Reinventing the wheel in Educational Technology: A perpetual drama?

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Slides: https://tecfa.unige.ch/tecfa/talks/schneide/km-2023/

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"a scary swamp with a clear and neat path that leads to a neat mountain pass in comic style"
- DALL-E (June 2023)

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PART 1 - 1
THE PROBLEM #1

Every 10 – 20 years…

… we are confronted
with a new disruptive technology
that does not disrupt much
because change
requires change in cultural attitudes
and knowhow
and that does not happen quickly.
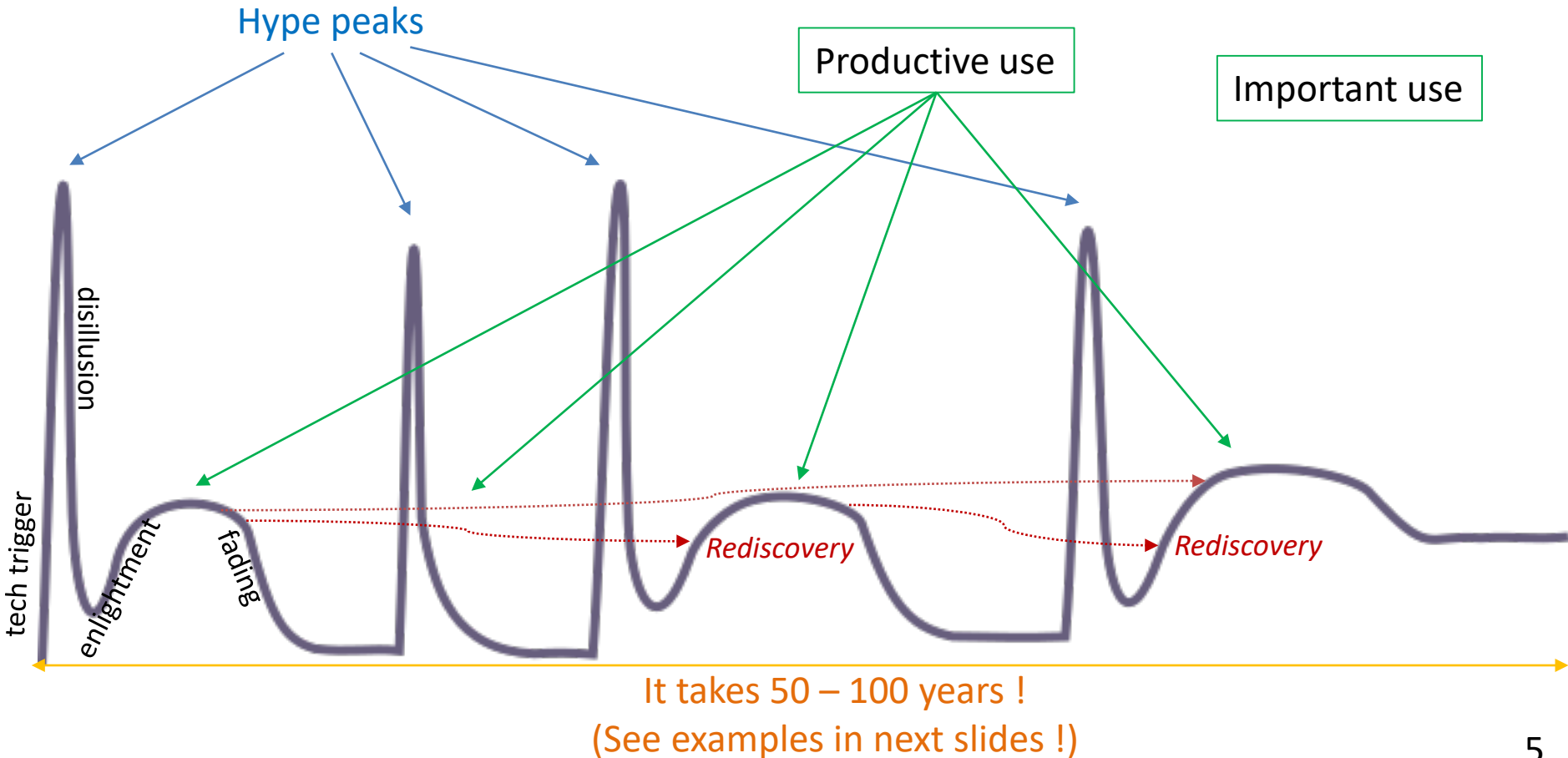
… most of this new technology
is very similar to older technology
(+ research, design and experience)
and is initially ignored.

If there is no shared history, then there is a tendency, seen repeatedly over these 25 years, for ideas to be rediscovered. A consequence of this is that it sees every development as operating in isolation instead of building on the theoretical, financial, and administrative research of previous work.
- The Historical Amnesia of Ed Tech,
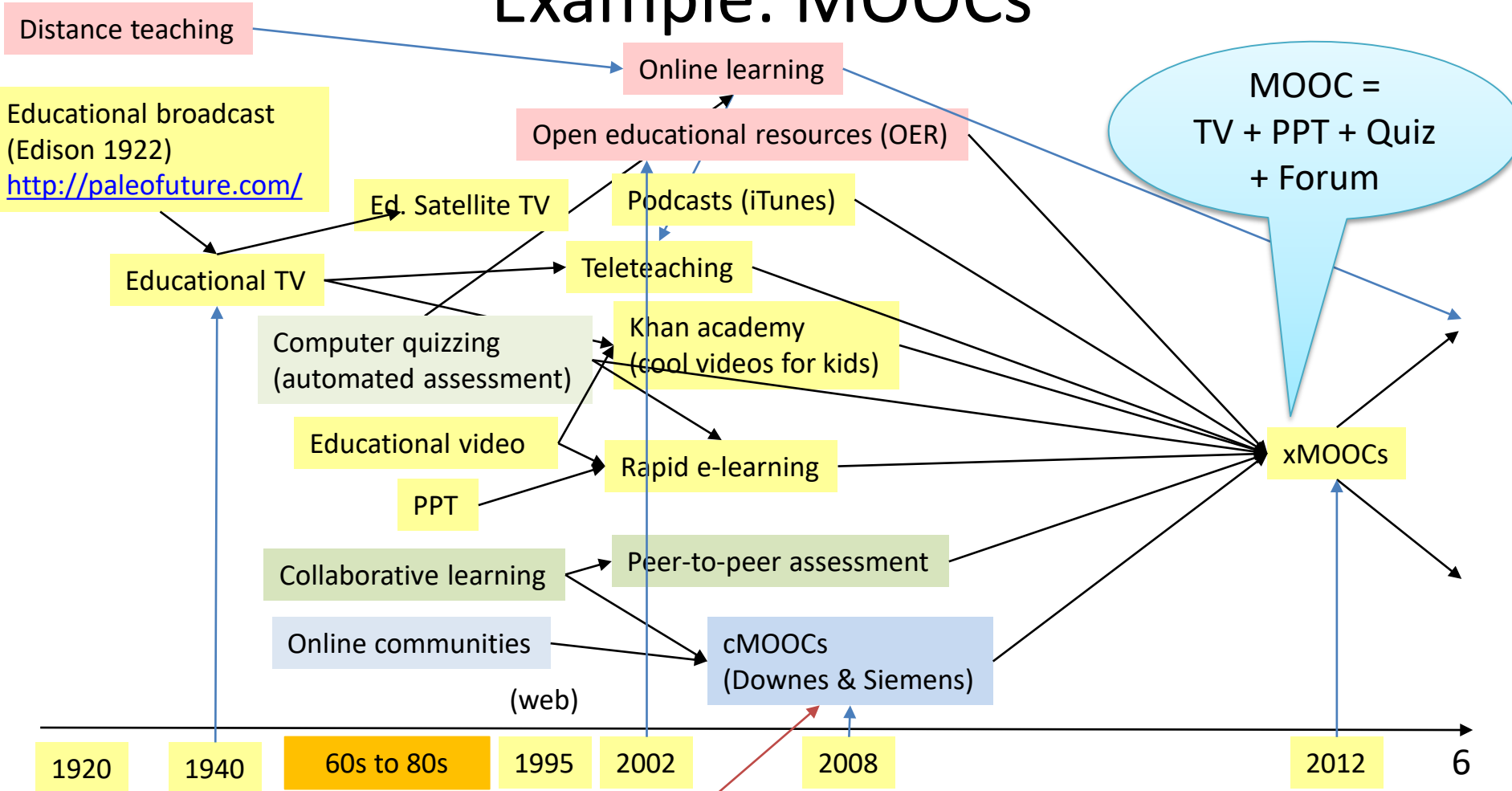25 Years of Ed Tech
Martin Weller (2020)

Technological change is fast
Its use in education is not
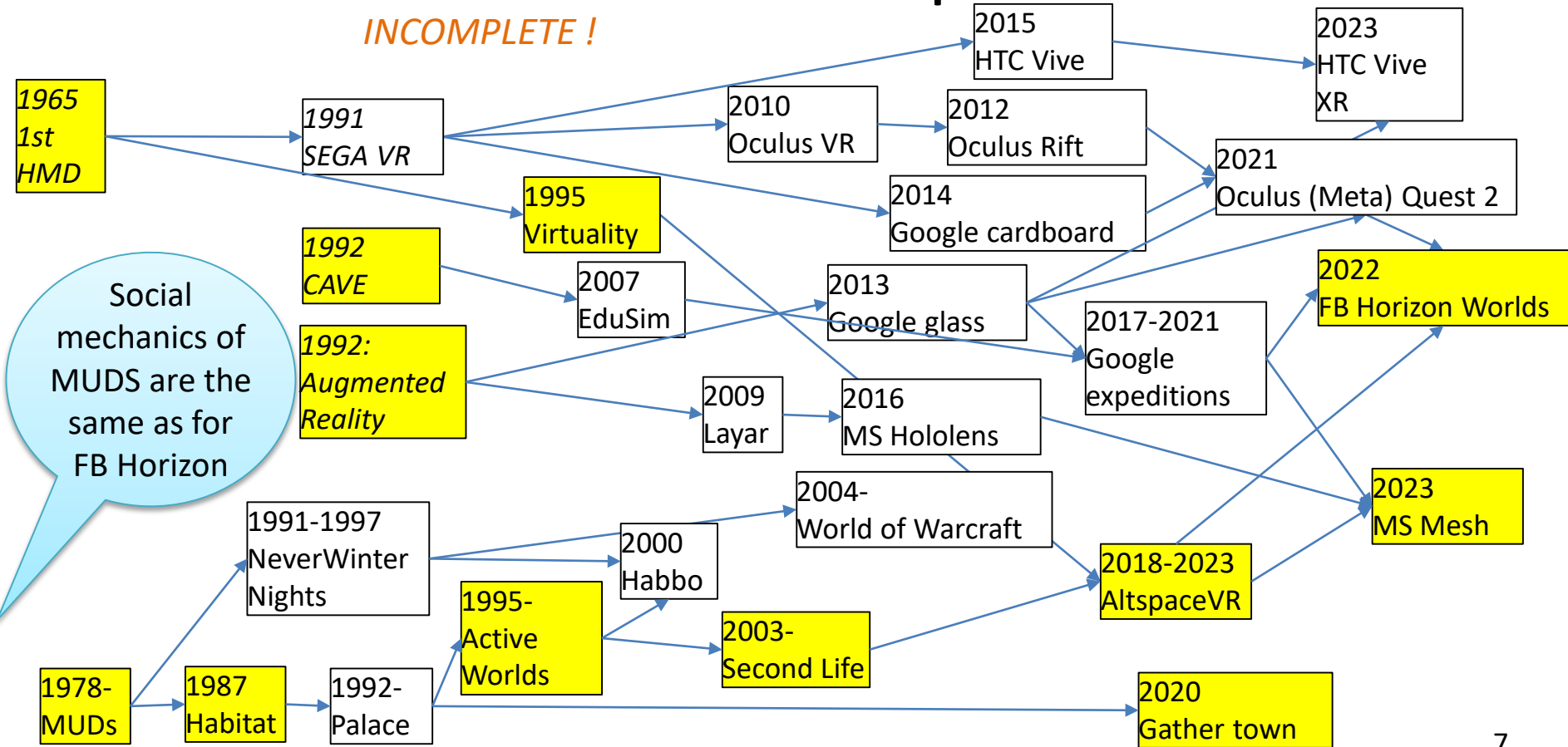
Cycles of (Gartner) hype cycles

Hype peaks

Productive use

Important use

disillusion

tech trigger

enlightment

fading

Rediscovery

Rediscovery

It takes 50 – 100 years !
(See examples in next slides !)

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Example: MOOCs

INCOMPLETE !

Distance teaching

Online learning

Open educational resources (OER)

MOOC =
TV + PPT + Quiz
+ Forum

Educational broadcast
(Edison 1922)
http://paleofuture.com/

Ed. Satellite TV

Podcasts (iTunes)

Educational TV

Teleteaching

Computer quizzing
(automated assessment)

Khan academy
(cool videos for kids)

Educational video

Rapid e-learning

PPT

Peer-to-peer assessment

Collaborative learning

Online communities

cMOOCs
(Downes & Siemens)

xMOOCs

(web)

| 1920 | 1940 | 60s to 80s | 1995 | 2002 | 2008 | 2012 | 6 |

Ex: Immersive and desktop VR in Education

INCOMPLETE !

1965
1st
HMD

1991
SEGA VR

2015
HTC Vive

2023
HTC Vive
XR

2010
Oculus VR

2012
Oculus Rift

2021
Oculus (Meta) Quest 2

2014
Google cardboard

1995
Virtuality

1992
CAVE

Social mechanics of MUDS are the same as for FB Horizon

2007
EduSim

2013
Google glass

2017-2021
Google expeditions

2022
FB Horizon Worlds

1992:
Augmented
Reality

2009
Layar

2016
MS Hololens

2004-
World of Warcraft

2018-2023
AltspaceVR

2023
MS Mesh

1991-1997
NeverWinter
Nights

2000
Habbo

1995-
Active
Worlds

2003-
Second Life

1978-
MUDs

1987
Habitat

1992-
Palace

2020
Gather town

Why do they reinvent?

A few ideas:

💡 "year zero mentality" (*I* invented this cool new thing)

🙈 People entering the field from elsewhere do not/cannot read

㊗ New ideas are formulated with different words that do not match known ideas

🐘 Commercial pressure for start-ups to be «disruptive»

👍 Techno-optimism («this time it will work»)

🔫 Technology seeks co-optation (and does not understand the victims)

📈 Hope that return on effort may be higher

⏻ Technology changes (software stops working)   *(Some ideas from Martin Weller)*

✊ Technology is not neutral (some will be disliked at some point)

♻ Some iteration *is* required for complex designs

🏃 Pedagogy may change

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PART 1 - 2
PROBLEM #2

Chasms
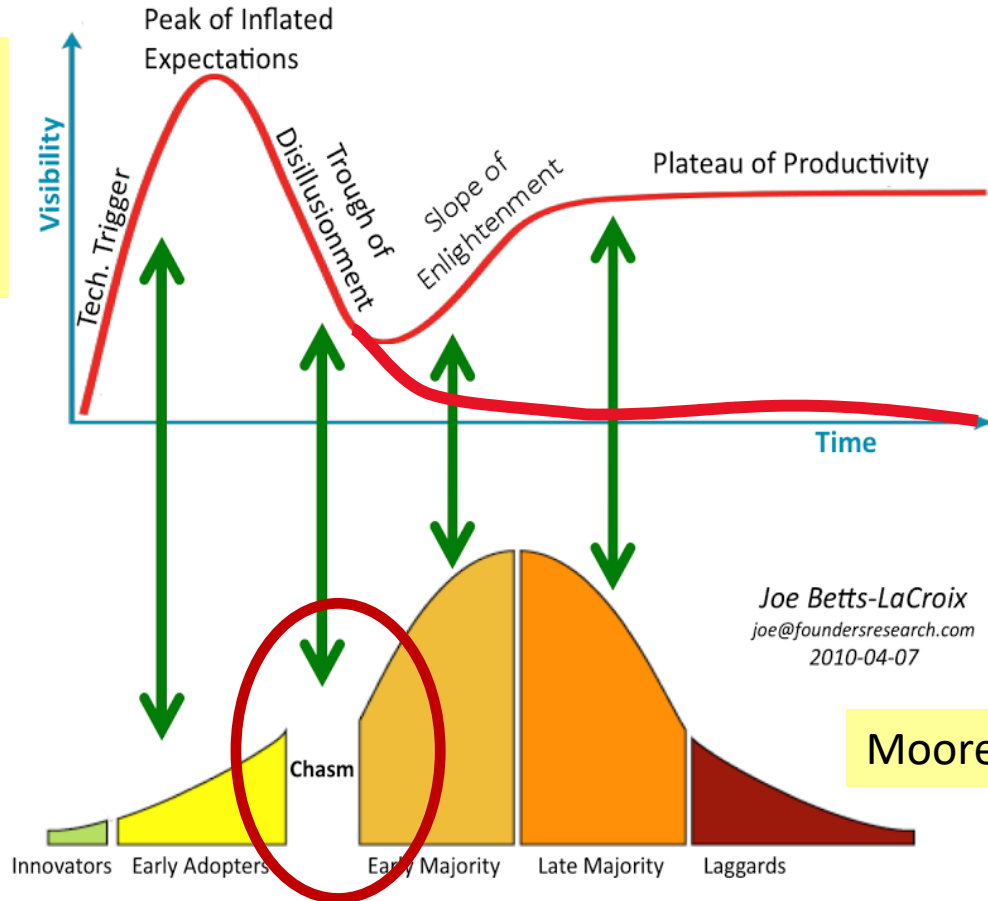
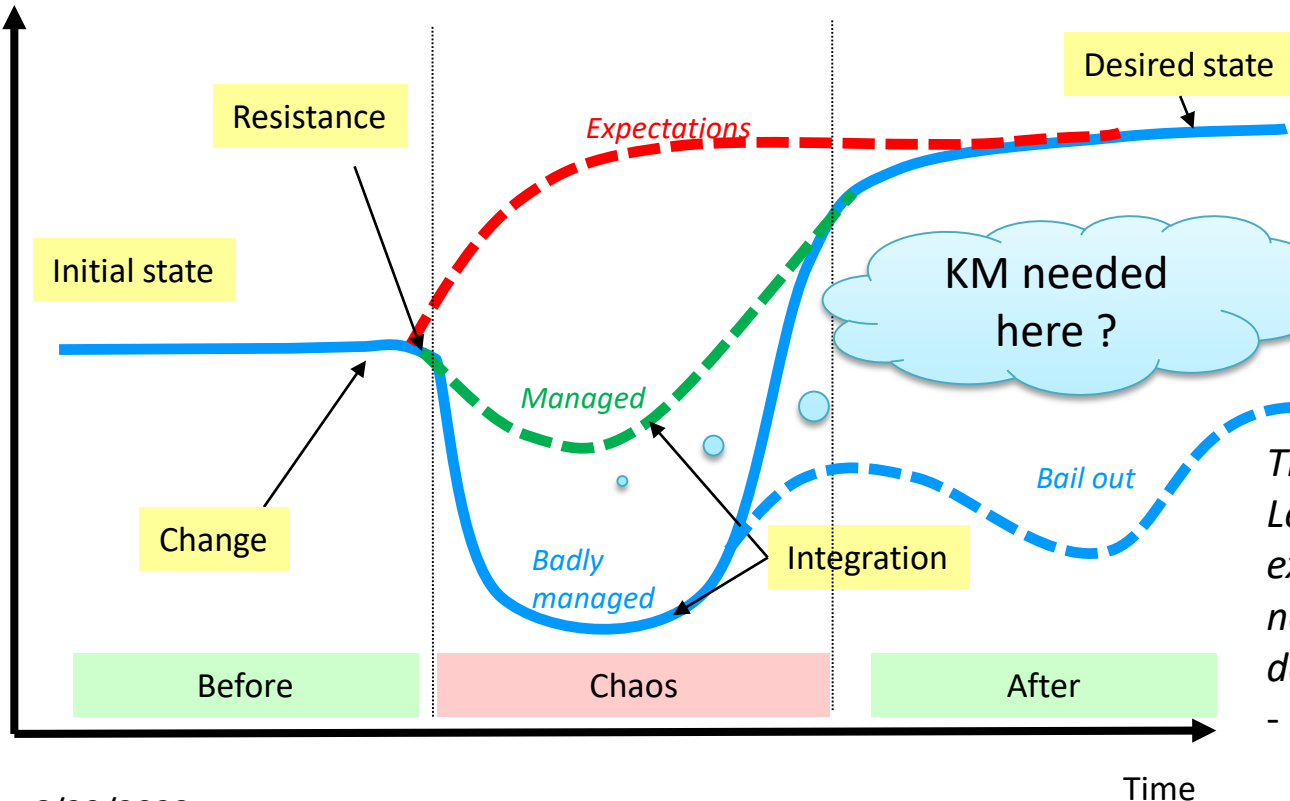Some innovation remains stuck even if technology is working,
e.g., micro credentials (OpenBadges) do work …
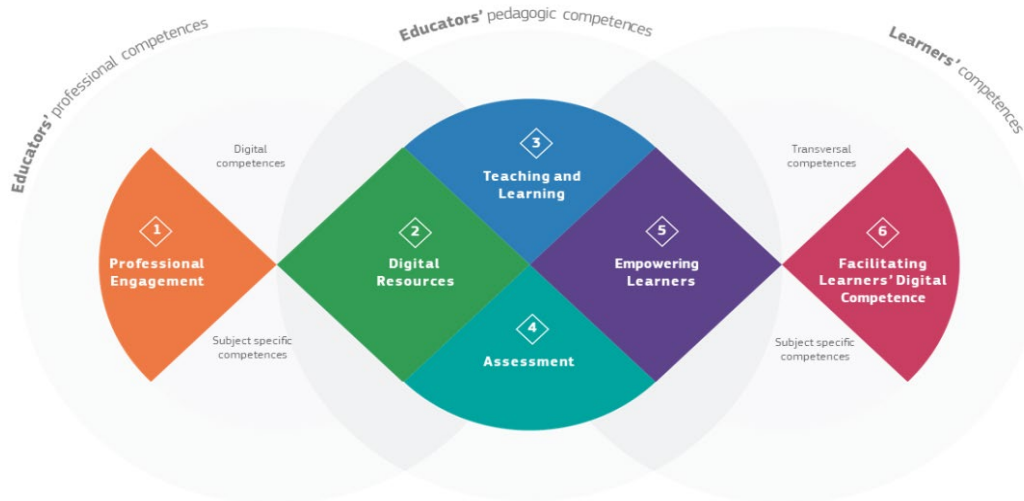
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The J-Curve is too steep
(Satir)

In particular for project-oriented learning (Dewey; Kilpatrick 1918)
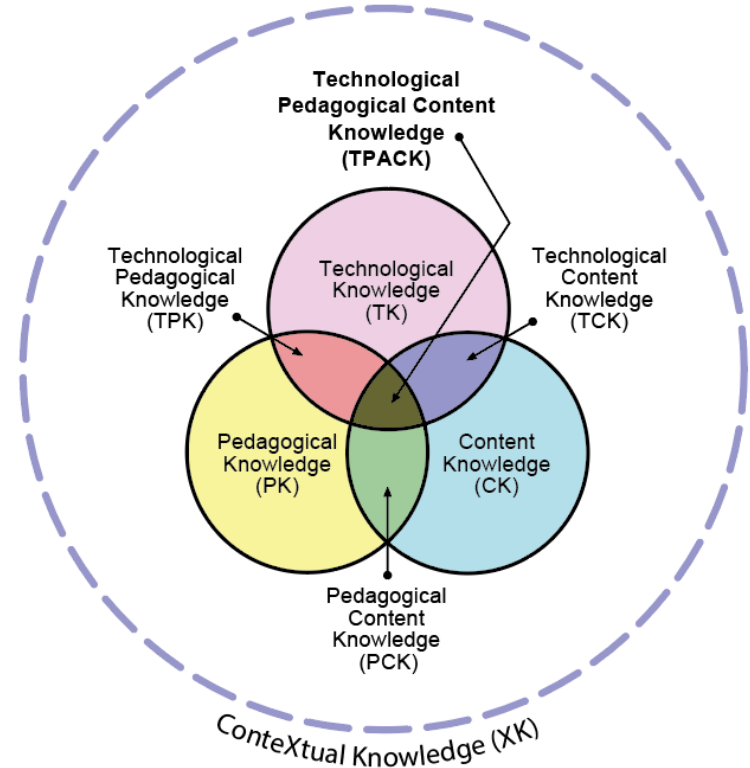
The field of Technology Enhanced Learning, despite some notable exceptions, is rife with results that never made it across the valley of death
- Richard Noss (UCL, 2014)

Education is difficult and worse with EdTech

Multiple teacher competences !

DigCompEdu, EU 2021

It's not rocket science, it's more complex

TPACK, Mishra, 2018

PART 1 – 3
DISCUSSION

How big is this drama ?

Not so much:

- Educational institutions operate over long timeframes and are robust (whereas most tech companies founded in the last 25 years are dead, https://www.bls.gov/bdm/entrepreneurship/entrepreneurship.htm)
- Most knowledge taught does not change much
- Publishable research also has a long time horizon
- Vendors of EdTech "often use powerful but largely meaningless and discredited theories, such as disruption, digital natives, and learning styles" (Weller), being slow is a good defense
- Change is slow, 25 years for school-wide change (Burkhardt&Schoenfeld, 2003).
- Change can be very expensive (bad ROI) and waiting = cheaper

BUT: We could (1) waste less effort on reinventing and also (2) improve change rates

Ways to go for remembering and building on top of proven knowledge ?

You can fill the bags with most of what you know

Remember

Reuse

Recommended change management + knowledge management «tricks» do always help, but are not enough in education

Additional ideas in PART 2 …

PART 2 - 1
# ROUTE 1: INTEGRATE KM IN TEACHING

Communal constructivism

In the **traditional learning model students pass through a learning programme like water flowing through a pipe**, with the tutors simply determining a goal, giving its direction and applying the pressure to get there.

In a **communal constructivist learning** environment, **students contribute to the communal knowledge in a permanent form – like a river enriching its flood plain each year by adding nutrients and minerals to the soils.** (Holmes et al., 2006:86)
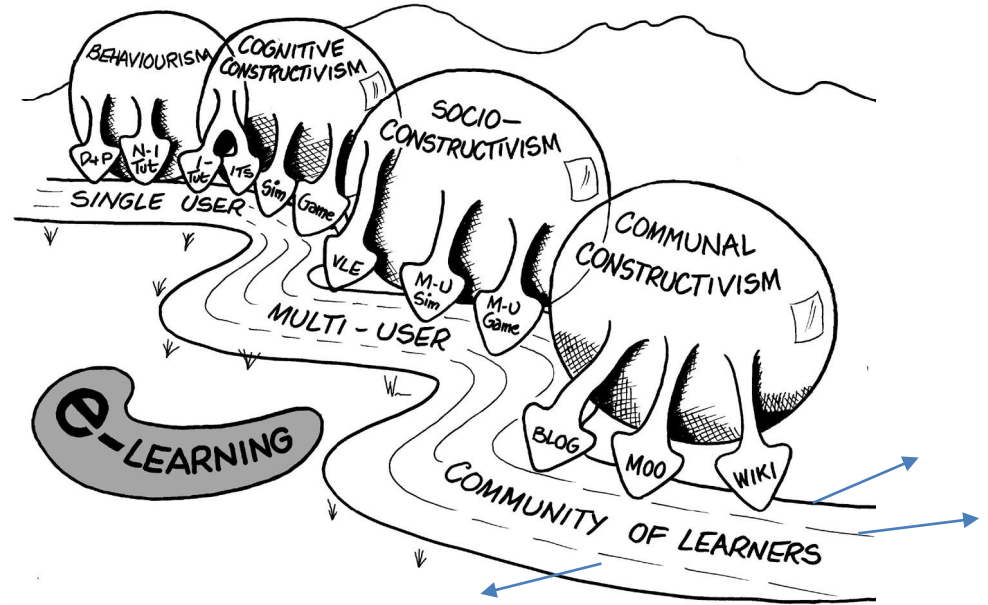
Water in a river model of communal constructivism,
Copyright Holmes and Gardner 2006, reproduced with permission by Bryn Holmes

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Contribution-oriented pedagogy

"**Learners contribute to the learning materials via contributions made available to others in a Web-based system**. The others may be others in the same group or others at other times. The others may be at the same or different locations." Collis & Moonen (2004)

Featuring:
- Learning from the work of other learners
- Using the work and experiences of other students as model answers or as a basis
- Increase of motivation, since submissions are meaningful for the course experience
- Expanding the range of examples and resources available for the course and the following
- Dialogue and interaction (typical benefits of collaborative learning)

Knowledge co-construction

- **Intentional learning**: Students actively try to achieve cognitive objectives (own their learning process)
- Restructuring schools as **knowledge-building communities**
- **Expertise as a process**: reinvestment of mental resources, available as a result of learning, into increasing levels of complexity.
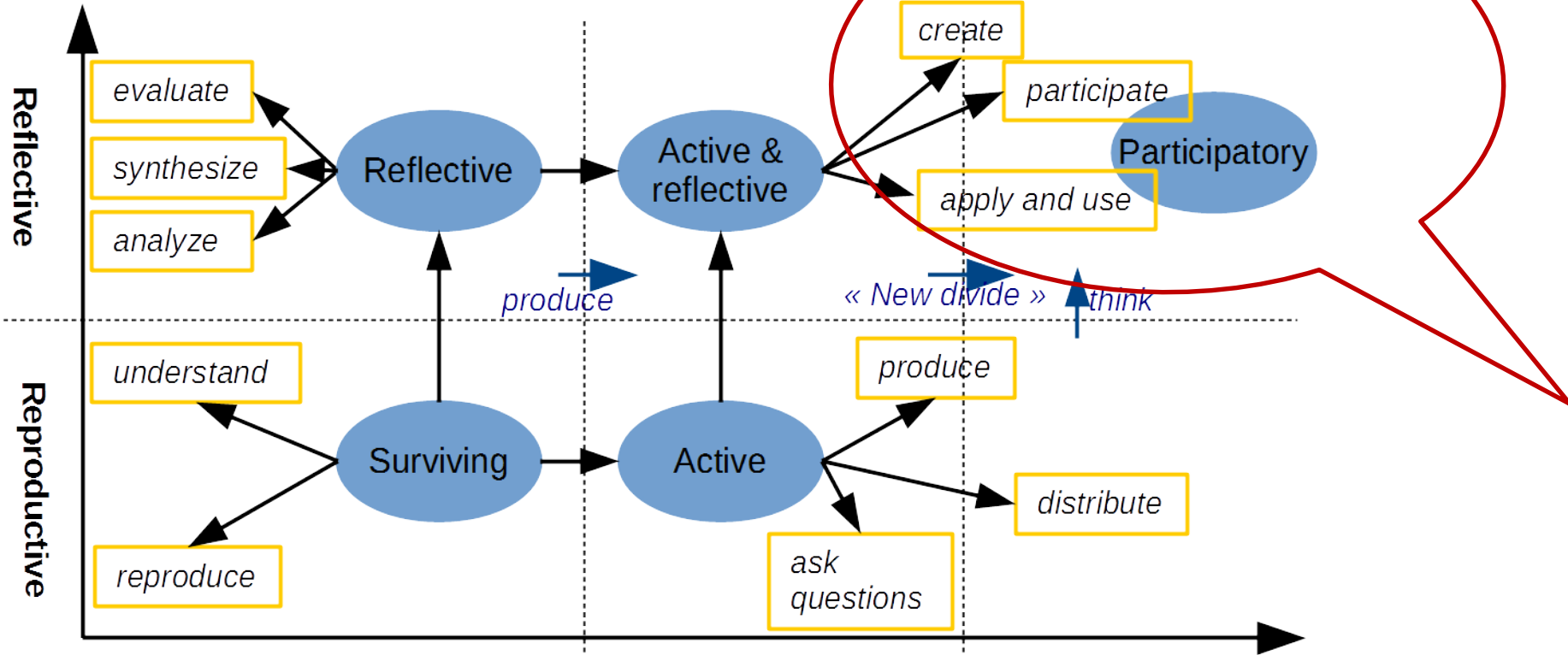
(Scardamalia & Bereiter, 1994)

Knowledge Forum provides university students and teachers with a **collaborative space** in which to organize course materials, analyze research results, discuss texts, and cite reference material.
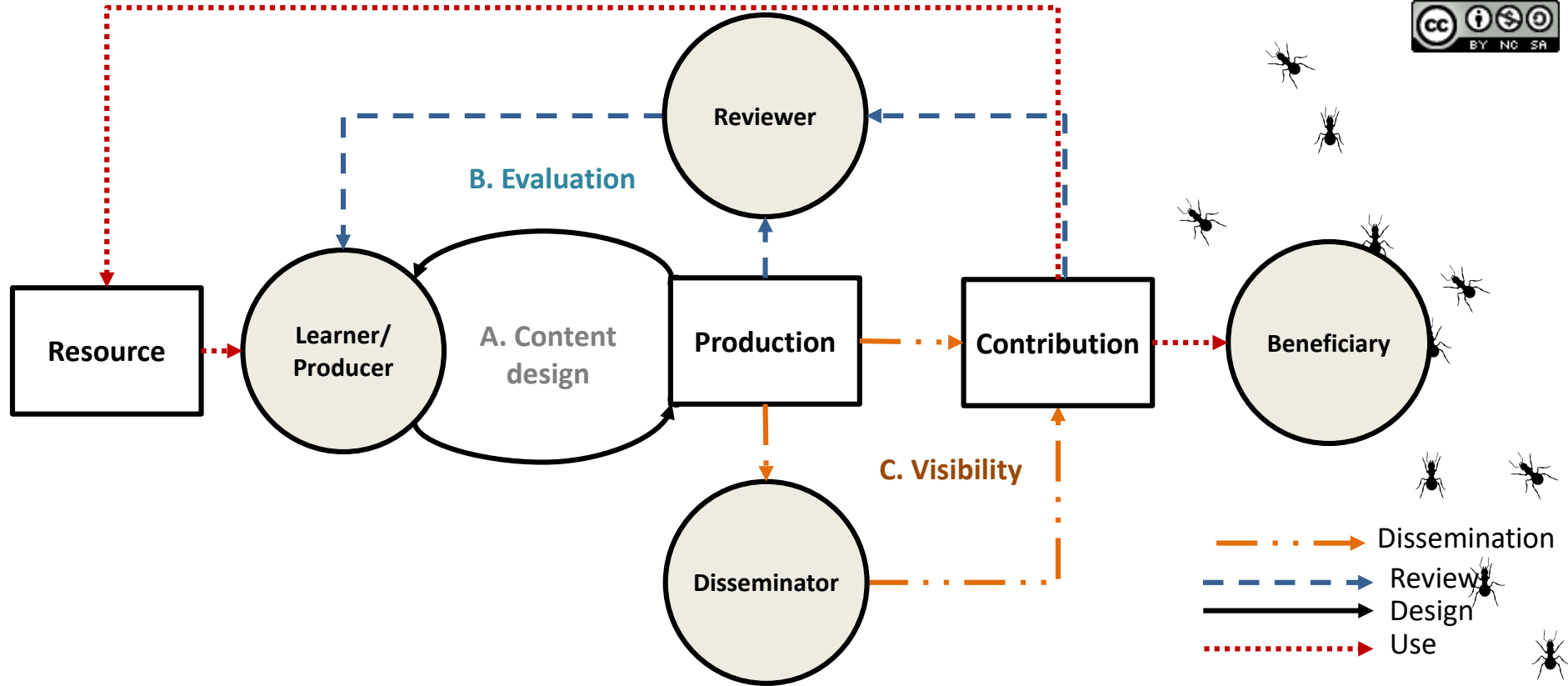

Learners as knowledge producers

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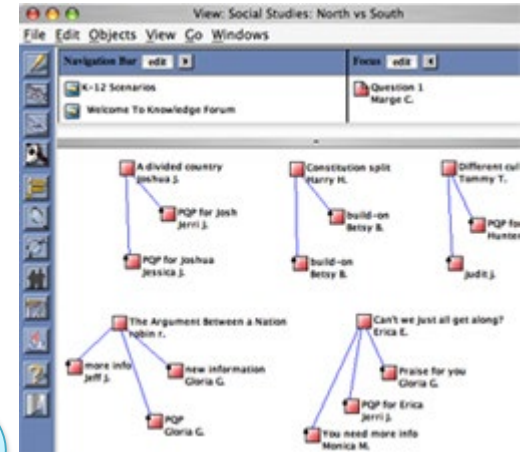
New media literacy: participatory skills

Inspired by Lin et al. (2013)

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Sharing and reuse framework for learner productions – a variety of possible workflows

B. Evaluation

A. Content design

C. Visibility

Resource → Learner/Producer → Production → Contribution → Beneficiary

Reviewer

Disseminator

Dissemination
Review
Design
Use

Model of different diffusion levels of contributions

"Public" is KM beyond teaching & learning

Use ....▸

Design ————▸

Moderation — — —▸

Diffusion —— · · —▸

Unrestricted external reuse

Citizens

Institutions

Public

Restricted external reuse

Access restricted

Targeted communities

Controlled sharing

Transversal internal reuse

Courses across cohorts

Internal reuse

(Groups of) students

Contribution

Teachers

Productions

Course Class

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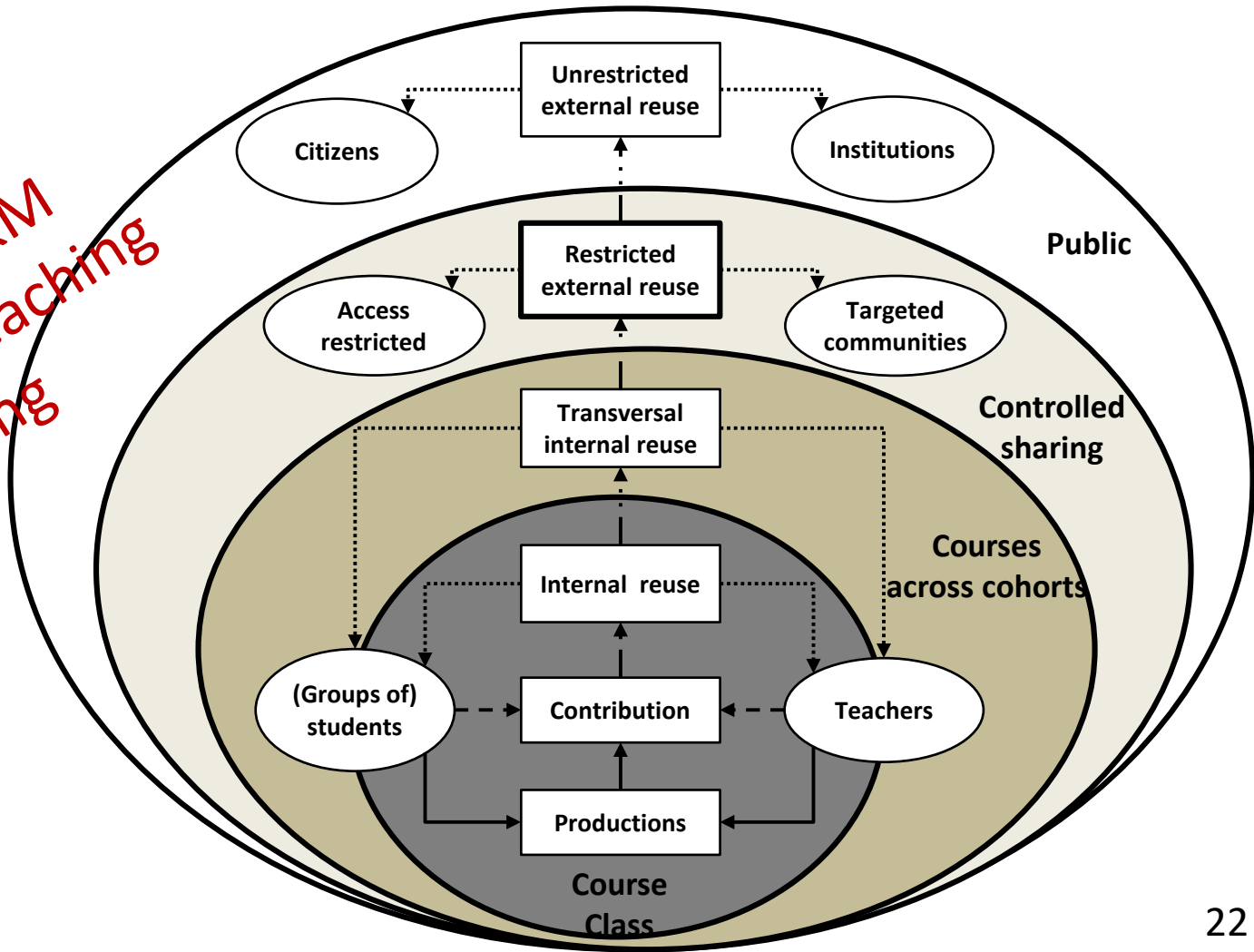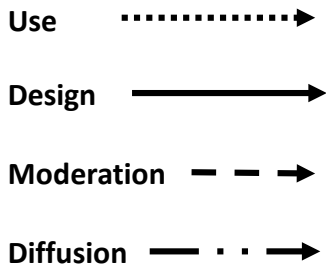
SO:

1. Train students to become knowledge workers

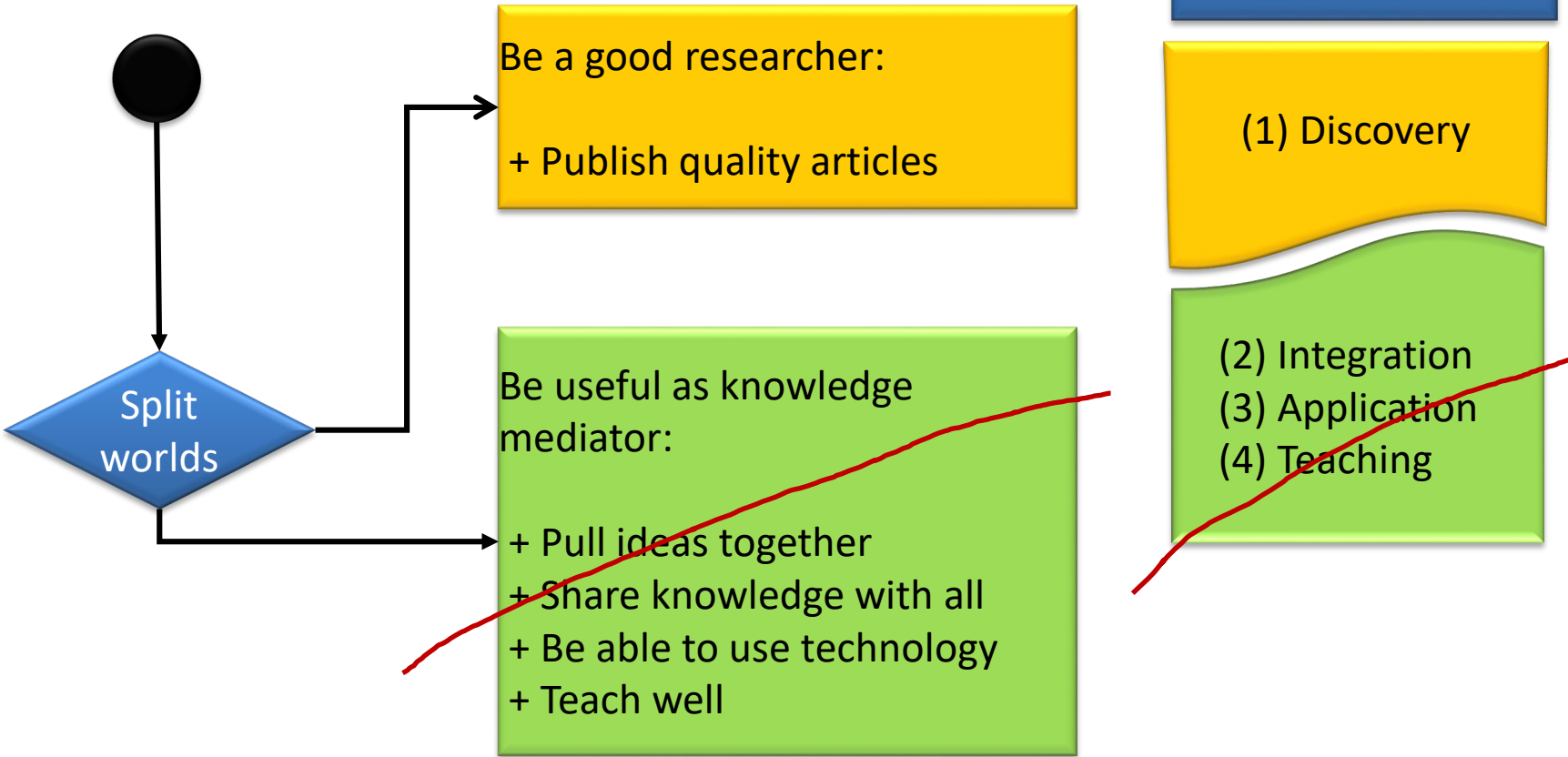2. Let them contribute to knowledge creation, integration and diffusion

PART 2 - 2
ROUTE 2: (REAL) INCENTIVES

What is a university teacher ?

Split worlds

Be a good researcher:

+ Publish quality articles

(1) Discovery

Be useful as knowledge mediator:

+ Pull ideas together
+ Share knowledge with all
+ Be able to use technology
+ Teach well

(2) Integration
(3) Application
(4) Teaching

And a school teacher ?

1. Instruction: Teachers are responsible for planning and delivering lessons to students, ensuring that curriculum objectives and standards are met. They prepare instructional materials and use various strategies and techniques to engage students in learning.

2. Classroom management: Teachers establish and maintain a positive and productive learning environment. They manage student behavior, establish rules and routines, and implement disciplinary actions when necessary. They also ensure that students feel safe and supported in their classroom.

3. Assessment and evaluation: Teachers assess student progress and understanding through formative and summative assessments. They design tests, quizzes, and assignments, review and grade student work, and provide constructive feedback to help students improve their performance.

4. Individualized instruction: Teachers identify and meet the individual needs of students. They differentiate instruction to accommodate different learning styles and abilities, provide support to struggling students, and challenge and extend learning for advanced students.

5. Collaboration and communication: Teachers work collaboratively with colleagues, parents, and other stakeholders to ensure the educational success of their students. They attend team meetings, parent-teacher conferences, and professional development sessions. They also communicate regularly with parents to discuss student progress and address any concerns.

6. Curriculum development: Teachers contribute to the development and improvement of the curriculum by designing and modifying instructional plans and materials. They stay updated on educational research, trends, and best practices to enhance their teaching strategies.

7. Professional development: Teachers engage in continuous professional development to stay updated on the latest teaching methodologies and content knowledge. They attend workshops, conferences, and training sessions to enhance their skills and knowledge in specific areas.

8. Support and guidance: Teachers serve as mentors and role models for students. They provide emotional support, guidance, and counseling to students when needed. They promote a positive and inclusive classroom atmosphere that fosters social-emotional well-being.

9. Administrative tasks: Teachers perform administrative duties such as record-keeping, attendance-keeping, and reporting student progress to school administrators and parents. They may also participate in school-wide activities, committees, and events.

IS ALSO VERY BUSY

According to ChatGPT 3

Only strong rewards will work !

Some ideas:
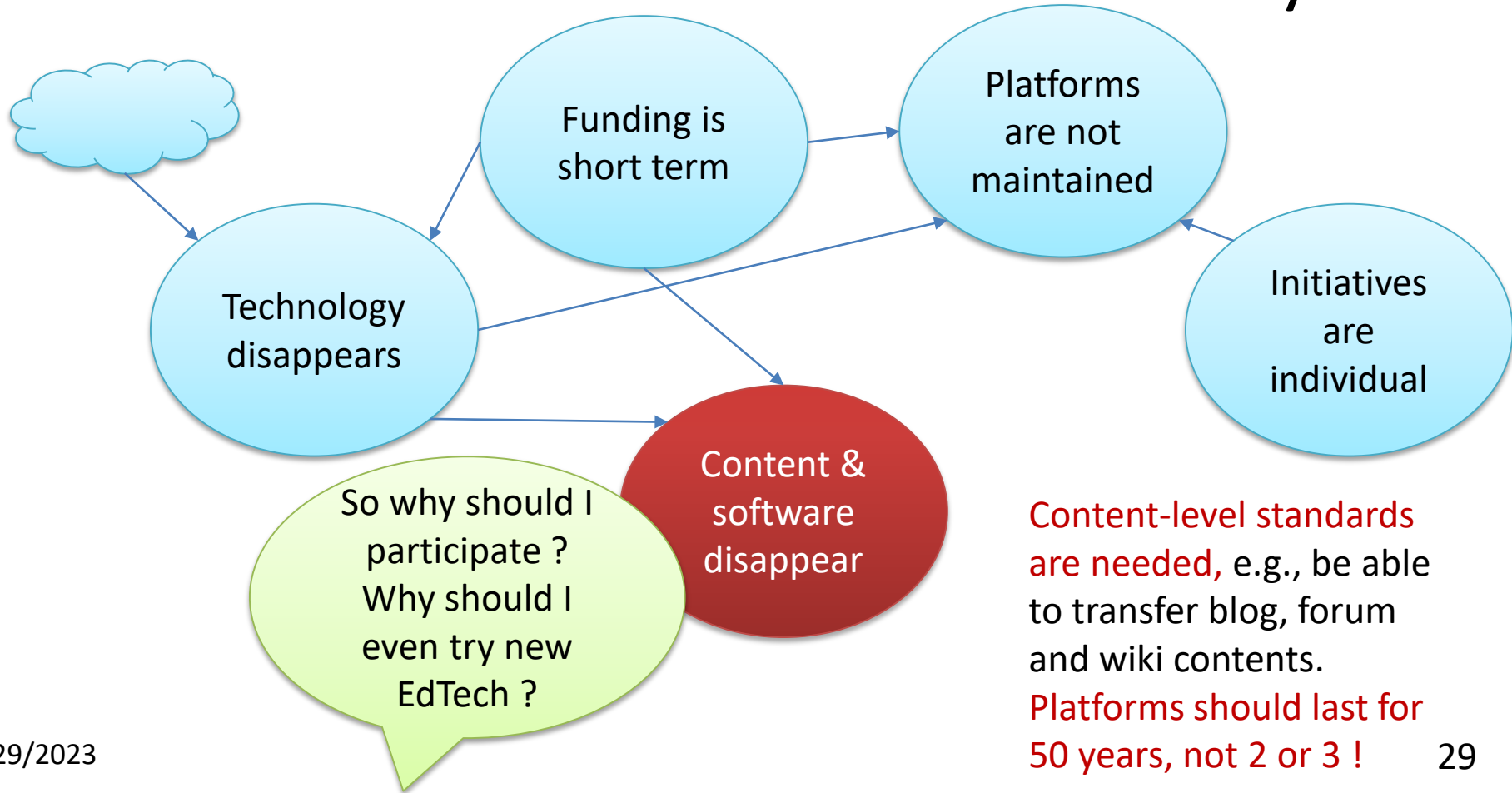
1. No professor jobs for people who do not contribute 10% of their time to sustainable online knowledge sharing
2. OER textbooks must be financed and managed by institutions (good example = https://open.bccampus.ca/)
3. Online sharing platforms should be maintained (very long term) by umbrella research associations or state institutions and be shared across user segments. Editors should receive financial compensation
4. School teachers who share knowledge and participate in research should receive 1 day off.
5. Contributed computer code should be validated as publication (e.g. via API documentation or user manual)
6. Include software maintenance and knowledge sharing platforms/OER in university rankings (e.g. BC is better than UniGE)

PART 2 – 3
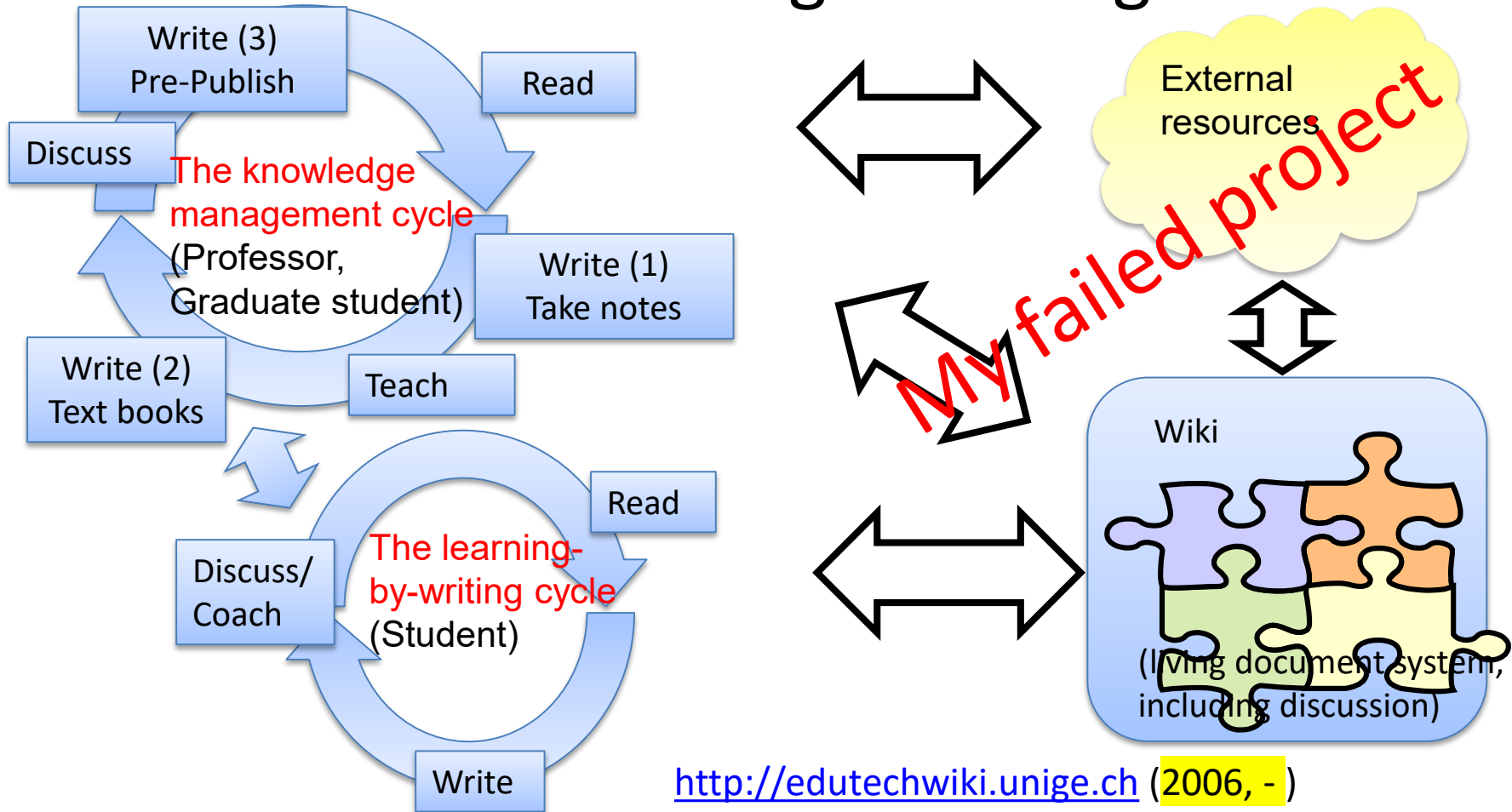# SUSTAINABILITY

Software and content sustainability

Funding is short term

Platforms are not maintained

Technology disappears

Initiatives are individual

So why should I participate ? Why should I even try new EdTech ?

Content & software disappear

Content-level standards are needed, e.g., be able to transfer blog, forum and wiki contents. Platforms should last for 50 years, not 2 or 3 !

PART 2 – 4
WHY DO WIKIS FAIL ?

Wikis as knowledge building community

Write (3)
Pre-Publish

Read

Discuss

The knowledge
management cycle
(Professor,
Graduate student)

Write (1)
Take notes

Write (2)
Text books

Teach

External
resources

My failed project

Read

Discuss/
Coach

The learning-
by-writing cycle
(Student)

Wiki

(living document system,
including discussion)

Write

http://edutechwiki.unige.ch (2006, -)

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TAM considerations
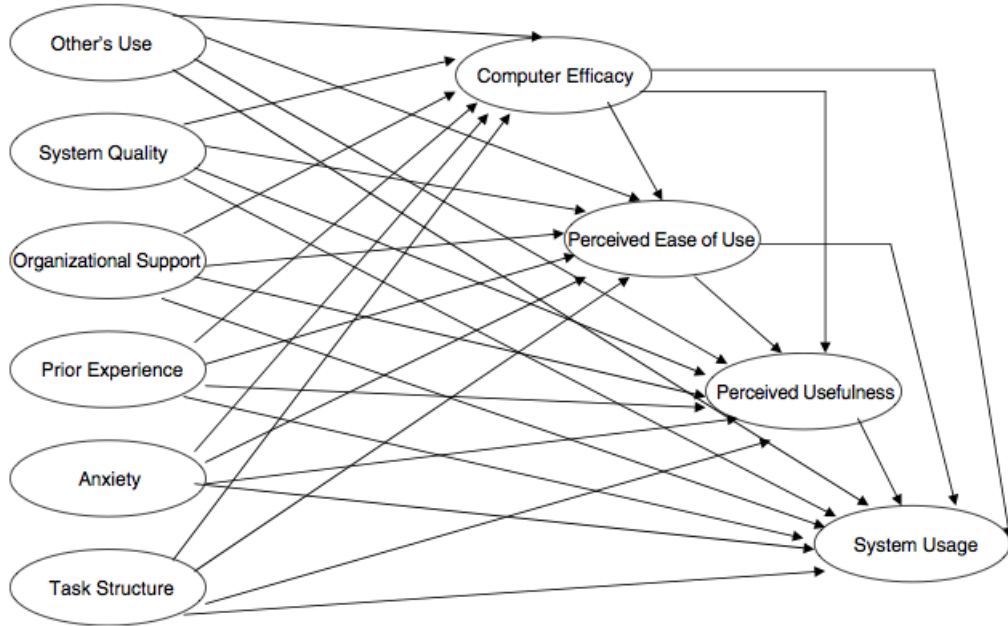
Technology Acceptance Model - TAM2, McFarland & Hamilton (2006)

People will maybe use a KM tech if it is:

Wikis

1. **Familiar** ✗
2. **Useful** ✓
3. **Usable** ✓
4. **Quick/easy** ✗
5. **Mastered** ✗
6. **Available** ✗ ✓
7. **Reliable** ✓ ✗
8. **Profitable** ✓
9. **w. support** ✗
10. **...**

+ Incentives !!

Hypertext was invented in the 60s and is not yet taught

PART 2 – 5
CONCLUSION

There is only a long path ! (> 25 years)

Research

Cultural change

School (as a whole)

Infrastructure
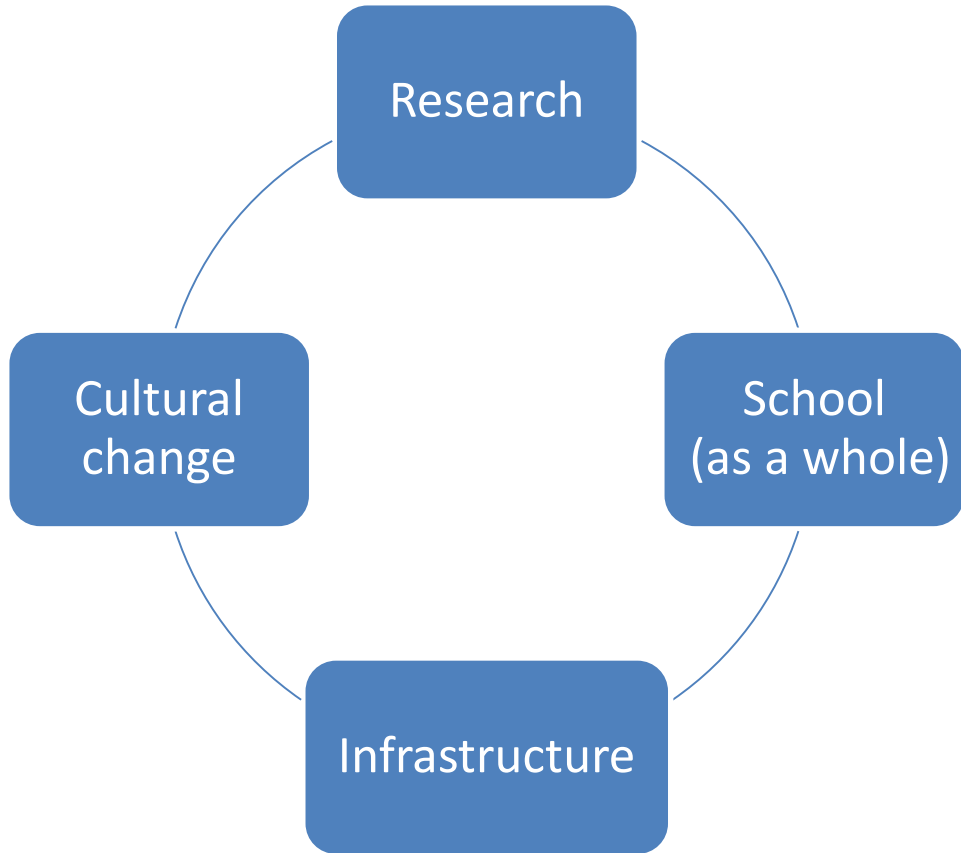
The continuing need is for neither abstract grand challenges nor short-term initiatives, but for a sustained building of capacity in technology-enhanced learning, through graduate programmes and investment in national hubs of expertise that share talent and facilities - Scanlon et al (2013)

❤*Some KM needed !*

Thanks for listening !
Questions ?
Comments ?

Some educational models that relate to KM
https://edutechwiki.unige.ch/en/Category:Community-oriented_instructional_design_models

URL for the slides: https://tecfa.unige.ch/tecfa/talks/schneide/km-2023/

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