Techno-Pedagogical Design of Open Educational Resources

Dr Denis Gillet

School of Engineering • Center for Learning Sciences • EdTech Collider

Swiss Federal Institute of Technology in Lausanne (EPFL)

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Open Educational Resources

Techno-Pedagogical Design

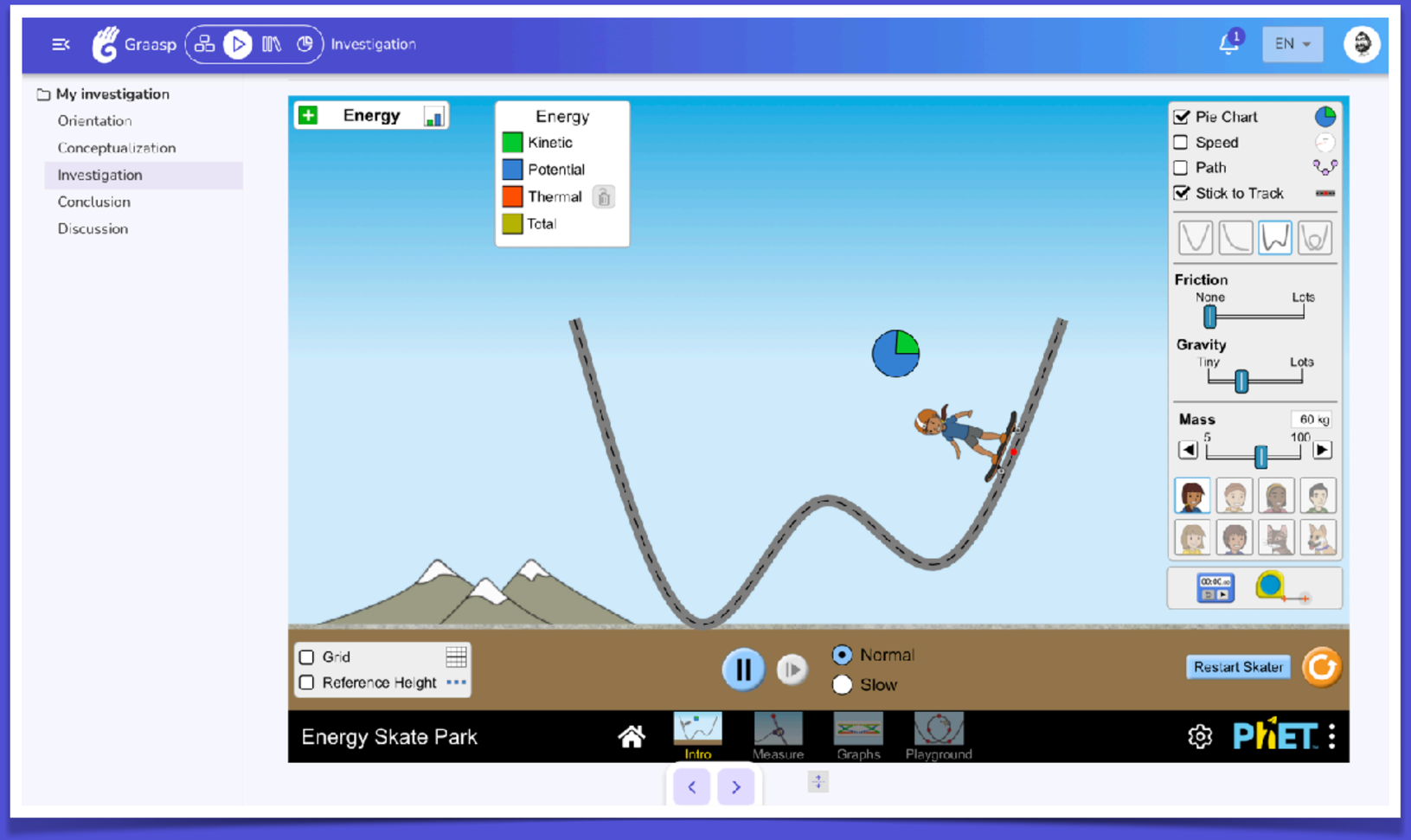
Open Educational Resources

The COVID pandemic has shown that we have digital **competences** and **platforms** in secondary and higher education, but limited value-adding educational **content**

We need to incentivize **educators** to create more educational **content**, and to share these so-called **digital resources** openly

→ **Open** Educational Resources (OERs)

Open Educational Resources for Inquiry-Based Learning in Go-Lab



Inquiry-based learning capsule integrating a PhET lab

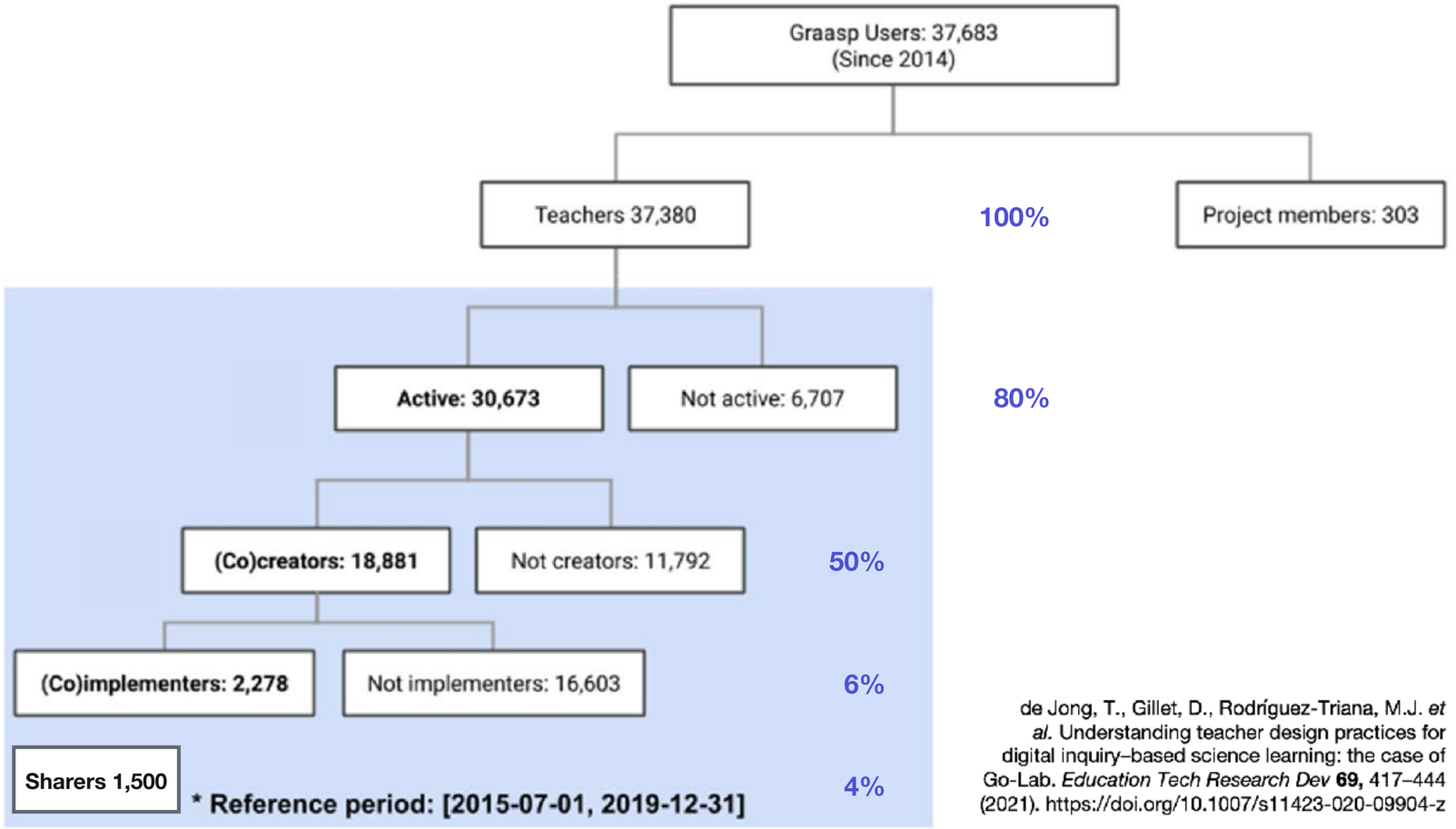
https://phet.colorado.edu

PhET INTERACTIVE SIMULATIONS

20k for a simulation
50k for a MOOC

…

Open Educational Resources

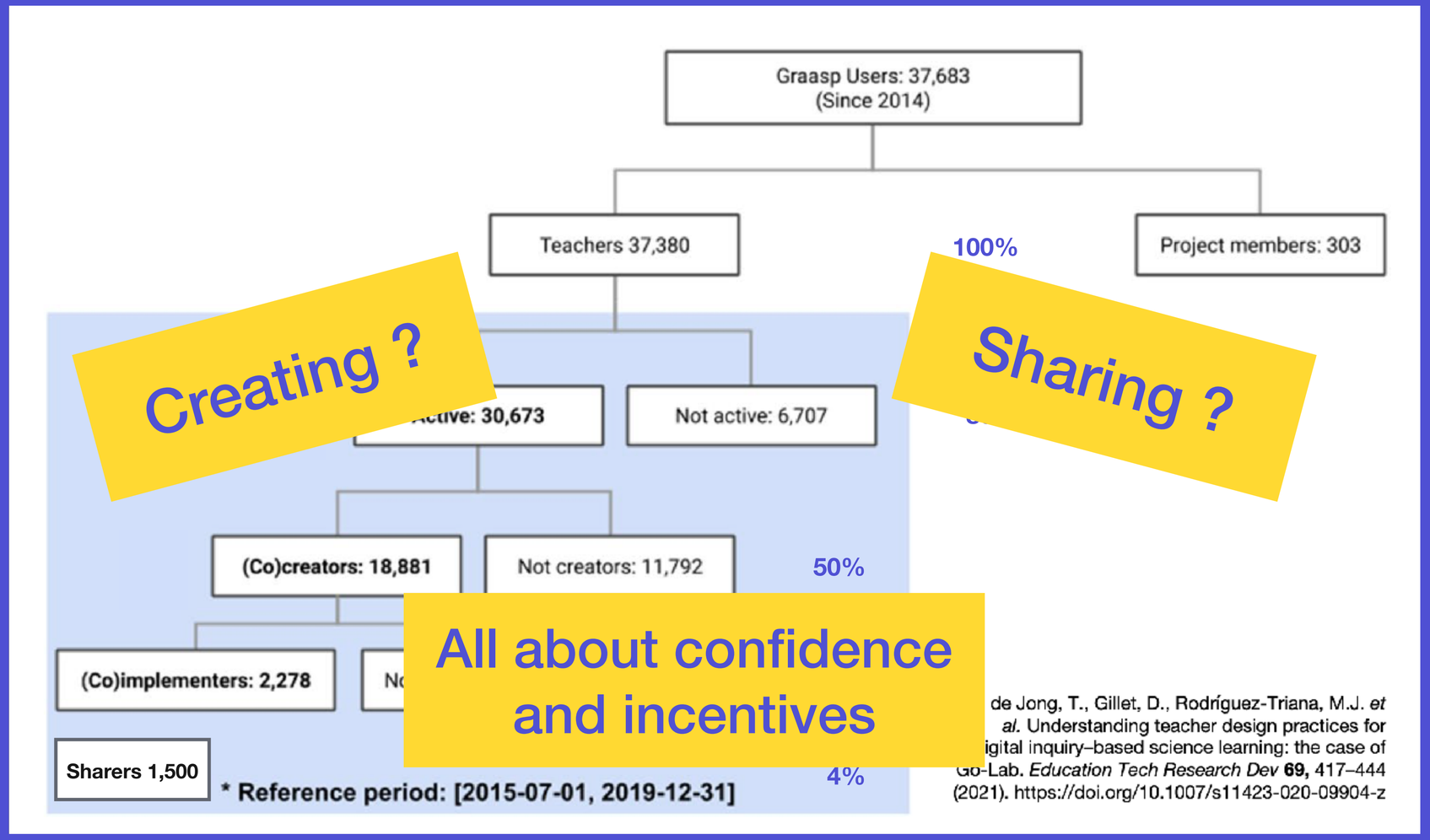


de Jong, T., Gillet, D., Rodríguez-Triana, M.J. *et al.* Understanding teacher design practices for digital inquiry–based science learning: the case of Go-Lab. *Education Tech Research Dev* **69,** 417–444 (2021). https://doi.org/10.1007/s11423-020-09904-z

Impact of the Go-Lab initiative in terms of adoption by teachers

about 9'000€ per implementer

Open Educational Resources



Impact of the Go-Lab initiative in terms of adoption by teachers

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Open Educational Resources

We need rich and intelligent OERs beyond mere digital documents to fully build on the added value of ICT and GenAI

multimedia

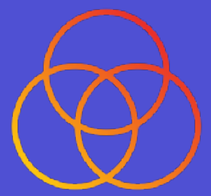
interactive

Online

collaborative

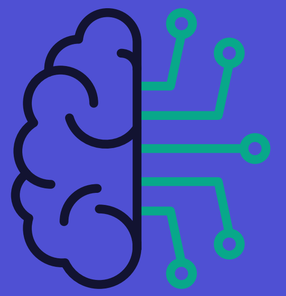
configurable and stateful

combined



structured

Adaptive or self-supported



Open Educational Resources

We need rich and intelligent OERs beyond mere digital documents to fully build on the added value of ICT and GenAI

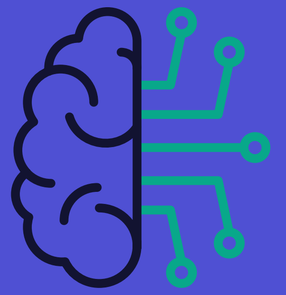
multimedia

eBooks • MOOCs
Jupyter notebooks
Interactive simulations
Online labs
xR animations
...

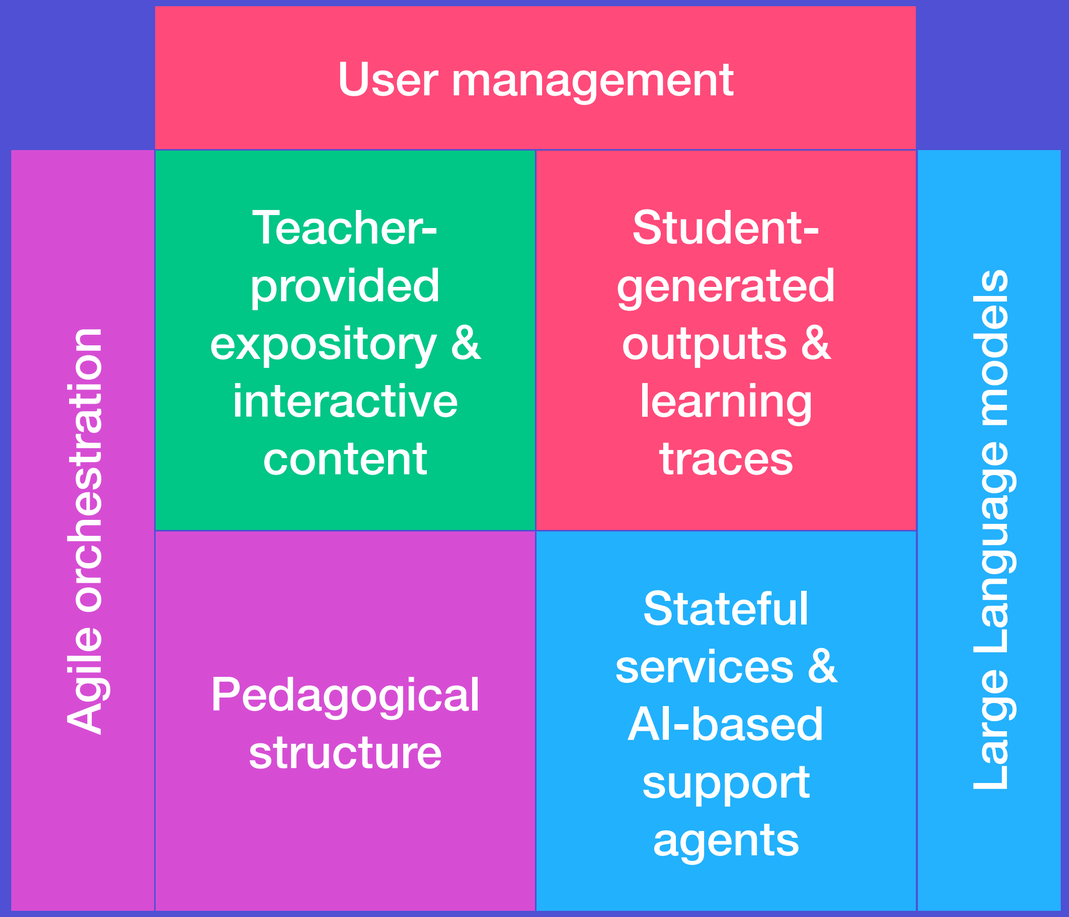
collaborative

configurable and stateful

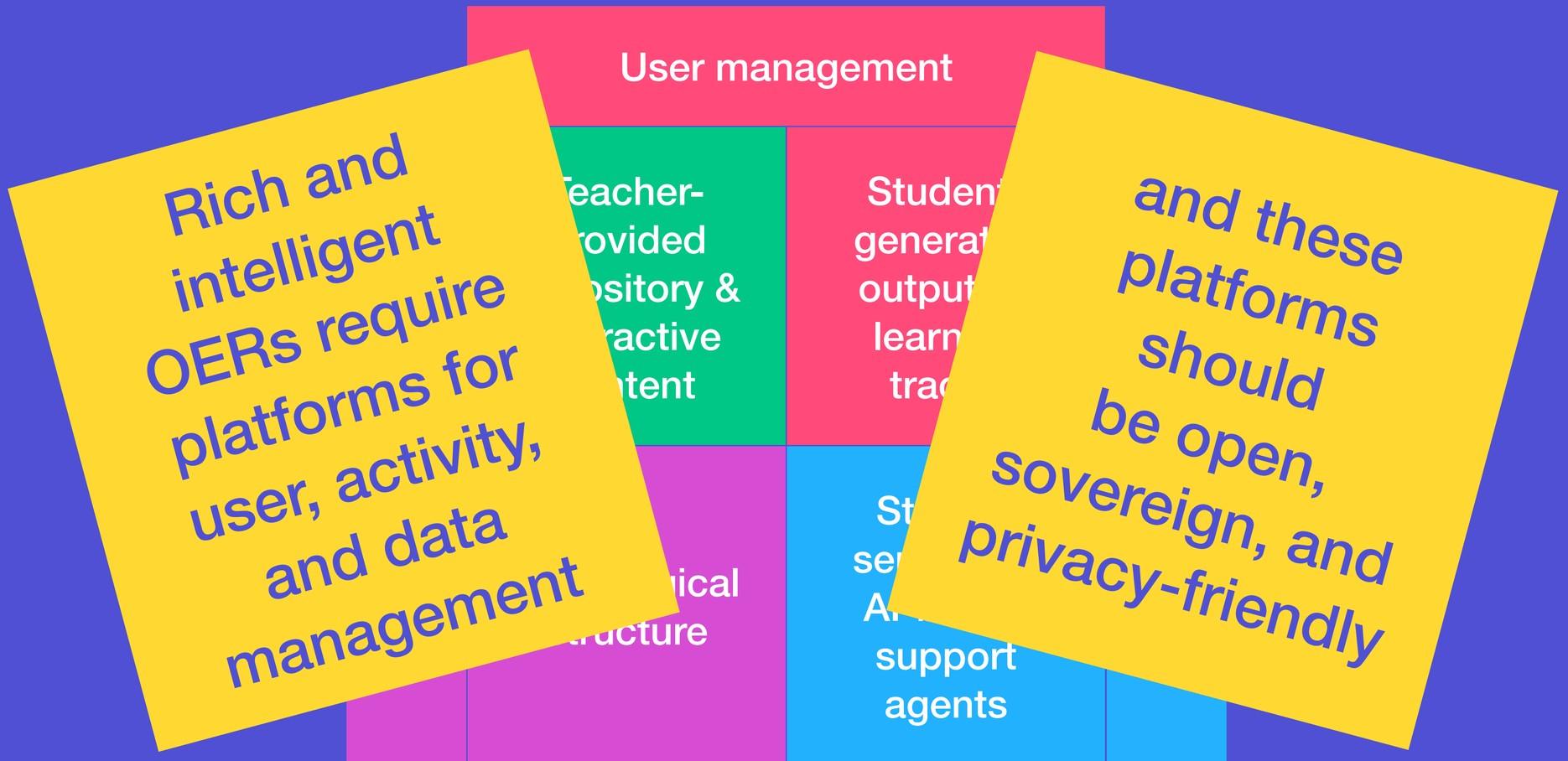
Adaptive or self-supported



Open Educational Resources

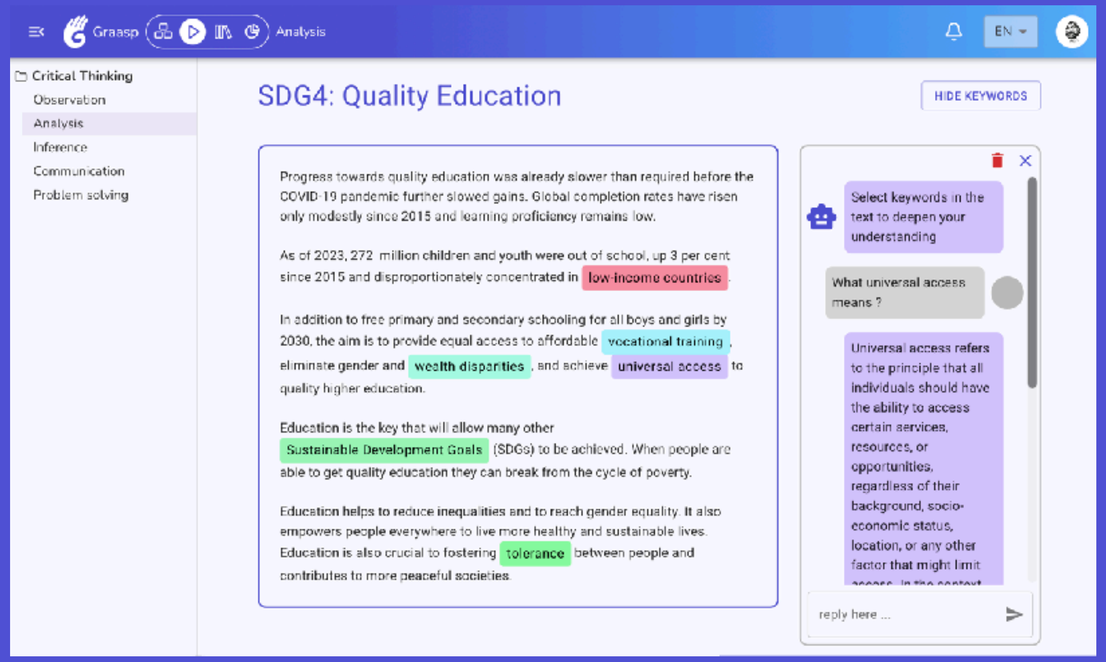


Open Educational Resources



Open Educational Resources

graasp.org supports the full life cycle of rich and intelligent OERs



Open source and open access **Learning Experience Platform** (EU projects, Swiss initiatives, Philanthropy)

Open Educational Resources

What is a Learning Experience Platform ?

Management

Moodle, Canvas, …

Courses

Documents & Slides

Summative assessment

Local instances

Delivery

Open edX, …

MOOCs

Videos & Quizzes

Peer evaluation

Regional instances

Interaction

H5P, Graasp, …

Activities

OERs & Apps

Formative assessment

Cloud

moodle

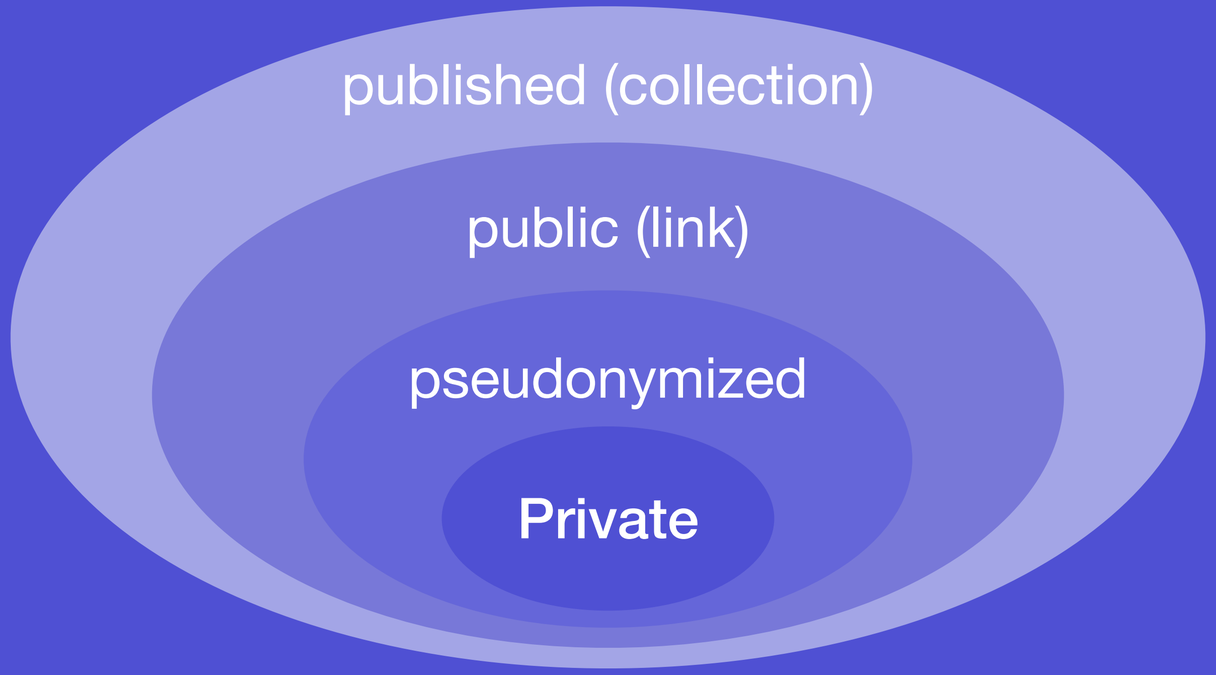
edX

Graasp

Open Educational Resources

Graasp offers a private, public or pseudonymized access to resources

A single link to the *Builder View*



A single link to the *Player View*

Any OER can also be integrated with a link into other learning platforms

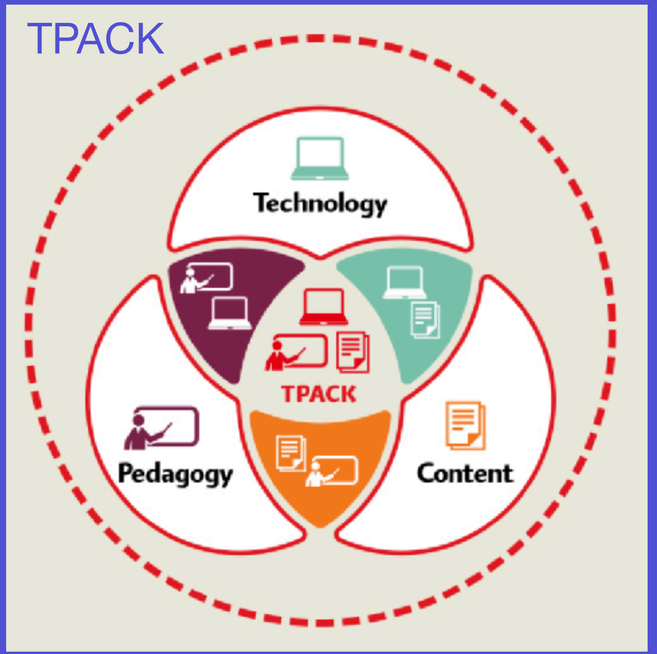
Open Educational Resources

Techno-Pedagogical Design

Techno-Pedagogical Design

We have to rethink the way we teach and students learn

Digital Education is about designing value-adding **digital interventions** (OERs) and adapting **pedagogical scenarios**



to offer students more effective **learning experiences** and **learning opportunities**

Technological Pedagogical Content Knowledge Integration Framework

Techno-Pedagogical Design

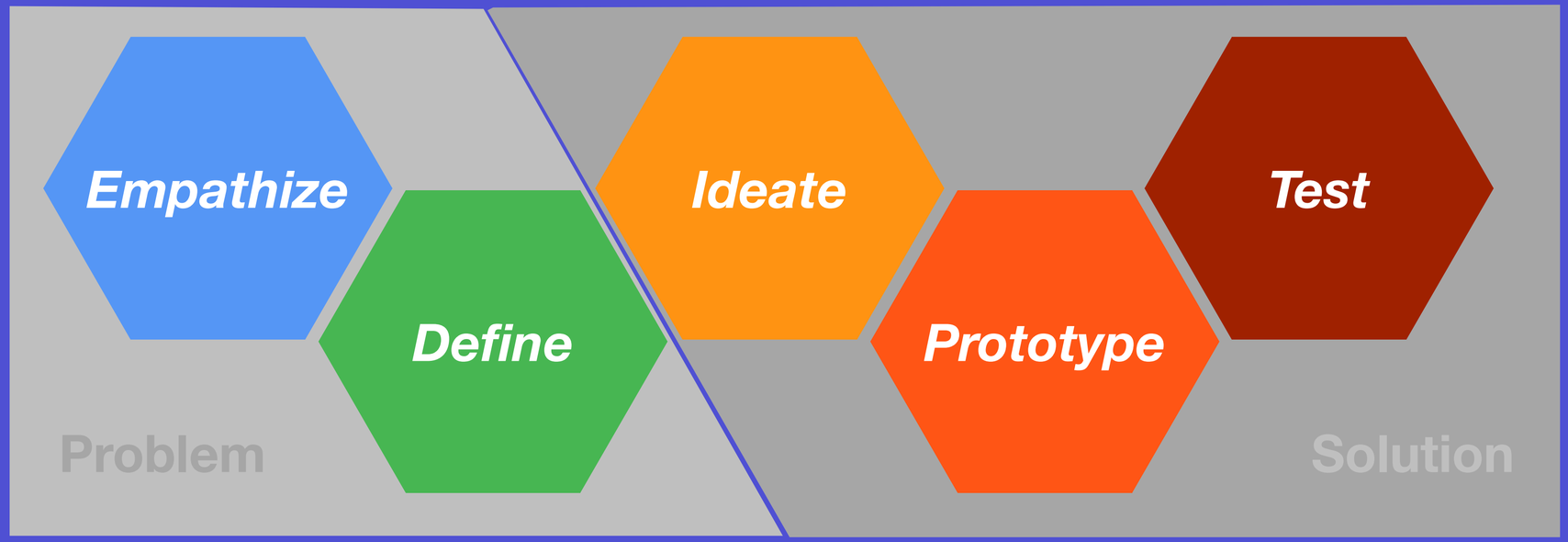
Technology

Pedagogy

Techno-Pedagogical Design

The *Stanford Design School* **user-centered** model for **design thinking** follows five stages: **Empathize** to consider and understand the problem to solve, **Define** to formalize this problem as something that can be tackled, **Ideate** to elicit preliminary solutions, **Prototype** to identify and refine the best and feasible alternatives, and **Test** to validate the final solution

User

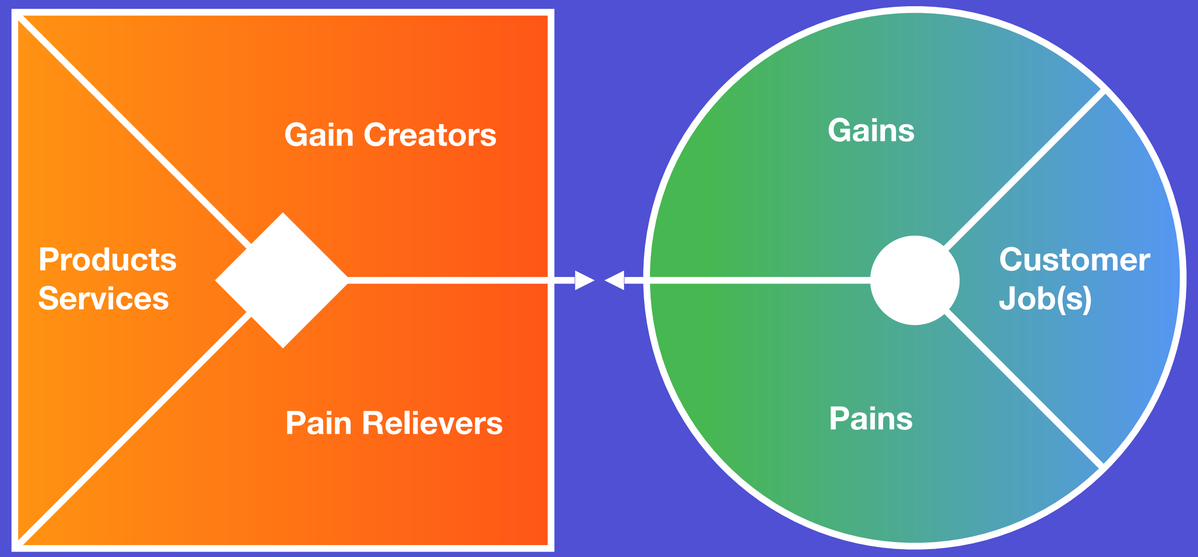


Techno-pedagogical solution

The **design thinking** process is useful for both **educators** and **learners**

Techno-Pedagogical Design

The value proposition canvas introduced in **business** can be used as a **boundary object** for **user-centered design** supporting the **Empathize**, **Define**, **Ideate**, and **Prototype** stages of **design thinking** activities for eliciting **research questions** or creating **digital interventions**



Value map
Benefits

Customer profile
Customers

Jobs: Important to insignificant

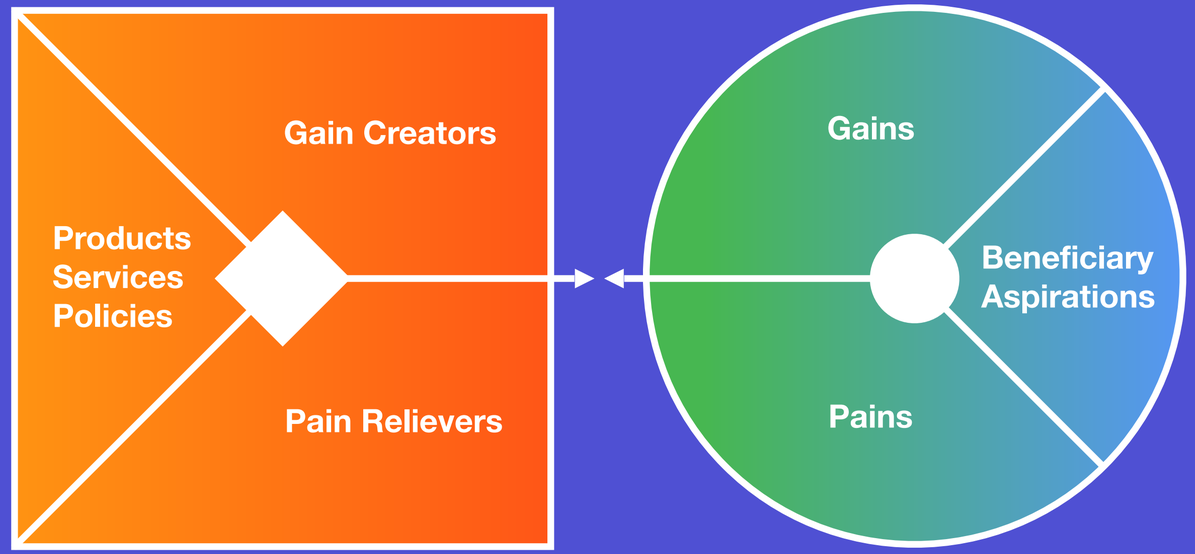
Gains: Essential to nice-to-have

Pains: Extreme to moderate

Helps defining the priorities

Techno-Pedagogical Design

As the original version is too business oriented, we proposed alternative impact-oriented **sustainability** and **techno-pedagogical value proposition canvases** elicited through participatory design with experts from digital technology, higher education, and human-computer interaction



Value map
Advantages

Beneficiary profile

D. Gillet, I. Vonèche-Cardia, and J. La Scala, Introducing Alternative Value Proposition Canvases for Collaborative and Blended Design Thinking Activities in Science and Engineering Education, IEEE TALE, 2022

Techno-Pedagogical Design

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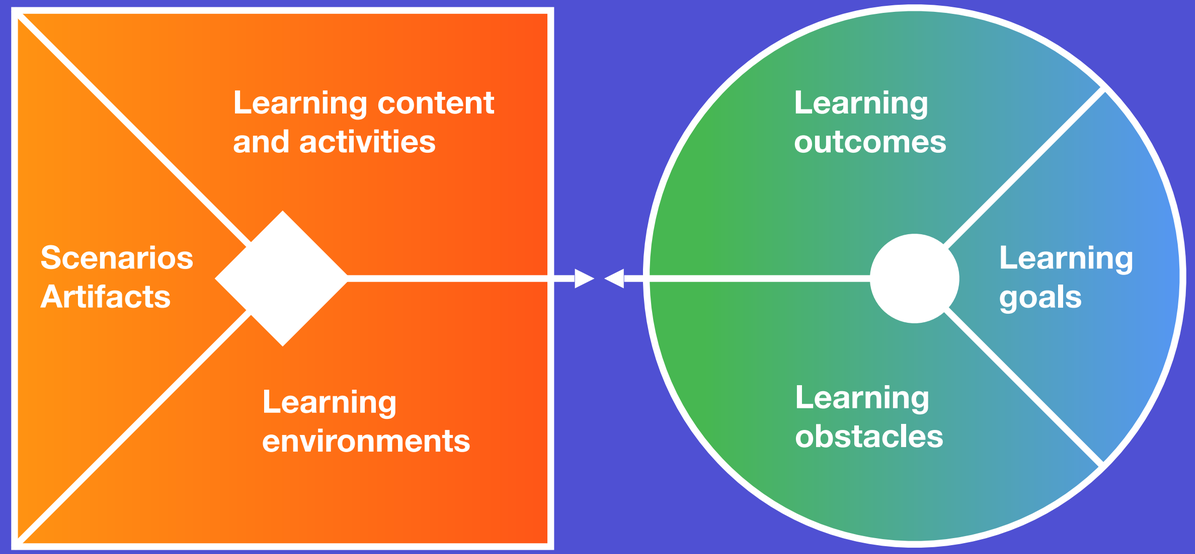
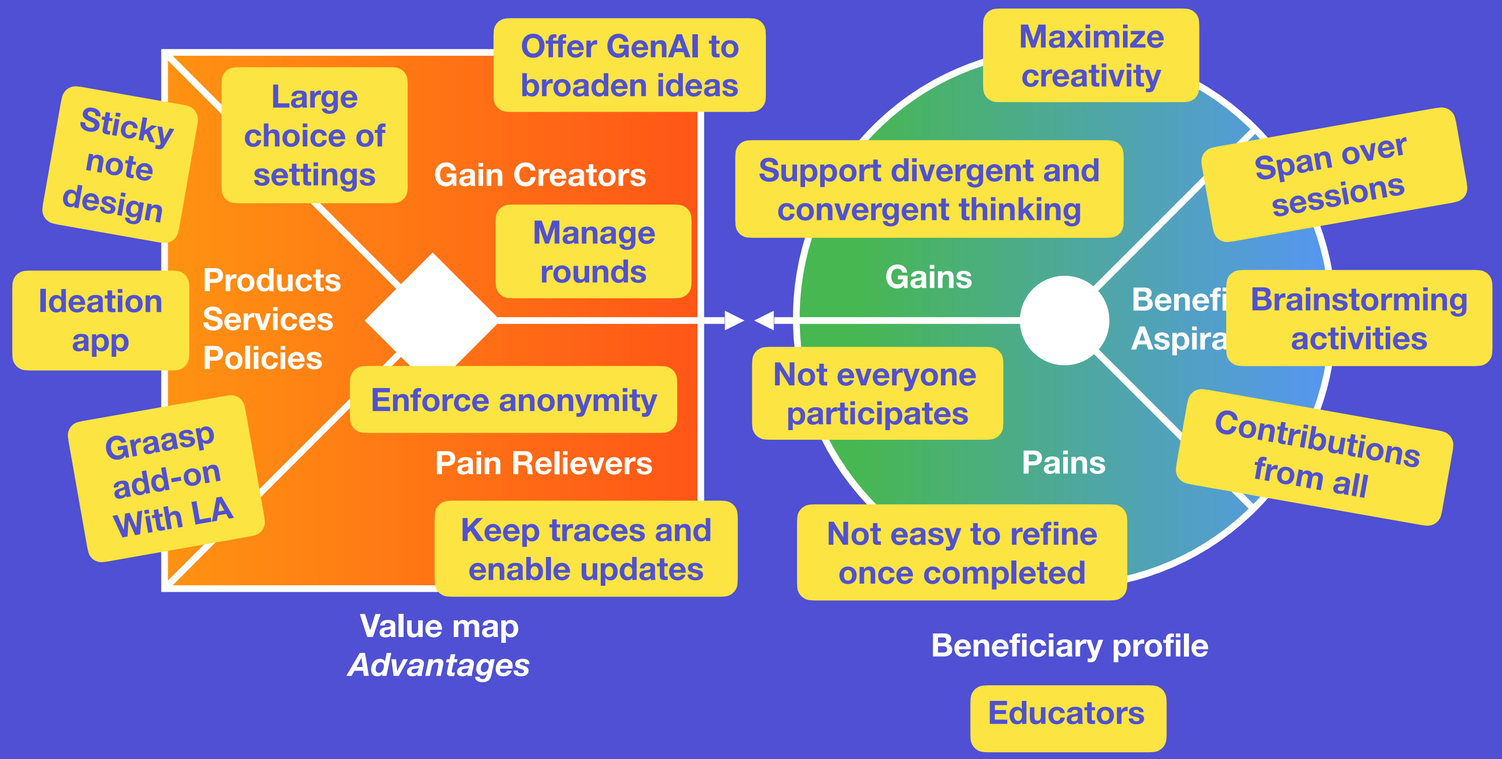


Sonia Sahli and Denis Gillet, “Designing a Generative AI Solution for Creating Summative Assessments in Higher Education “, ICL 2025

Techno-Pedagogical Design

Imagine you would like to implement **collaborative design thinking** activities to introduce design methodologies and entrepreneurship

You would like your students to define a new EdTech solution but be creative enough (not to create yet another clone of Moodle)



Focus on implementing brainstorming-like activities for the **ideation** of a new EdTech solution

Techno-Pedagogical Design

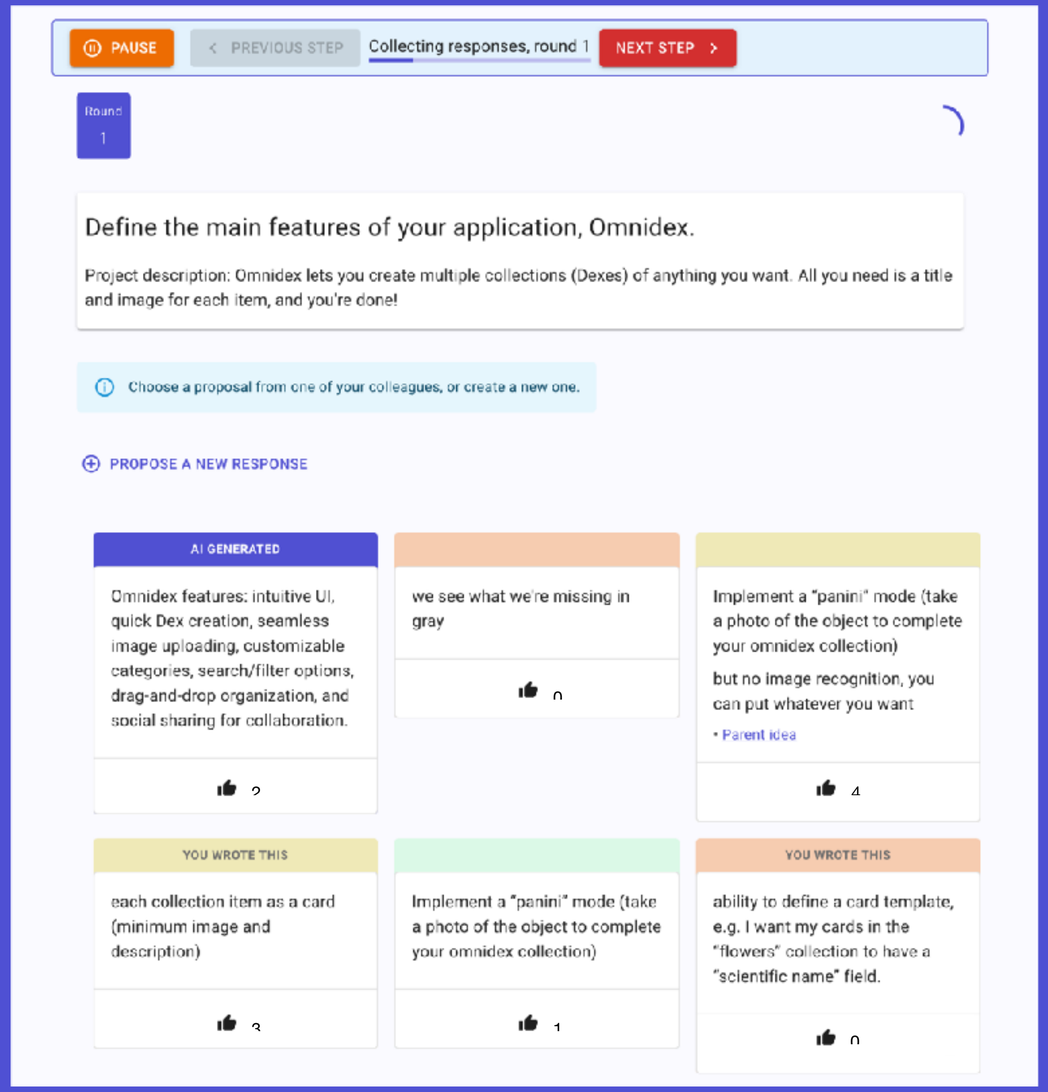
So, we designed an ideation tool that is also the digital intervention currently investigated in a PhD

Anonymity: Everyone equal

GenAI agent visible: Transparency

Short duration: Spontaneity

Rounds: Creativity (build from previous)



J.C. Farah, J. La Scala, S. Ingram, and D. Gillet, Supporting brainstorming activities with bots in software engineering education, Proceedings of the 6th International Workshop on Bots, 2025

J. La Scala, S. Sahli, and D. Gillet, Stimulating Brainstorming Activities with Generative AI in Higher Education, IEEE Global Engineering Education Conference, London, UK, April 2025

Concluding Remarks

Education is increasingly geared toward the acquisition of transversal skills to learn how to think

Free, rich, and intelligent educational resources should become central to digital education

Their implementation requires open platforms and a techno-pedagogical design methodology

Now, an OER can almost be created by Generative AI solutions, is it going to help or reduce sharing ?

Contact Details

denis.gillet@epfl.ch
https://react.epfl.ch

https://graasp.org