun, but also for learning.

LEARNING OF YOUNG PEOPLE WITH TECHNOLOGY and DIY

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 schoolarly 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

Not only for fun, but also for learning.

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**.

543177-LLP-1-2013-1-ES-KA3-KA3MP:
Do It Yourself in Education: Expanding digital competence to foster student agency and collaborative 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

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
  - » <u>on</u> a cloud technology (at schools and out of school)
  - » <u>on</u> 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.**
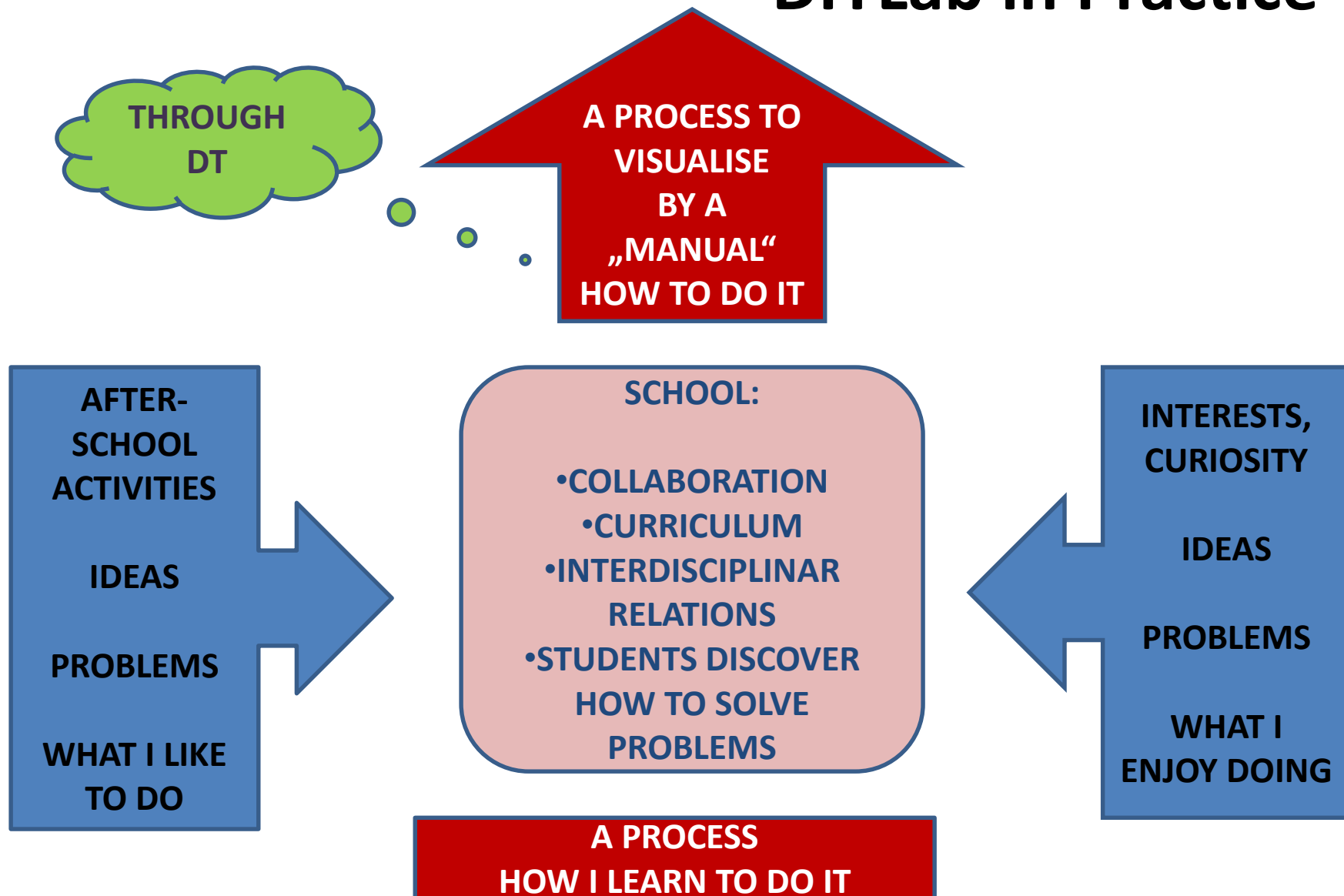
TASK 1: TO RESEARCH WHAT STUDENTS LIKE TO DO (OUT OF SCHOOL)?

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 requiremets:

DIGITAL LITERACY

NON-FORMAL AND FORMAL LEARNING

CREATING, SHARING AND LEARNING IN COLLABORATION

(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
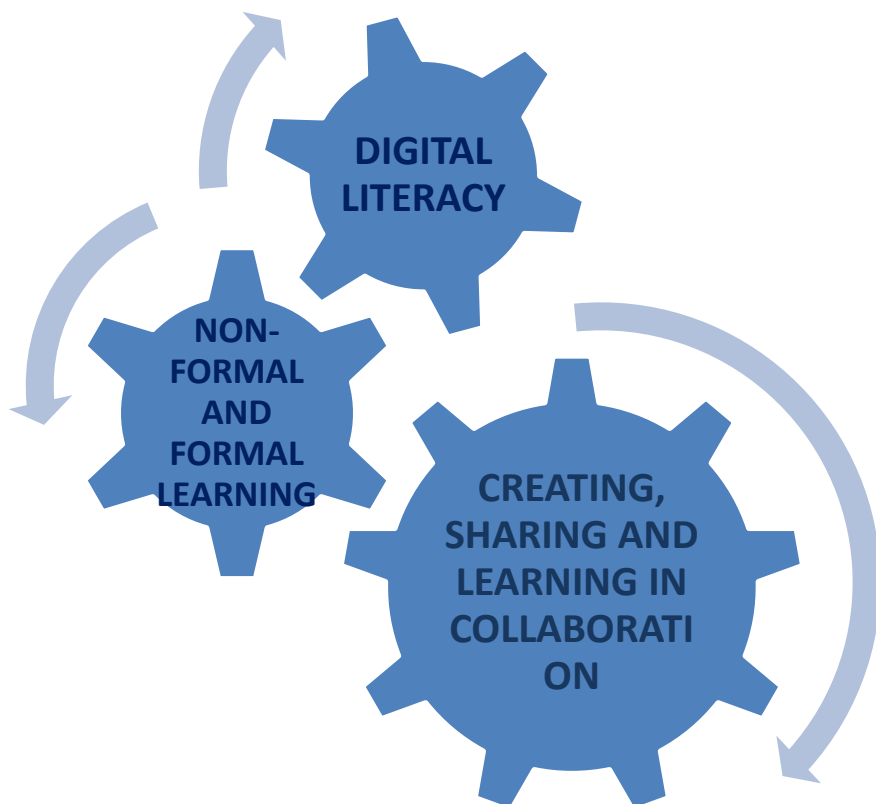
TASK 3: TO IMPLEMENT DIYLAB ACTIVITIES

DIY activity	Departments
How I am becoming a teacher	IT + Art
Collection of examples of problems which human cannot solve without computers (tomography, …)	IT
Bird house	Biology + IT
Little Dances in Scratch	IT
Animated stories	IT
Digital objects for IWB	IT
Divers LogBook (Apps for mobile)	IT
Tablets in classroom teaching	IT
Wiki of teaching activities	IT
Digital teaching objects	IT
Robot project	IT

DIYHUB (hub.diylab.eu)

HOW I AM BECOMING A TEACHER

Aim:

To understand factors and effects which contribute and participate in a process of how I am becoming a tecaher (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 proces 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

Branch/ Field/ Domain	Specialization/Example
CS and Telecommunication	GPS Internet Video-conferencing
Transport	GPS
Physics	Astronomy Meteorology Distributed calculations/computing Simulations
Medicine	Robotics in surgery Tomography Sequestrotomy for DNA Hearing defect Cybernetic Leksell gamma knife
Technology	Technology Motion Capture
Manufacture	Bar code

ANIMATED STORIES

- Milan Žemlička: O chytrém Jeníkovi
- Miloslav Khas: Story about a little car

LEARNING	=	ACTIVITY	+	FEEDBACK	+ AUTO-REFLECTION

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

courses	Number of students (Bc., MA, Part/Full Time)	Number of departments	DIYLab objects
18	242	3	141

METHODS:

questionnaires for student teachers/teachers

focus group with student teachers

RESULTS

Education and Culture
Lifelong Learning Programme
ERASMUS

DIYLab in TE

543177-LLP-1-2013-1-ES-KA3-KA3MP:
Do It Yourself in Education: Expanding digital competence to foster student agency and collaborative learning

REFLEXIVITY

FOR A TEACHER
Q1:
Q2:

LEARNING = ACTIVITY + FEEDBACK + AUTO-REFLECTION

FOR A LEARNER

RAZMOV, V.N. (2007) *Effective Feedback Approaches to Support Engineering Instruction and Training in Project Settings.* University of Washington. Dissertation Thesis.
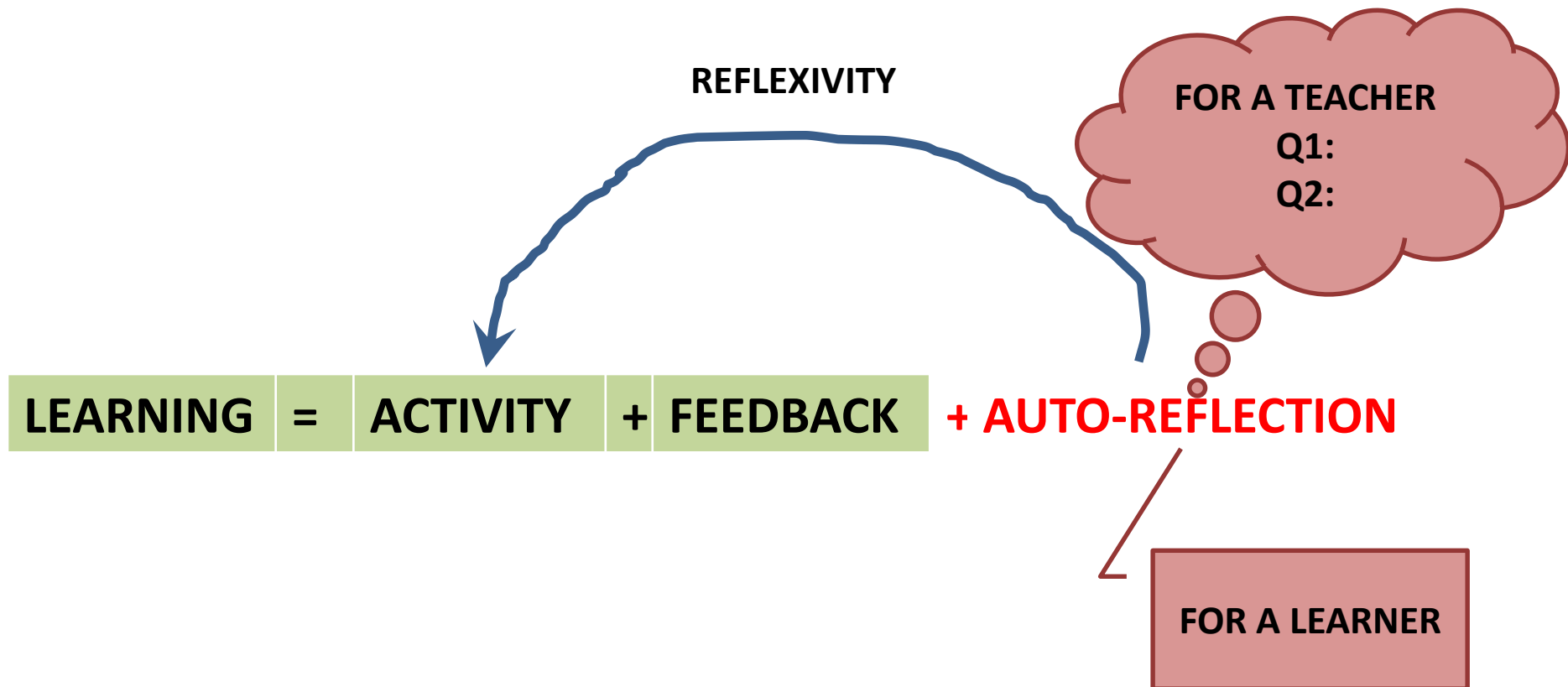
TASK 4: TO GET FEEDBACK
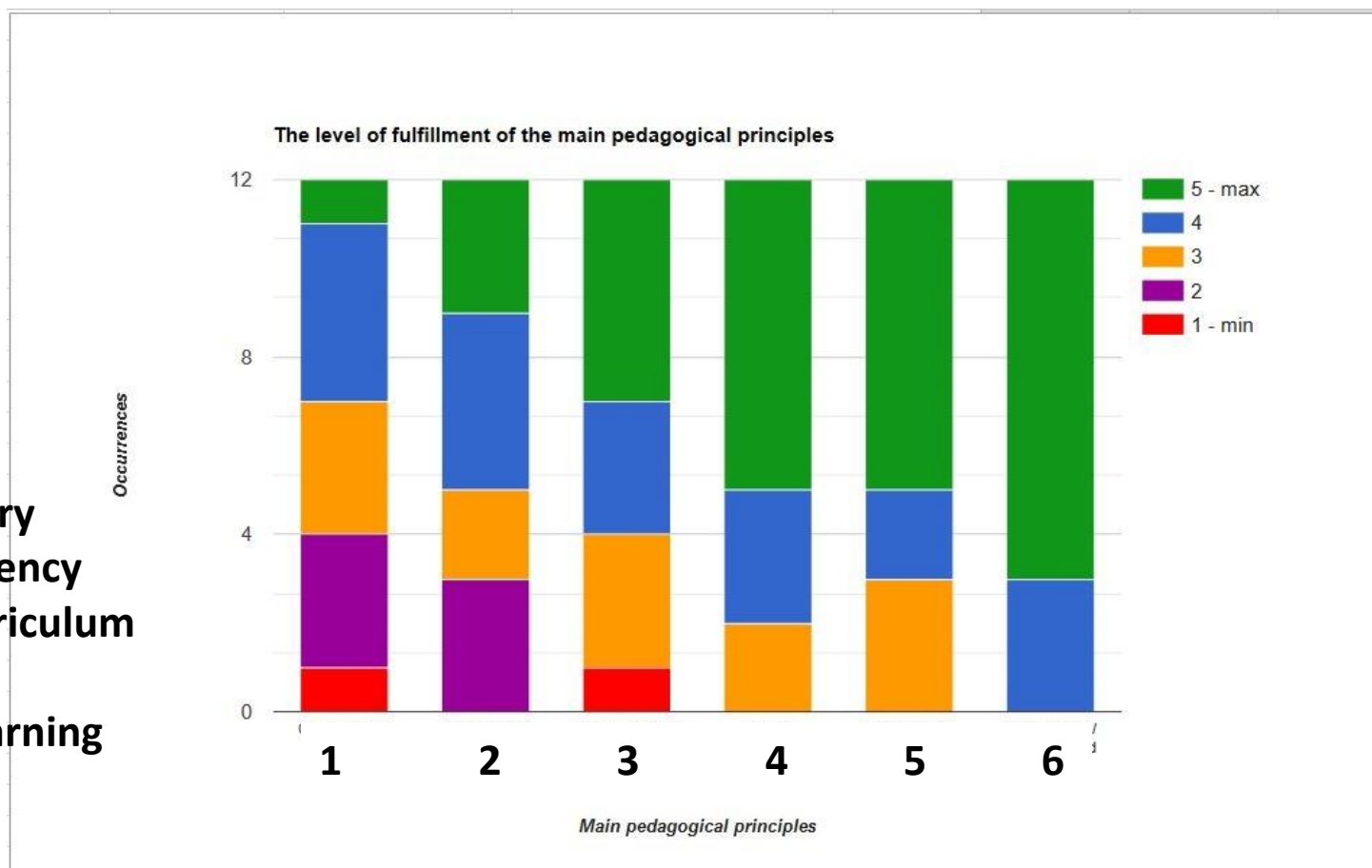### WHAT WE HAVE DONE WITH (ICT) STUDENT TEACHERS

METHOD: questionnaires for teachers

1: collaborative
2: IBL
3: transdisciplinary
4: digital competency
5: relation to curriculum
6: autonomous/
self-regulated learning

The level of fulfillment of the main pedagogical principles

Occurrences

Main pedagogical principles
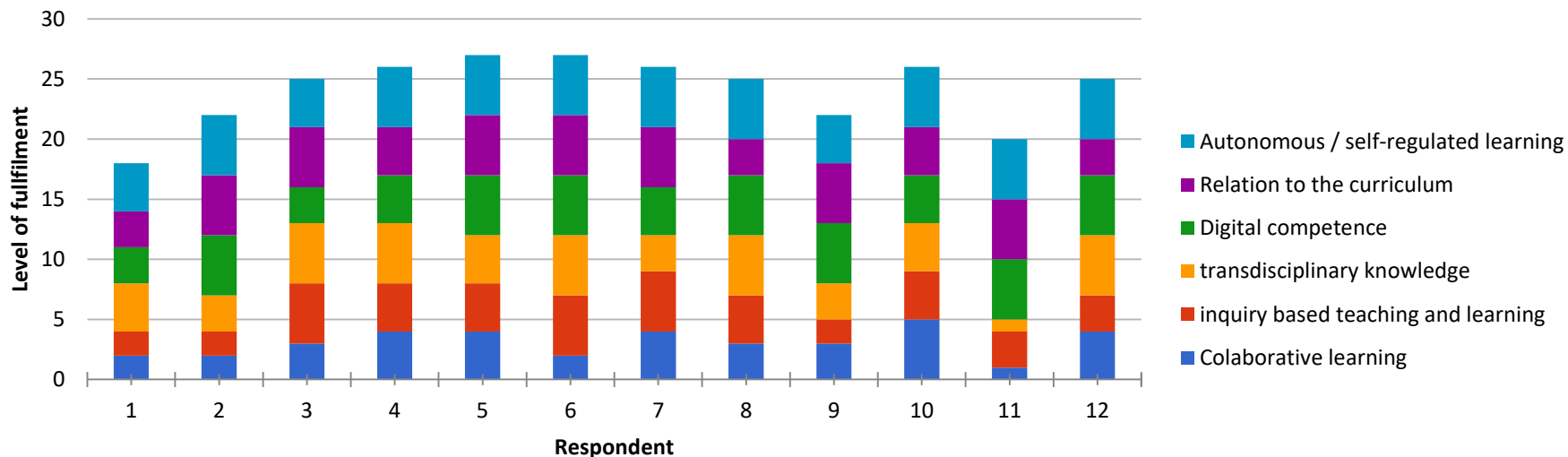
Legend: 5 - max, 4, 3, 2, 1 - min

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)

ESHET, Y. (2012) Thinking in the Digital Era: A Revised Model for Digital Literacy. In: *Issues in Informing Science and Information Technology, Volume 9, 2012.*

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.

ESHET, Y. (2012) Thinking in the Digital Era: A Revised Model for Digital Literacy. In: *Issues in Informing Science and Information Technology, Volume 9, 2012.*

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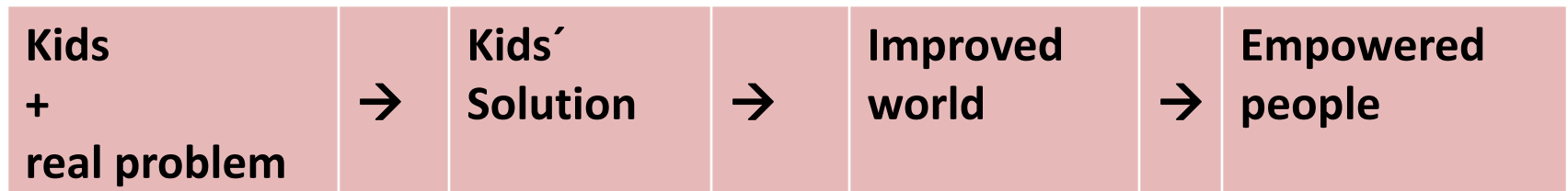## WHAT WE HAVE DONE WITH (ICT) STUDENT TEACHERS

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, …)

ESHET, Y. (2012) Thinking in the Digital Era: A Revised Model for Digital Literacy. In: *Issues in Informing Science and Information Technology, Volume 9, 2012.*

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**

ESHET, Y. (2012) Thinking in the Digital Era: A Revised Model for Digital Literacy. In: *Issues in Informing Science and Information Technology, Volume 9, 2012.*

CONCLUSIONS

MOTIVATION WHY TO IMPLEMENT DIY INTO EDUCATION?

Kids + real problem	→	Kids´ Solution	→	Improved world	→	Empowered people

Education to Better Their World

Book of Marc Prensky (SITE 2016 in Savannah)

ESHET, Y. (2012) Thinking in the Digital Era: A Revised Model for Digital Literacy. In: *Issues in Informing Science and Information Technology, Volume 9, 2012.*

WELCOME ON

http://diylab.eu/

http://hub.diylab.eu/

THANK YOU FOR YOUR ATTENTION

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