Learning by playing in the 21ˢᵗ century: Boosting computational thinking and digital education among youth

Škola hrou ve 21. století: podpora informatického myšlení a **digitálního vzdělávání mezi** nejmladšími

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Overview

▶ Relevant skills for the 21st century

▶ Computational thinking and digital skills education throughout Europe

▶ Selected Best Practices and inspiration from throughout the EU

  ▶ Pupils and students, Educators, Management

Based on a study of solutions that support computational thinking and interest in technical fields, esp. IT produced for the Vysocina Region in July 2018.

Skills for 21ˢᵗ century technology transformation

80% of technology which will be used in 10 years not yet invented

To be implemented by 80% of people already in activities

**50% of current jobs worldwide** (30% in EU) will disappear in 25 years

9 out 10 jobs will require digital skills

44% of the EU population (ages 16 ≈ 74) lack basic digital skills

Towards a **new social divide ?**

IT IS ESSENTIAL THAT EDUCATION INSTITUTIONS PREPARE STUDENTS AND TEACHERS FOR THESE RAPID ECONOMIC AND SOCIAL CHANGES

Skills for 21st century across EU

Digital Economy and Society Index (DESI) 2018, Human Capital

DESI Report 2018 – Human Capital
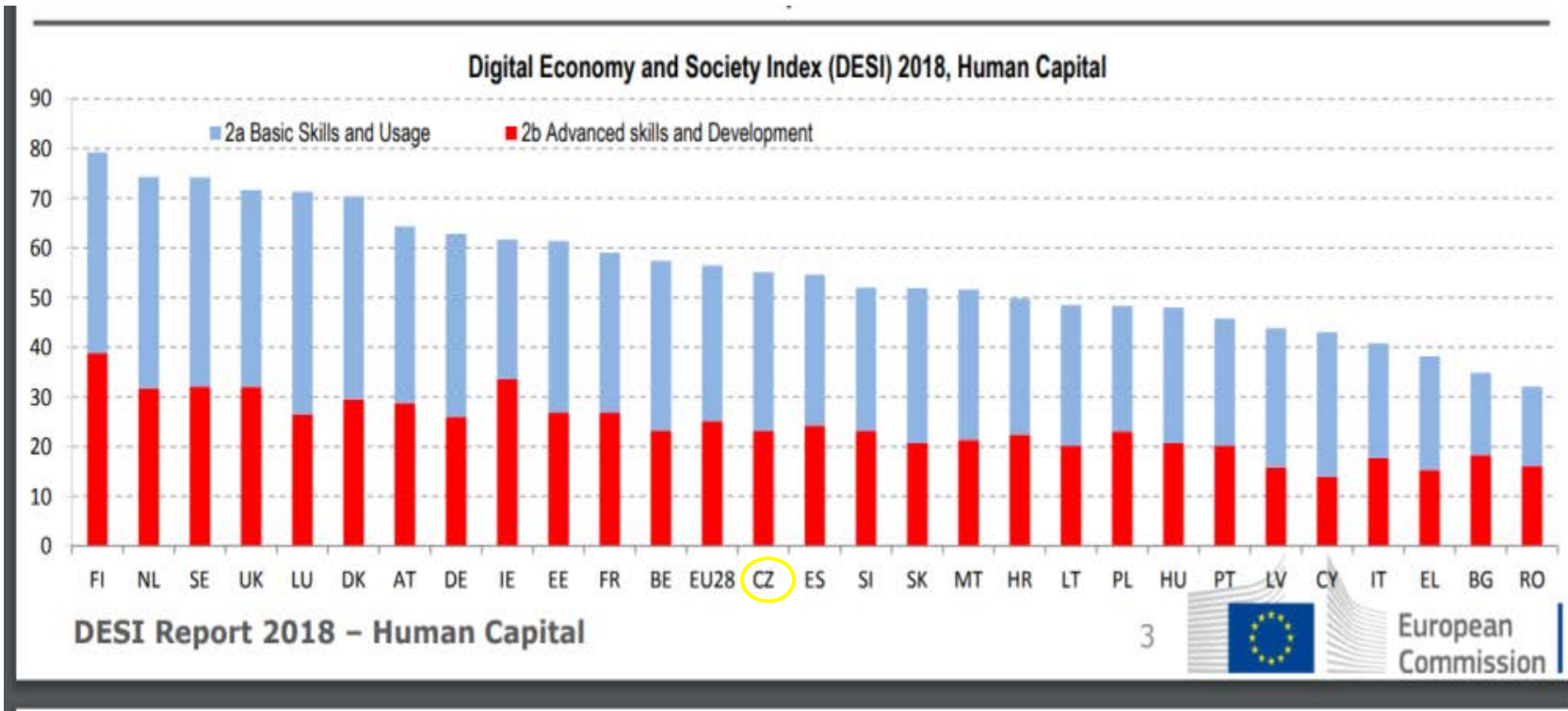
European Commission, DESI Index, 2018

▶ Basic digital skills and Internet use

▶ Advanced skills and Development, which includes ICT specialist employment and graduates in STEM

Skills for 21st century – what are they?

There is no need for everybody to be a professional programmer, but it is necessary that everyone who wants to engage effectively in society on both the personal and the professional level possess a certain level of "computational thinking".

Computational thinking development

▶ Focus on computational thinking and digital skills development on all levels of education

▶ Computational thinking development horizontally across subjects

▶ Inclusion and empowerment in decision making for all stakeholders

▶ Encouraging teacher training and knowledge sharing

▶ Focus on developing students' interests and real life applications

Youth: computational thinking development without the use of technology
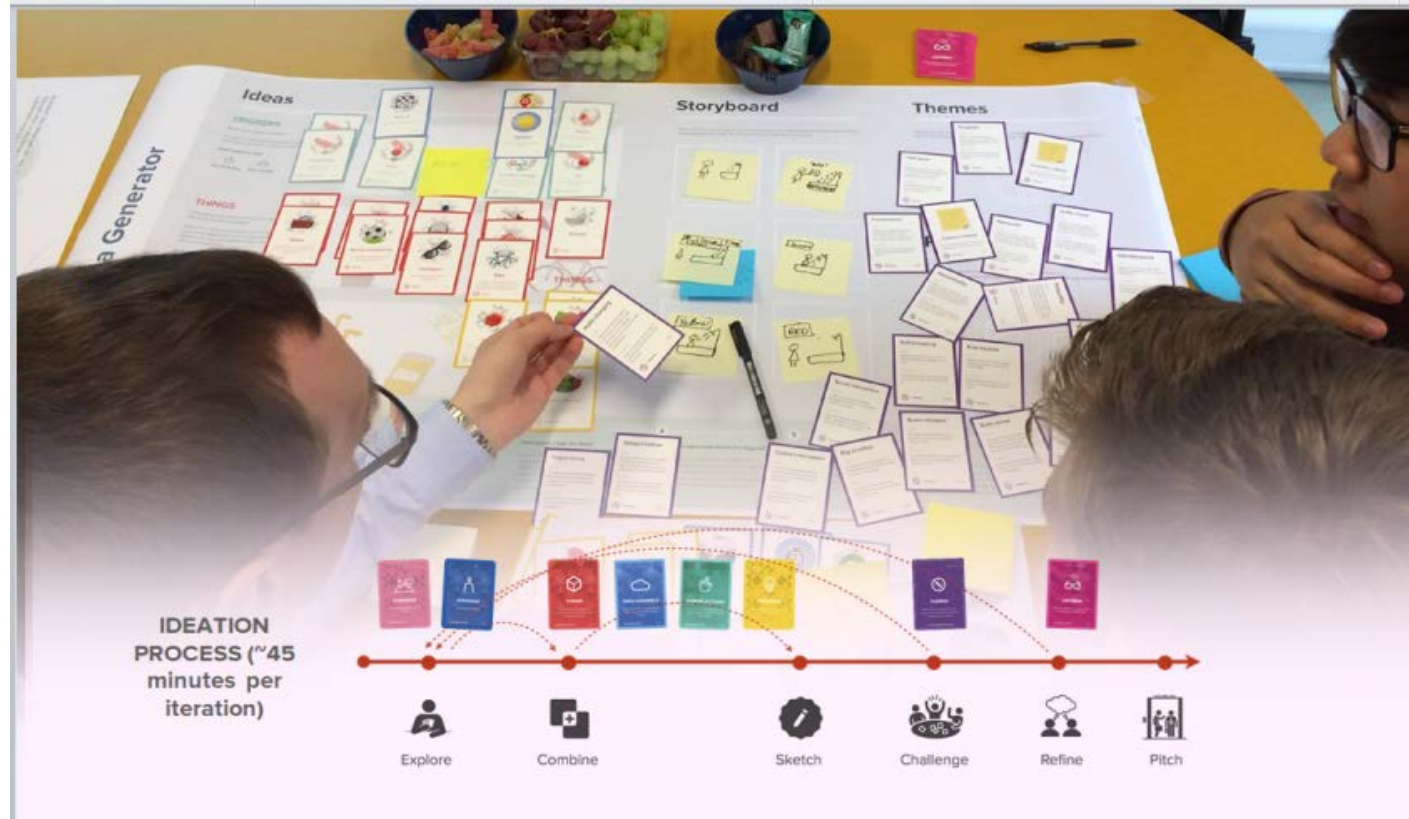
- ▶ LEGO 6 bricks – using Duplo to develop cooperation, creativity etc.
- ▶ IoT Tiles – table game for understanding IoT, cooperation skills etc. (http://tilestoolkit.io)
- ▶ CS Fundamentals – unplugged games and activities on CODE.org

Youth: Visual programming "drag & drop"

▶ Scratch – learning the basics by dragging and dropping commands (https://scratch.mit.edu)

▶ Drag & drop games based on popular cartoons, characters... (Angry Birds, Frozen) available through e.g. Code.org

▶ Greenfoot

(www.greenfoot.org)

Robotic toys

▶ Bee-bot or Pro-bot car educational toys programmable based on pre-defined commands

MAKEY MAKEY BOARD   ALLIGATOR CLIPS   INSTRUCTIONS

JOYLABZ

STICKERS   USB CABLE   6 CONNECTOR WIRES

▶ Makey Makey invention kit

Single board computers (with accessories)

▶ Arduino
https://www.arduino.cc/

▶ UDOO Neo Kit https://umi-sci-ed.cti.gr

▶ BBC Micro:bit
http://microbit.org

Educational tools for developing classical programming language skills
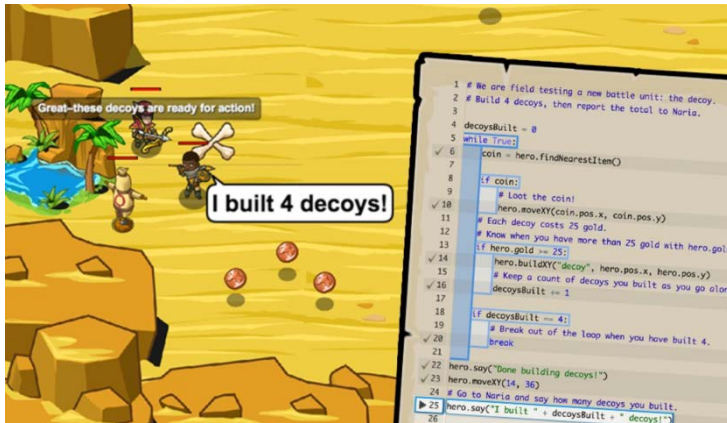
▶ Code Combat (https://codecombat.com/) influencing a game learning JavaScript and Python

▶ CodeMonkey (www.playcodemonkey.com) creating and playing a game learning open source language CoffeeScript

Support for educators and managers

► *eTwinning* (www.etwinning.net) – EC and national ministries' initiative supporting cooperation among schools and teachers in Europe. 200 000 teachers have participated in this growing community that offers differing tools and opportunities.

► Resources specifically for teacher education: *European Schoolnet Academy* (http://www.europeanschoolnetacademy.eu/) or *School Education Gateway* (www.schooleducationgateway.eu)

► Resources for performance measuring and competence identification e.g. Digital Competence Framework (DigComp) or Self-reflection on Effective Learning by Fostering the use of Innovative Educational Technologies (SELFIE)

Brining out the competitive streak in students and schools alike

► *Code week* (http://codeweek.eu/)

► *ALL DIGITAL week* (http://alldigitalweek.eu/)

► *STEM discovery week* (http://www.scientix.eu/events/campaigns/sdw18)

► *European Youth Awards* (https://eu-youthaward.org/)

► *Open Badges* (https://openbadges.org)

What's next in the Vysocina Region?

- Cooperation with the stakeholder group in Vysocina on choosing the most appropriate solutions (student preferences and abilities, educators' abilities, time allowance in current curricula, skills needed in job market)

- Adopting selected solutions

- Implementation of solutions in pilot schools, eventually all schools

- Developing supporting activities: long-term cooperation among educators, management support development, cooperation among relevant potential job providers and students

Workshop invitation

Smart cities and regions: A systems approach for better lives

▶ Prague on December 19th, 2018

▶ Organized by EPMA in cooperation with the Vysocina Region

▶ Representatives of public administrations, innovation experts, and representatives of private and third sectors

Thank you!

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