Digital transformation of education and science and its consequences

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Overview:

- Two implications
- Analysis
- Recommendations
- Croatian case
- Conclusions
- Discussion

„If we teach today’s students as we taught yesterday’s, we rob them of tomorrow.“
John Dewey
Implication 1

Digital transformation of economy and society

Digital transformation of schools and universities
Implication 2

Digital transformation of schools and universities

→

Digital transformation of economy and society
Discussion:

• Which implication is more accurate?

• Is it possible that (once again) education and science is in front of industry and how to achieve that?

Is there anything missing?
Supporting Implication 1

• The kind of things that are easy to teach are now easy to automate, digitize or outsource.
• Digital technologies can also promote social inclusion by creating better access to quality education and offering new opportunities for skills development (OECD, 2014)
• “MOOCs” and mobile learning are filling education gaps
• Technology creates and destroys jobs (?)
  – Jobs that will disappear (lost the race against the machine).
    • clerks and administrative staff, professional drivers (Frey, Osborn, 203)
  – Jobs that are in collaboration with machines / algorithms (run with the machine).
    • doctors / surgeons, teachers
  – Jobs that are completely new or remain largely untouched
    • new roles that involve managing data and machines, security & privacy

How to respond to that in the education systems?
The futur job market

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How to respond to that in the education systems?
Supporting Implication 2

• Seizing the opportunities and mitigation of challenges/risks
• Ethical issues of digitalization, reflecting on development or streamlining and policy leading
• New approaches to education, training, re-skilling - to maximizing the benefits of a digital and inclusive economy and society today (digital age) and in the future (conceptual age) – Pink “A Whole New Mind: Why Right_Brainers Will Rule the Future?

• Skills:
  – Basic skills and literacies
  – Digital (computational skills)
  – Science, technology, engineering and mathematics (STEM) skills
  – Computational skills
  – Soft skills – creativity, innovation, design, organizational change, entrepreneurial creativity …
State of the art – reform goals and technology risks

- Nearly one in five 15-year-old students in OECD countries does not acquire the minimum skills necessary to participate fully in today’s society. Some 16% of recent (education) reforms focus on ensuring quality and equity in education.
- Some 29% of reform measures considered in the report aim to better prepare students for the future.
- Many countries also introduced policies to ensure that students can find a job or a place in further education.
Figure III.13.3 ▪ Change between 2012 and 2015 in time spent on line outside of school

Minutes per day spent using the Internet

Percentage of high Internet users (spending 2 to 6 hours online per day), during weekdays

1. "OECD average-27" includes OECD countries with available data for both PISA 2012 and PISA 2015.
Gaps

• Digital divide
• Gap between “Technology 4.0” and “Policy 1.0”
• Gap between “Jobs 21th century” and “Education 20th century”
• Age gap –
  – Younger people are better prepared for the digital working environment than older people
  – 55% of workers lack basic problem-solving skills in technology-rich environments (PIAAK, 2015)
• Skills mismatch - Not just more skills but different set of skills
  – Educational system's inability to keep up with technological change (Goldin and Katz, 2008)
Leadership – systemic change

• Changes **throughout** the system
• Creating a **continuous cycle** of innovation and improvement
• Bring **stakeholders** together and to manage these deep, systemic changes
• Even talk to those who think the reform is not needed 😏
• Leaders **bottom-up and top-down**
• Leaders as **problem-solvers**
• „People recognize that even though money is tight and change is hard, we have to move forward.“ Source: Transforming Education for the Next Generation. A Practical Guide to Learning and Teaching with Technology. Intel Education. (Leslie Wilson)
• Develop a **shared vison** and **commitment**
• Promote **Deep learning**
CURRICULUM REFORM IN CROATIA

- The curriculum reform started in 2015 in Croatia as one measure in the Strategy for Education, Science and Technology
- Expected to affect all levels of education, all subjects, cross-curricular topics and frameworks for assessment, special education and education of gifted students
- Experimental implementation of the new curriculum reform starts in the 2018/19 school year School for life
  - Teacher training in digital environment
  - Digital transformation of schools
- Informatics was planned to become an elective subject in all grades of compulsory education (previously addressed in grades 5-8) and an obligatory subject for two years in upper secondary education (Gymnasium).
COMPUTATIONAL THINKING vs DIGITAL LITERACY

- **Obligatory Informatics in grades 5 & 6 (11-12 y.)** in the 2018/19 school year
  - Equal opportunity for all
  - Reduce the digital divide
  - Include all stakeholders - Budin et al (2017)

- **Cross curricular** topic of ICT – digital literacy

- **Programming of micro computers**
  - Interdisciplinary approach 2017/18 - teachers of all subjects
  - Computational Thinking and Programming
  - Grassroots initiative and joint venture with private sector

- **“e-Schools: Establishing a System for Developing Digitally Mature Schools (pilot project)”** [https://www.e-skole.hr/en](https://www.e-skole.hr/en)

- **EU technical assistance** instruments for peer learning
The new curriculum for organized in four domains:

- e-Society
- Digital Literacy and Communication
- Information and Digital Technology
- Computational Thinking and Programming
Higher Education – Program Agreements

- **Third cycle** 2018 – 2021 (or 2022)
- **Program overall goal**: fight against fragmentation of HE and research
- Three-folded mission goals
- **Education**: reverent for 4th industrial revolution, EQF, future jobs
- **Research**: ICT supported, academia-industry,
- **The third mission**: Serve to society: innovation, transfer of technology (in which direction?)
CONCLUSIONS

• Digital transformation of education and science
  – developing the next generation of lifelong (deep) learners, innovators and global citizens
  – Problem solving skills is at the very heart of the computational thinking

• Educational technology initiatives bring risks and opportunities
  – Approaching technology deployment not as a device initiative, but an education initiative – in schools as well as at universities
  – Equal opportunities for all

• Policy support – inclusion of all stakeholders and encouragement of grassroots developments
  – Schools and universities working together with industry

• Bottom-up and top-down leadership
  – Critical planning decisions on a deep, evidence-based understanding of how to improve learning and teaching
Dig. transf. of economy

Leadership

Dig. transf. of schools and univ.
Thank you