ITELab – Innovating ITE curricula

Key Action 2 - Knowledge Alliance project

ITE Forum: 17th Oct 2019, 15hCEST

Returns to Innovative Teaching: a focus on Artificial Intelligence

Discussion question: "The challenges and advantages of using leading-edge technology in teaching & learning settings?"
THE ITELAB UNIVERSITY INDUSTRY FORUM

Characteristics:
- U + I
- Knowledge-sharing
- Multiple voices
- Contemporary topics
- Monthly

ITE FORUM
The place to discuss Initial Teacher Education brought to you by ITELab in collaboration with the Future Classroom Lab and Next-Lab • ite-forum.eun.org
ITE FORUM: TODAY’S AGENDA

1. **Welcome** by co-chairs Dr Conor Galvin (UCD) & Peter Claxton (SMART)

2. **Returns to Innovative Teaching – a focus on AI**
   - Dr. Patrick Camilleri, University of Malta
   - Marco Neves, expert DGE Portugal
   - Peter Claxton, Senior Strategy Manager, SMART Technologies
   - Dr. Kamakshi Rajagopal, researcher KU Leuven
   - Vicky Charisi, Research Scientist, EC JRC, Centre for Advanced Studies

3. **Open Forum:** “The challenges and advantages of using leading-edge technology in teaching & learning settings?”
HE, AI and the age of digital ubiquity

remaining relevant

Dr Patrick Camilleri University of Malta
enactment and change

Pace of Innovation

Age of Pervasive Technology
- New literacies + cognitive capacities
- Information age

Digital
- Cold War. Universities as loci of creativity

Industrial
- Professional degrees for office work

Agricultural
- WW2 coordination between military and academics. Manhattan Project

Age of Discovery. New knowledge. Economy and Social Progress
- Cultivating the individual. Logic. Rhetoric. A technology free society.
where do we stand today?

a point of inflection
unprecedented disruption
focus on what AI cannot do
assessment
autonomy
teacher’s working conditions
attention at the roots
attention to culture
blurring boundaries
humanics
traditional literacies

new literacies

- data literacy
- technological literacy
- human literacy

Cognitive Concepts

Dr Patrick Camilleri University of Malta
meaningful learning

cognitive capacities

• systems thinking
• entrepreneurship
• critical thinking
• cultural agility
Digitally driven economy

- just in case
- just in time
- just for you

- the nomad learner experience
cross thematic growth mindset

- fragmented vs continuous, global

- tutor mentor facilitator

- lifelong learning

- enhanced digitally mediated learning
Thanking you for your attention
IS ARTIFICIAL INTELLIGENCE GOING TO TRANSFORM THE SCHOOL?

A MOOC DEVELOPMENT BY THE PORTUGUESE MINISTRY OF EDUCATION
Why?
In the age of Cognitive Machines

Challenges and Opportunities
“Our intelligence is what makes us human, and AI is an extension of that quality.”

Yann LeCun
We are crossing a turning point of no return

The “formulas” that worked in the past, in all areas of our society, will very soon become outdated and obsolete.
Technological Megatrends

**IoT** 30 billion sensors (2020)

**Big Data** Over the last two years, 90% of data has been produced

**AI** Algorithmic power

**5G+** Nervous System (hyper connection)

**Quantum Computing** Computational power
Life Ruler Algorithms (*other intelligences?*)

Where to go? Google Maps
What to watch? Netflix
What to buy? Amazon
Who to fire? Uber
What information to access? Facebook
With whom to date? Tinder
Main questions in the age of cognitive machines!

We will be challenged by cognitive agents. How to live side by side with them?

What models of (re)training and education will be needed?

Who (will) control the machines that take decisions (ethics, bias)?
An (educational) framework
Over the last 4 years, the Portuguese Ministry of Education has taken huge steps towards bridging the gap between the past and the present.

Key-documents to better empower the 21st century.
Two Law-Decrees

- Autonomy and Curriculum Flexibility (55)

- Inclusion (54)
Framework documents

- The Students’ Profile by the end of Compulsory Education

- Essential Learning

- Framework for each subject matter
MOOC structure
4 Modules

1) What is Artificial Intelligence

2) Learning for AI (learning how to live in an AI world)

3) Using AI to support teaching and learning

4) Learning about AI
Main Goals

Recognizing the importance of AI

Developing a critical understanding of the impacts of AI

Knowing how to identify the challenges and opportunities generated by the impact of AI
Main Goals

Understanding how to integrate the theme of AI in the classroom

Identifying some AI-supported educational tools that you think might be appropriate for your students, and evaluate their benefits and disadvantages

Identifying the potential of AI in the field of Education
Thank you
AI at SMART

- Smart pens
- Search and recommendation
- Auto moderation
- NDA
AI pen modes improve the whiteboard experience

- Text Pen recognizes ink strokes as text
- Shape Pen recognizes ink strokes as shapes
- Magic Pen spotlights or magnifies parts of the whiteboard based on ink gesture
Search and recommendation

- User facing search improvements
- Recommendations
  - Other people have also viewed this
  - Best general subject templates
  - We noticed you’re doing Math here are some related math content
  - This content is proven to improve outcomes
  - Etc.
Auto moderation

- Allow users to share their content quicker

Safe Search APIs for obvious rejections

Manually review takedown requests
A review of the state-of-art of the use of recommendation in educational portals and OER repositories

Kamakshi Rajagopal
17 October 2019
Figure 1 General architecture of a recommendation engine
Is recommendation useful for educational repositories / platforms?
Consider this

• User behavior: who is your user and how do they use your platform?

• Complete User experience: how does recommendation fit in with other parts of your platform?

• Measuring success: what are your measures for success of implementing recommendation?
Is recommendation useful for educational repositories / platforms?
Yes.
If users come to your platform to explore

If users use platform to keep in touch with latest resources

If repository grows
If users know what they need from your platform

If users are looking for particular materials and resources

If repository does not grow
How can recommendation be implemented?
Roadmap

• To get to know the user (user behavior, statistics, focus group, survey)

• To define your design challenges regarding user interaction (current experience vs desired experience)

• To define your measures of success (user presence, user engagement, quality assessment)

• To identify the role of recommendation in your business (monitor reception of recommendation engine)
<table>
<thead>
<tr>
<th>User behaviour</th>
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<tbody>
<tr>
<td>Designed Complete User Experience</td>
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</table>

<table>
<thead>
<tr>
<th>Functionality</th>
<th>Purpose</th>
<th>Measures of success</th>
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<tbody>
<tr>
<td>Search</td>
<td></td>
<td></td>
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<tr>
<td>Recommendation of people (peers; experts; others)</td>
<td></td>
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<tr>
<td>Recommendation of resources</td>
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<tr>
<td>Evaluative business process</td>
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Lessons learnt

• Recommendation components
  • Algorithms
  • Visualisation

• User interaction and User experience

• User-centric design and Evaluation
Key message
Find out if Recommendation fulfills your users’ needs

Make your users co-owners of your platform: use their input to define recommendation strategy and implementation

Recommendation is only part of the whole user experience
Q & A
Vicky Charisi
JRC, Centre for Advanced Studies
European Commission

Artificial Intelligence / Robotics and Child’s Learning

ITEDlab
17 October 2019
Today..
- Overview of research on social robotics
- Methods
- Current research
- Ethical Considerations
- Connection with Policy
Robots and Child’s Learning
Robots and Child’s Learning

**Embodiment hypothesis**
Intelligence emerges as a **result of sensorimotor activity** in the interaction of an agent with an environment

**Embodied Social Artificial Intelligence**
AI - robotics – psychology – philosophy - education

![Images of robots and people interacting]

(Images: Karremann, 2016; Joosse et al., 2016; Scassellati, 2018; Charisi et al., 2017)
Overview

→ Previous research on child-robot interaction
  - in play activities
  - for inquiry learning support

HUMAINT project on the Impact of AI on Human behaviour

Current work and initial results

Ethical considerations in child-robot interaction
Child-Robot Interaction for inquiry learning support

Child-Robot Interaction for inquiry learning support

→ Duration of response versus explanation depth

Embodiment
Embodiment
Overview

Methods

Current research

Ethical considerations

Policy

- Mechanics
- Manipulation
- Sensors
- Computer vision
- Voice recognition

Social Intelligence

Embodiment

Multi-modal interaction

Intention

Social relationship

Policy
Methodological considerations: Synthetic methodology

An example:

**Automatic ranking of engagement using movement and turn taking features**

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Human-human interaction  
Robot vision and perception  
Hybrid play environment

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STUDY 1

Is there any impact of a Social Robot Interventions on children’s problem-solving process?

Lucas, 1883

R. Gómez Haru: Hardware Design of an Experimental Tabletop Robot Assistant, HRI2018
The current experiment

Methodology

- N=34 children,
  - Baseline (without robot): N=10
  - Condition 1 (turn-taking): N=10 (age= 7,8 years, SD=1,31)
  - Condition 2 (voluntary interaction N=14 (age= 7,23 years, SD=1,42)
- 106 individual sessions of ~15min
STUDY 2

Child’s trust on social robots depending on robot’s prior cognitive and social behaviour
**Motivation:** Methodological approaches for Child - Robot Interaction

Open-ended tasks → spontaneous and exploratory actions → novelty-based development

**Unstructured Play**  
Learning by doing

**Musical Play**

**Music-making**

Presence of music in all cultures, time periods and across age-groups

Creative Thinking process → Music-making
The data consisted of 7063 annotated actions (micro-behaviours) of 12 individuals.
Patterns of sequence of actions

Transition probability between subsequent actions

The patterns of transition probability appeared **more stable** in the last session.

**Session 1**
Evaluation of musical outcome
→ Deliberate action of music-making

**Session 7**
Exploratory actions
→ music-induced body movements
Responsible design and innovation

How can we embed Child’s Values and Rights into our systems?

Convention on the Rights of the Child

Educators’ views on using humanoid robots with autistic learners in special education settings in England.


Principles
How each one of the suggested additional AI principles should be adapted to protect and promote child rights.

From Policy to Practice
What support tools/resources/actions are needed to implement the guidelines.

Multi-stakeholder Policy Engagement Strategies
How to best engage different stakeholders to implement the guidelines, across regions and sectors. The groups will focus on engaging:

Child Online Protection Initiative
Thank you for your attention!

Vicky Charisi
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https://vickycharisi.wordpress.com/
"The challenges and advantages of using leading-edge technology in teaching & learning settings?"
ITE FORUM - AUTUMN 2019

- series of monthly thematic seminars
  - Short reflective video/podcast posted in advance
  - In conversation sharing views on the theme from different perspectives: university, industry, schools, policy and student teachers
  - Open discussion

2019 programme:
- Feb 21st: Hearing the Learner - engaging the student teacher voice (part 1)
- Mar 21st: Hearing the Learner - engaging the student teacher voice (part 2)
- May 16th: Designing Teaching Resources - including ‘soft skills’ with inclusive aims
- June 20th/21st: Schools Innovation Forum at the FCL, BXL - Spaces for Learning
- Sept 19th: Returns to Innovative Teaching - from schools and teaching perspective
- Oct 17th: Returns to Innovative Teaching - a focus on Artificial Intelligence (AI)
- Dec 12th: Learning through doing - a focus on VR and video

Sustainable forum - Schools Innovation Forum - linked to the Future Classroom Lab [http://fc.leun.org](http://fc.leun.org)
ITELab (Initial Teachers Education Lab) is a Knowledge Alliance project between higher education institutions and industry to foster innovation and knowledge exchange in initial teacher education (ITE). Project number: 575828-EPP-1-2016-1-BE-EPPKA2-KA. It is co-funded under the European Commission’s Erasmus+ Programme from January 2017 to December 2019.

This publication was created with the financial support of the Erasmus+ Programme of the European Union. This publication reflects the views only of the authors and the European Commission cannot be held responsible for any use that may be made of the information contained herein.

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