The SAMR Framework for Study Technology Integration in Science Education

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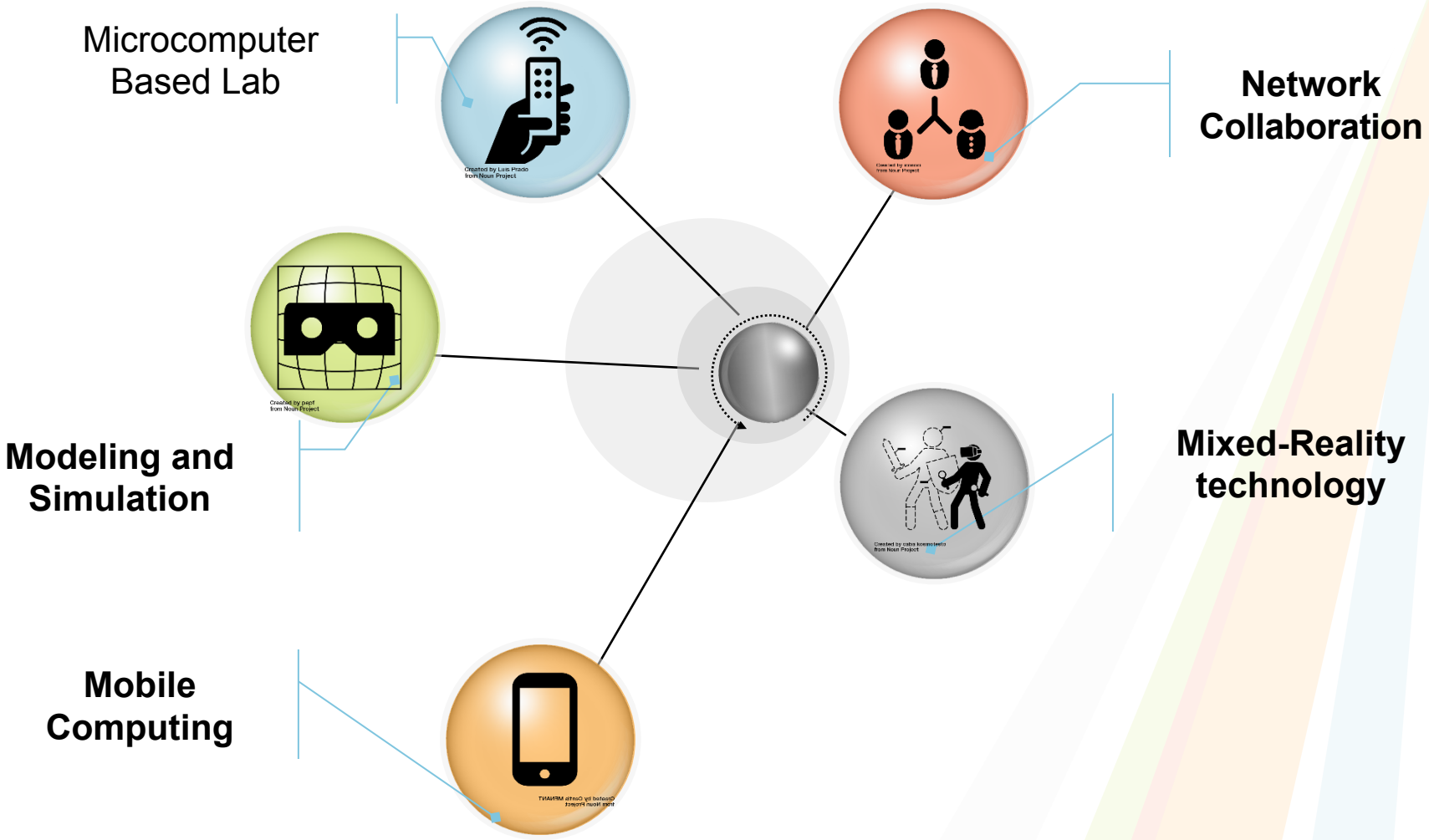
Outline

1. ICT in Science Education (SE)
2. Matrix Model of the ontology of ICT Integration in SE
3. SAMR Framework for Assessing ICT Integration in SE
4. Preliminary study

ICT in Science Education

- In comparison with the great success of ICT in all spheres of the life, integration of ICT in education seems to remain modest
- Many researchers tend to believe that the main bottleneck of ICT integration into education stems from teachers' lack of **technological literacy**
- We assume that success of the ICT integration requires significant changes in **teachers' worldview**.

ICT in Science Education



Ontology of ICT integration in science education

Components of worldview

- Self-conception
- Mutual interactions
- Conception of reality
- Interactions with reality

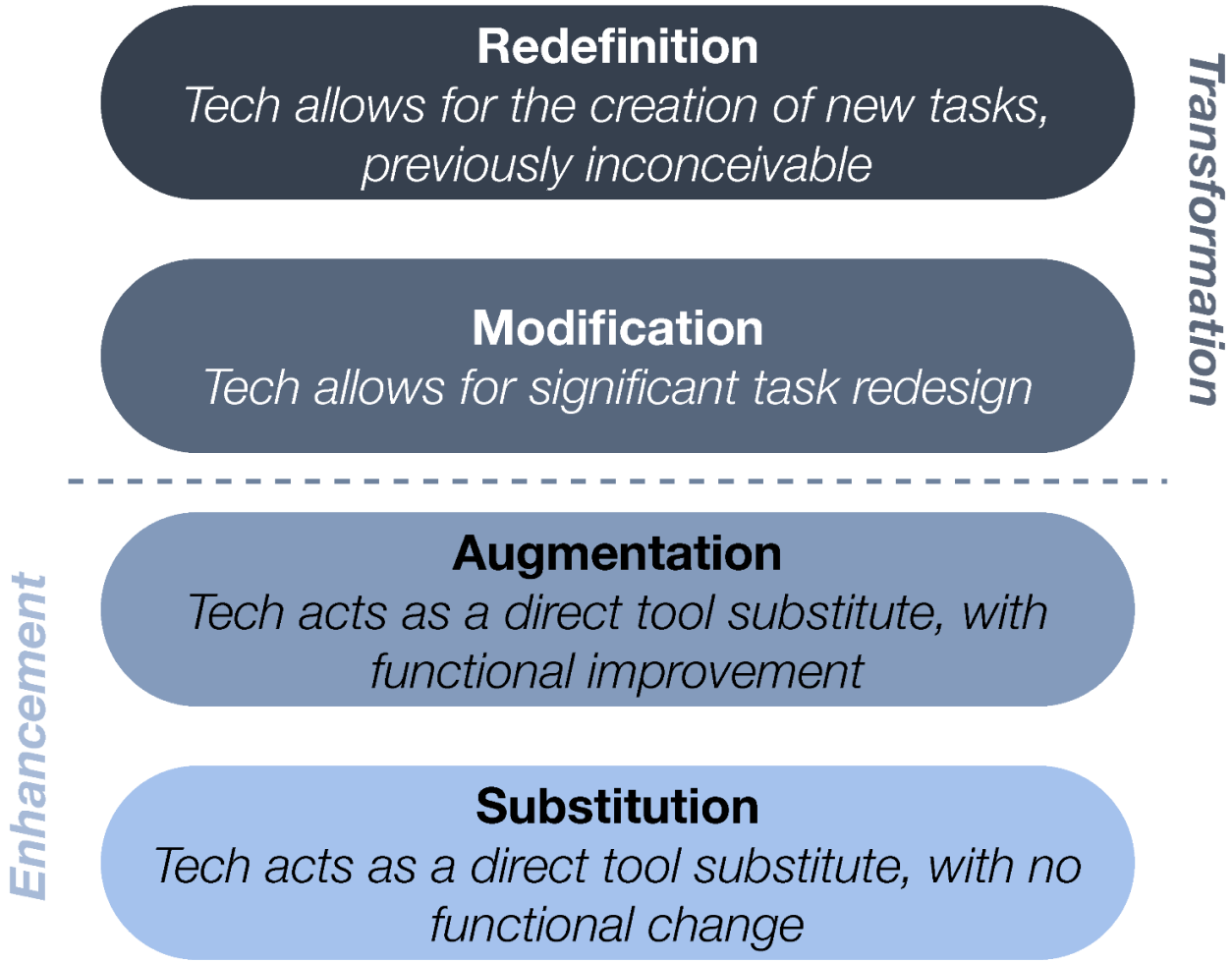
Corresponding transformations of Digital society

- Blurred distinction between reality and virtuality
- Blurred distinctions between human, machine, and nature
- Reversal from information scarcity to information abundance
- Shift from the primacy of entities to the primacy of interactions

Matrix model of ontology of the ICT integration

Worldview	Transformations	Teacher	Learner	Environment	Curriculum
Self-conception	Reality/virtuality	Perceptions about informational organisms	Perceptions about informational organisms	Mixed-reality technology	Integration the digital inquiry methods
		Self-recognition as informational organism	Self-recognition as informational organism		
Mutual interactions	People/nature/artifacts	Perception of digital artifacts as socially behaving entities	Perception of digital artifacts as socially behaving entities	Cyber-physical systems, emerging probes and sensors technologies	Integration artifacts as objects of inquiry
		Utilizing ICT in scientific inquiry teaching	Utilizing ICT in scientific inquiry learning		
		Perception artifacts as objects of inquiry	Perception artifacts as objects of inquiry		
Conception of reality	Information abundance	Perception of Data Intensive Science as the new science paradigm	Perception of Data Intensive Science as the new science paradigm	Informational redundancy	Personalization of curriculum
		Teacher as a leader and not a driver in the class	Student as a co-learner with the teacher in the class		
		Teaching in digital space	Learning in digital space		
Interactions with reality	Primacy of interactions	Teachers' self-recognition as partners in the educational communications	Intensive interaction between learners	Collaborative learning environment	Attention to relations and to interactions in curriculum
		Teachers' awareness about the domination of networked learning	Collaborative inquiry based learning		

SAMR Framework for Assessing ICT Integration in Science Education



SAMR Framework for Assessing ICT Integration in Science Education

- We consider the *Redefinition* as the supreme, creative form of the understanding of technology in education

- Our hypothesis is that the changes of teachers' worldview are vital for their understanding the role of technology in science education in its transformative stage (*Modification/Redefinition*)

SAMR Framework for Assessing ICT Integration in Science Education

- Studying and analyzing the ICT integration phenomenon in science education
- Examining and assessing worldview of teachers about the essence of technology and its role in education

The preliminary study

Goal

To examine the science teachers' worldview regarding the ICT integration in their professional life.

Research questions

1) Whether science teachers perceive digital technologies just as a tool, or as a more general cultural phenomenon?
2) Whether and how the specially developed training course affects the teachers' worldview?

Sample

18 in-service teachers who had undergone a specially developed training course in the School of Education at Tel Aviv University

Methods

Data collection

Pre/post semi structured interviews

The questions were based on the matrix model

Data analysis

Quantitative and qualitative analysis

The analysis were based on the SAMR framework

Findings and conclusions

1. Conducting a specially developed training course allowed to change the teachers' worldview
2. The SAMR framework approved its effectiveness as a tool for assessing teachers' worldview
3. A number of teachers achieved the Redefinition level of perception

Thank You!

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