

# Techno-Pedagogical Design of Open Educational Resources

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**Open Educational Resources**



**Techno-Pedagogical Design**



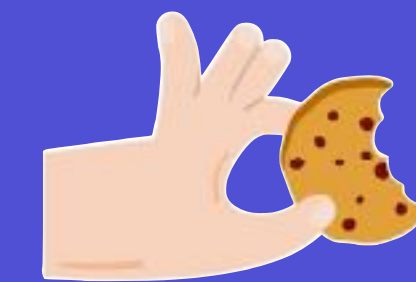


# Open Educational Resources

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

The screenshot shows the PhET Energy Skate Park simulation running in the Go-Lab environment. The interface includes a top navigation bar with 'Graasp' and 'Investigation' labels. On the left, a sidebar lists 'My investigation' stages: Orientation, Conceptualization, Investigation (selected), Conclusion, and Discussion. The main simulation area features a skater on a track with a pie chart showing energy distribution. A legend identifies energy types: Kinetic (green), Potential (blue), Thermal (orange), and Total (yellow). On the right, control panels for Friction, Gravity, and Mass are visible, along with checkboxes for 'Pie Chart', 'Speed', 'Path', and 'Stick to Track'. The bottom of the interface has a control bar with 'Grid', 'Reference Height', 'Normal/Slow' speed settings, and a 'Restart Skater' button. The PhET logo and navigation icons for 'Intro', 'Measure', 'Graphs', and 'Playground' are at the very bottom.

Inquiry-based learning capsule integrating a PhET lab

<https://phet.colorado.edu>

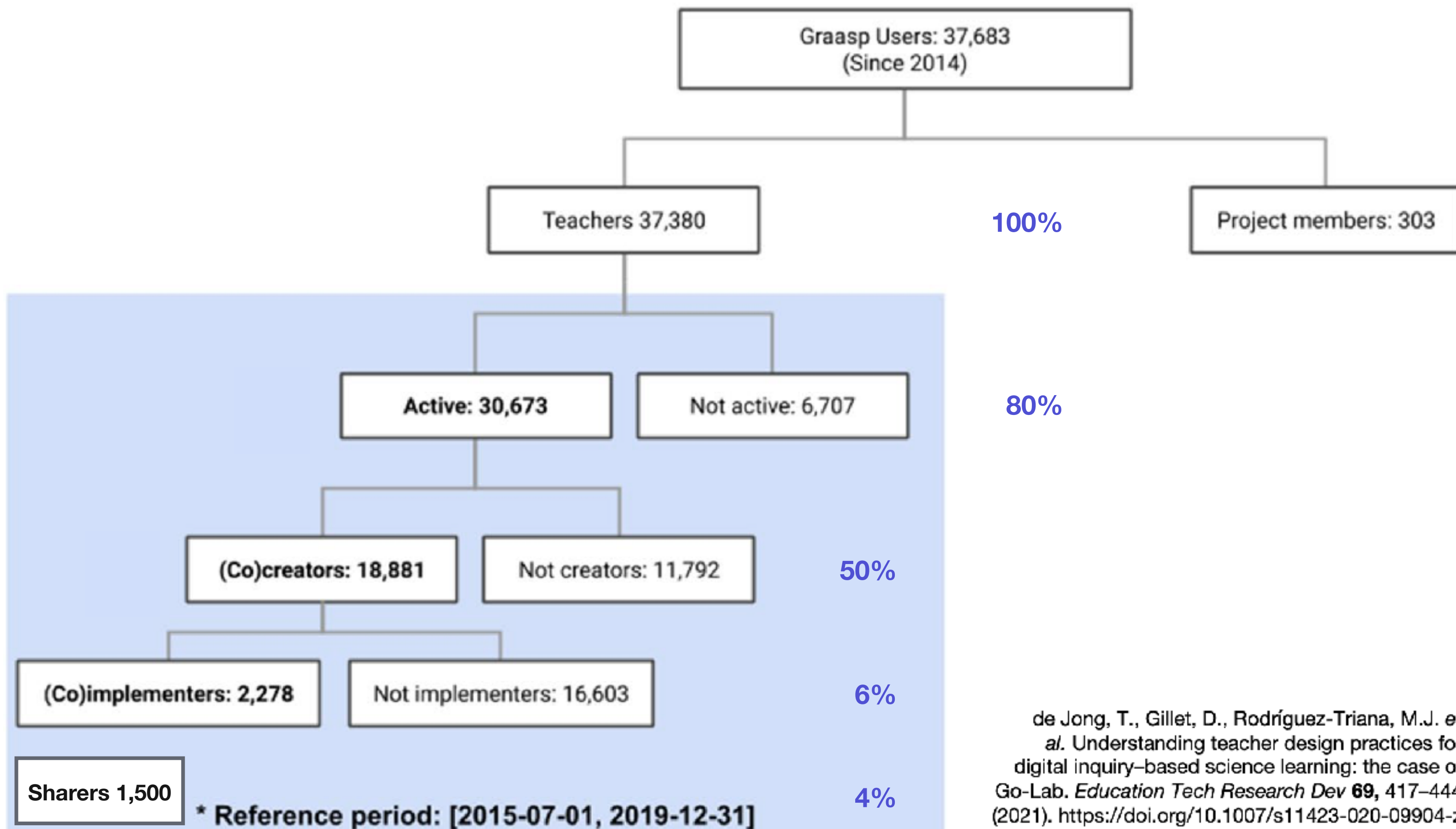


20k for a simulation  
50k for a MOOC

...



# 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>

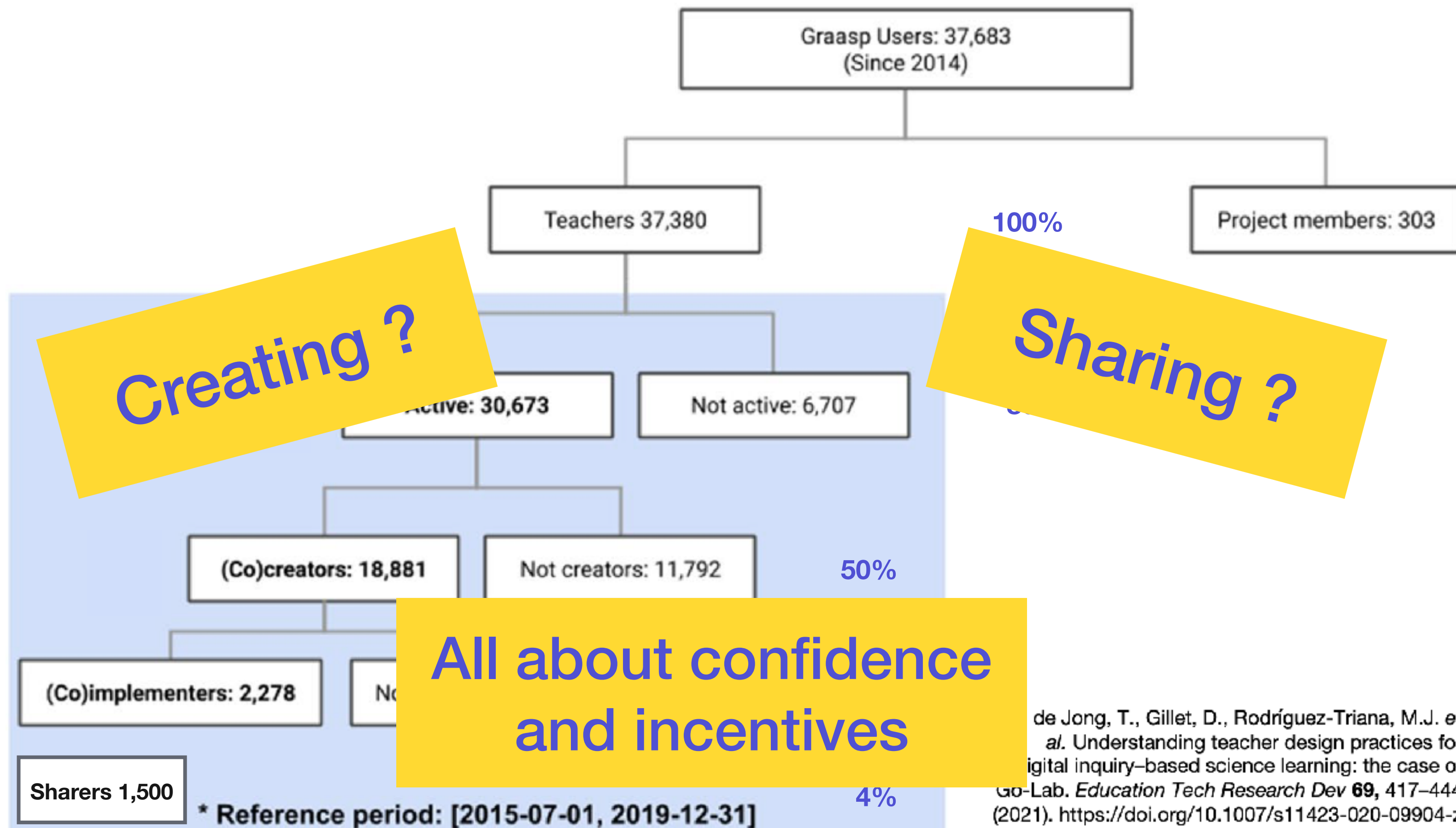
Impact of the Go-Lab initiative in terms of adoption by teachers



about 9'000€ per implementer



# Open Educational Resources



Creating ?

Sharing ?

All about confidence and incentives

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>

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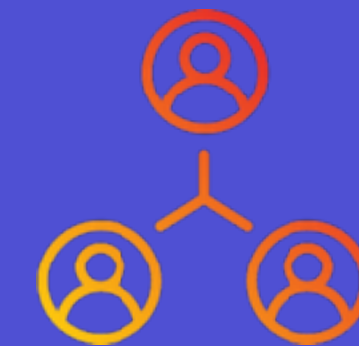
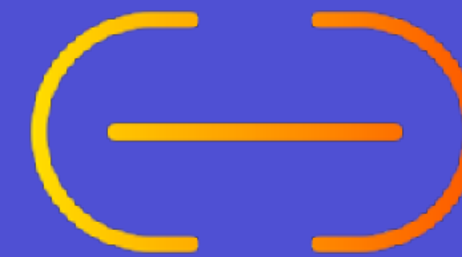
We need rich and intelligent OERs beyond mere digital documents to fully build on the added value of ICT and GenAI

multimedia



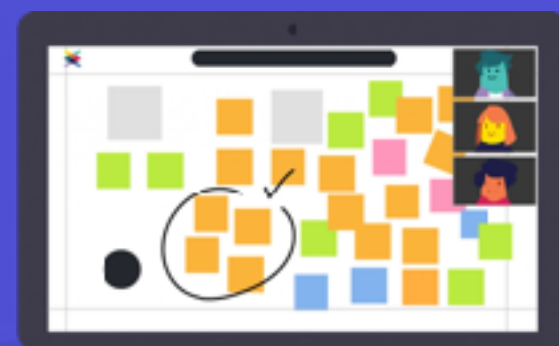
interactive

Online

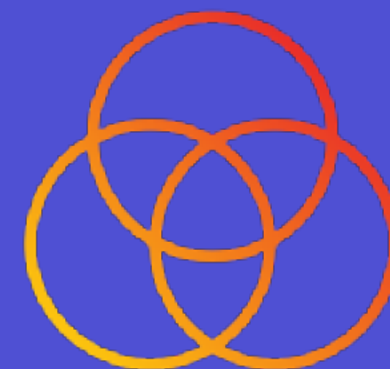


collaborative

configurable  
and stateful

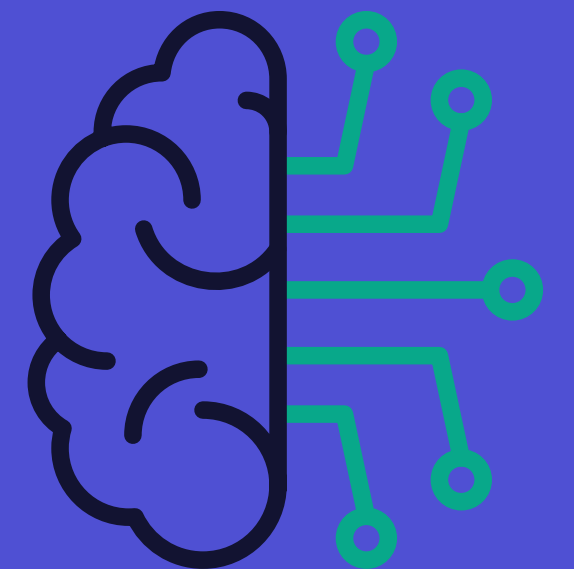


combined



structured

Adaptive  
or self-  
supported





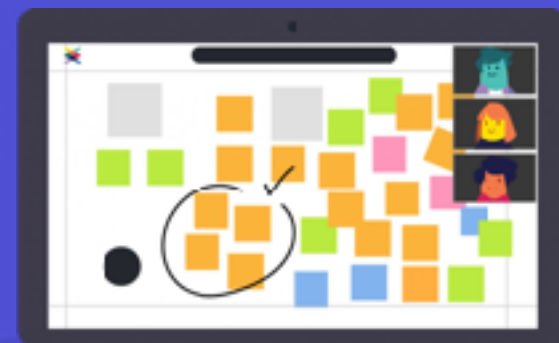
# Open Educational Resources

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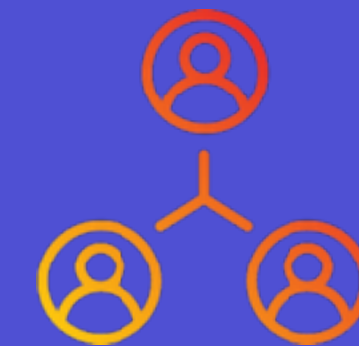
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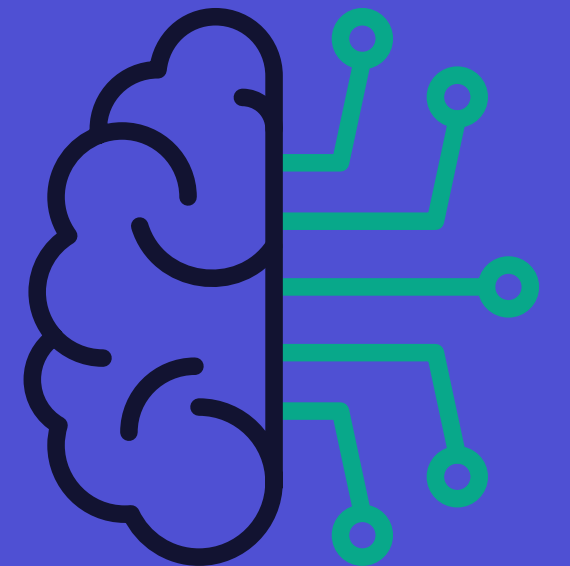


eBooks • MOOCs  
 Jupyter notebooks  
 Interactive simulations  
 Online labs  
 xR animations  
 ...



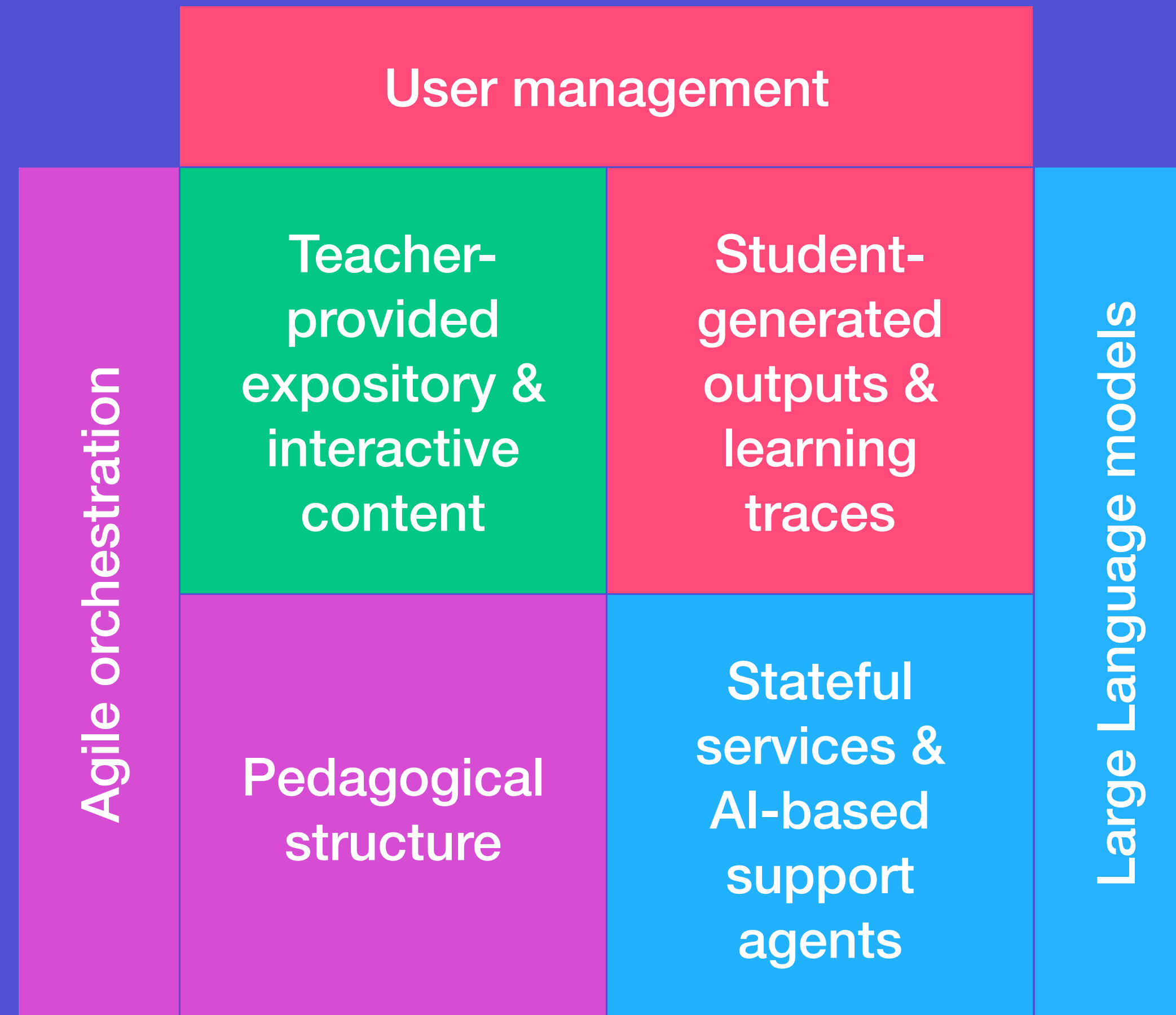
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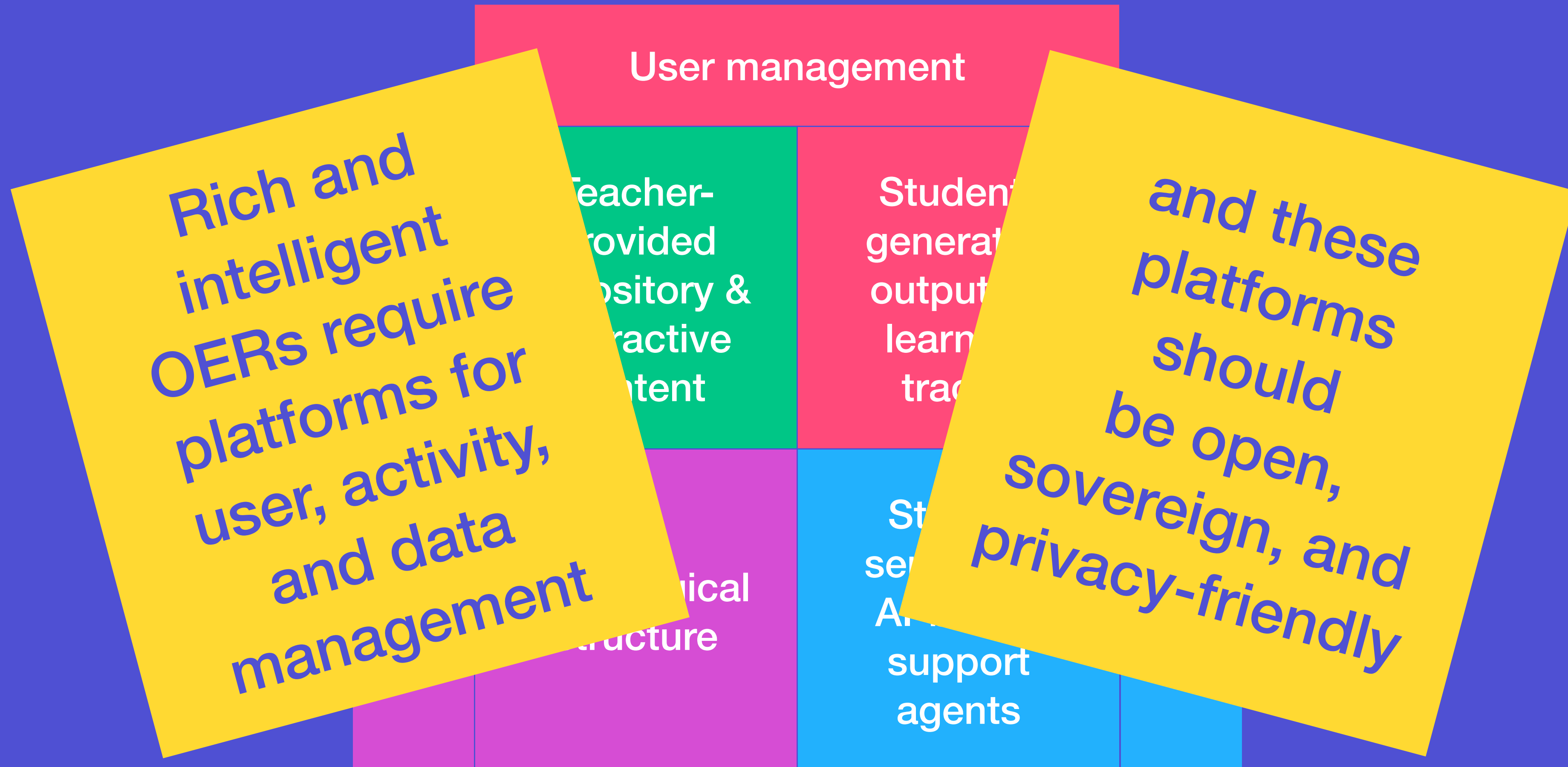


# Open Educational Resources





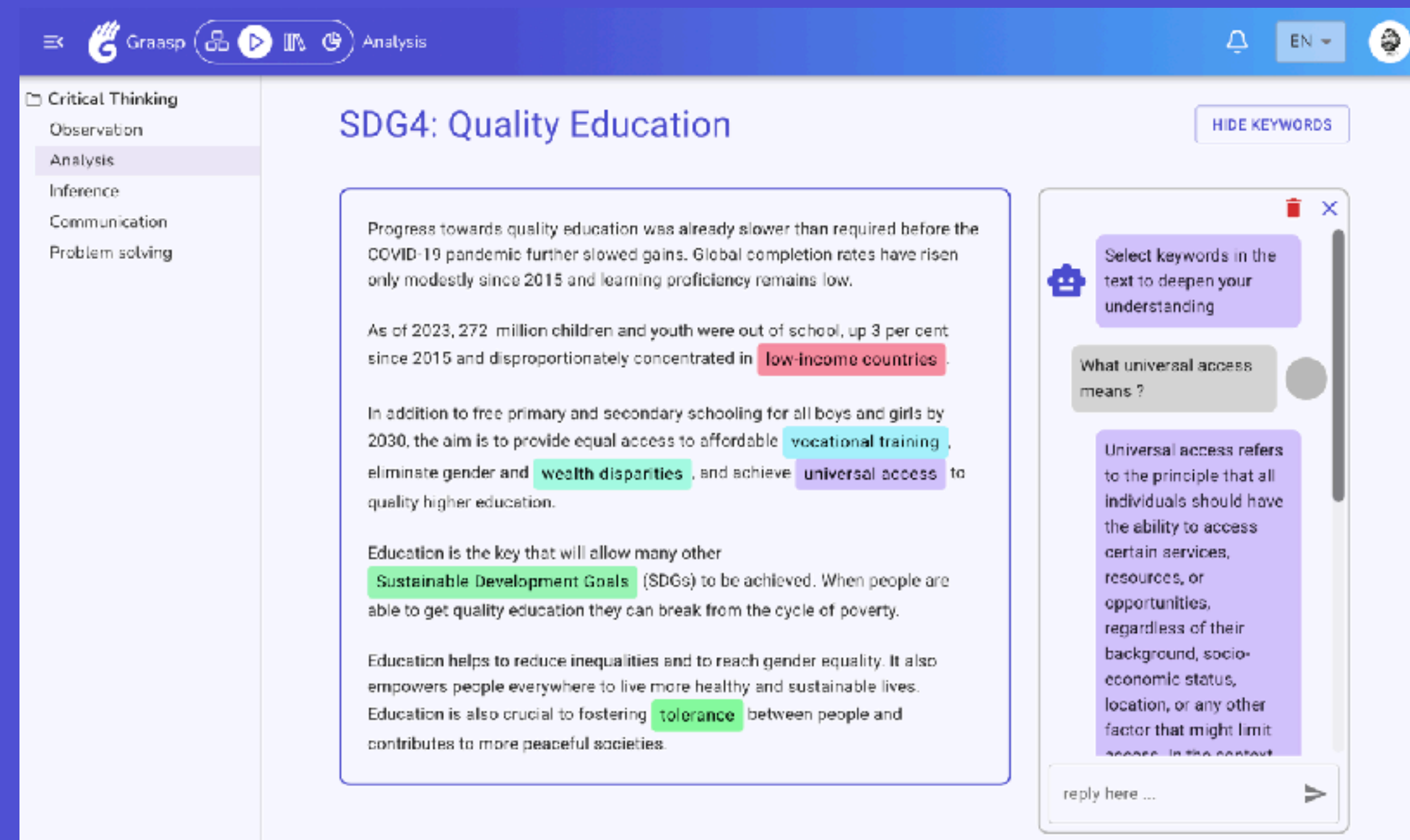
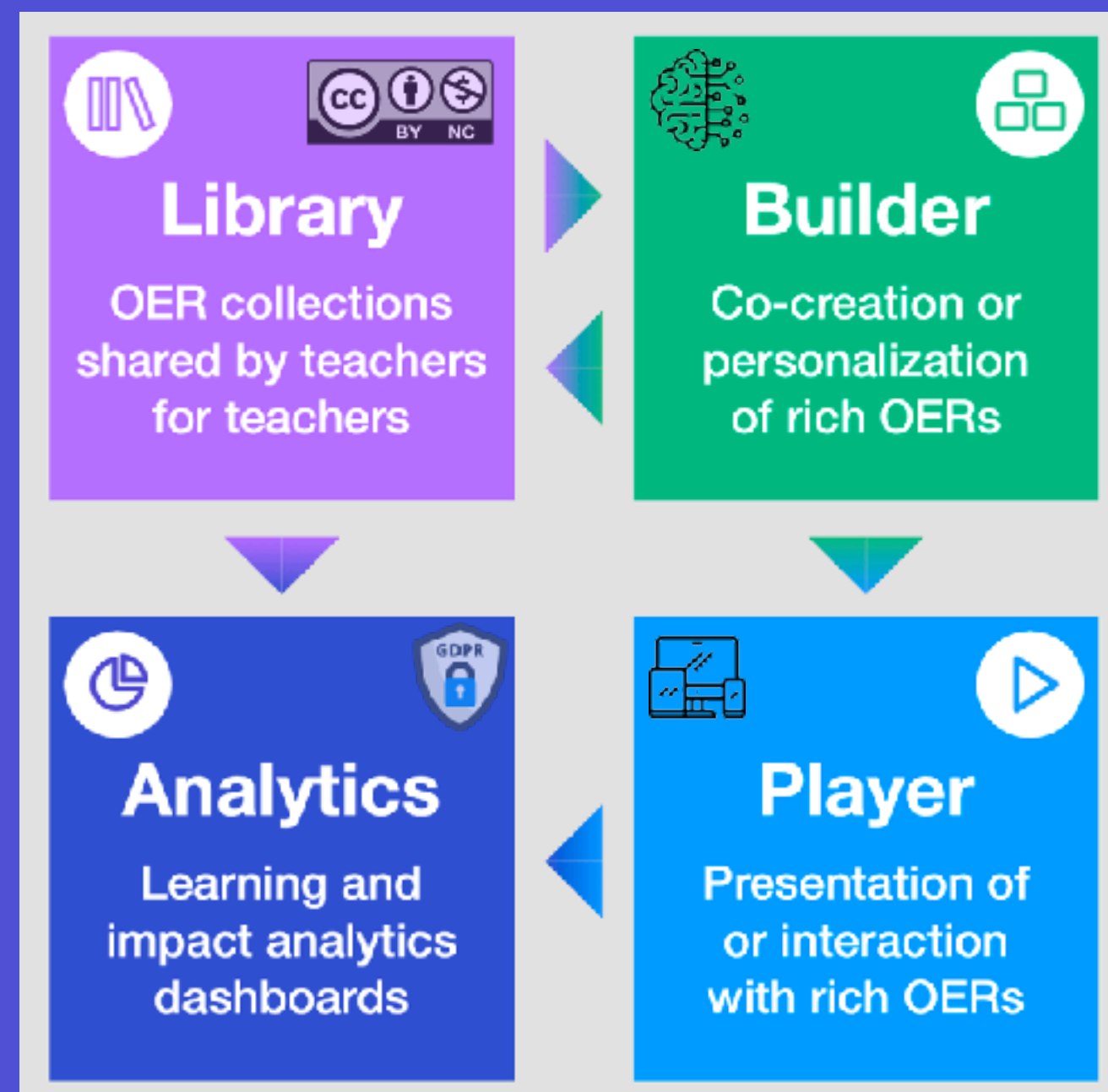
# Open Educational Resources





# 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*

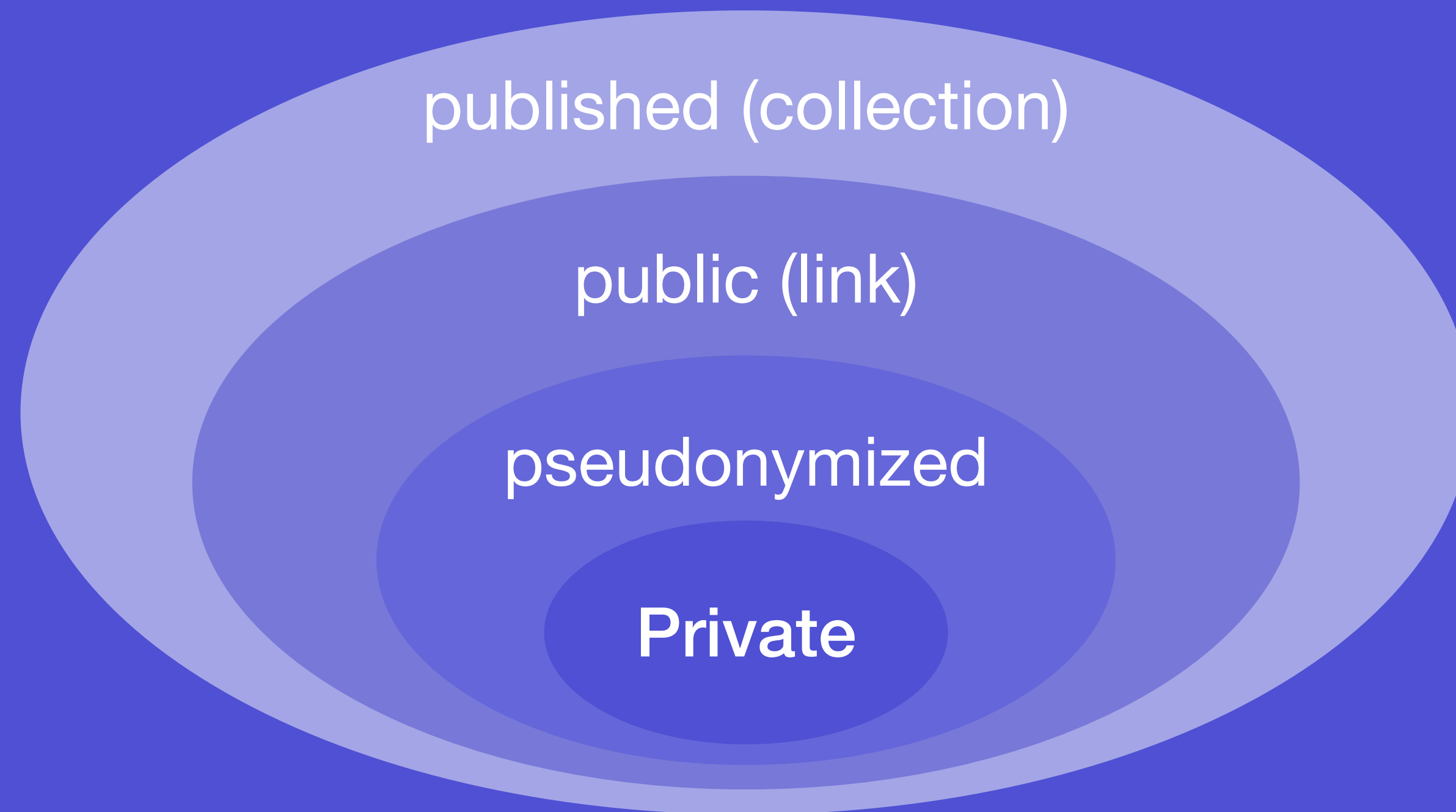




# Open Educational Resources

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

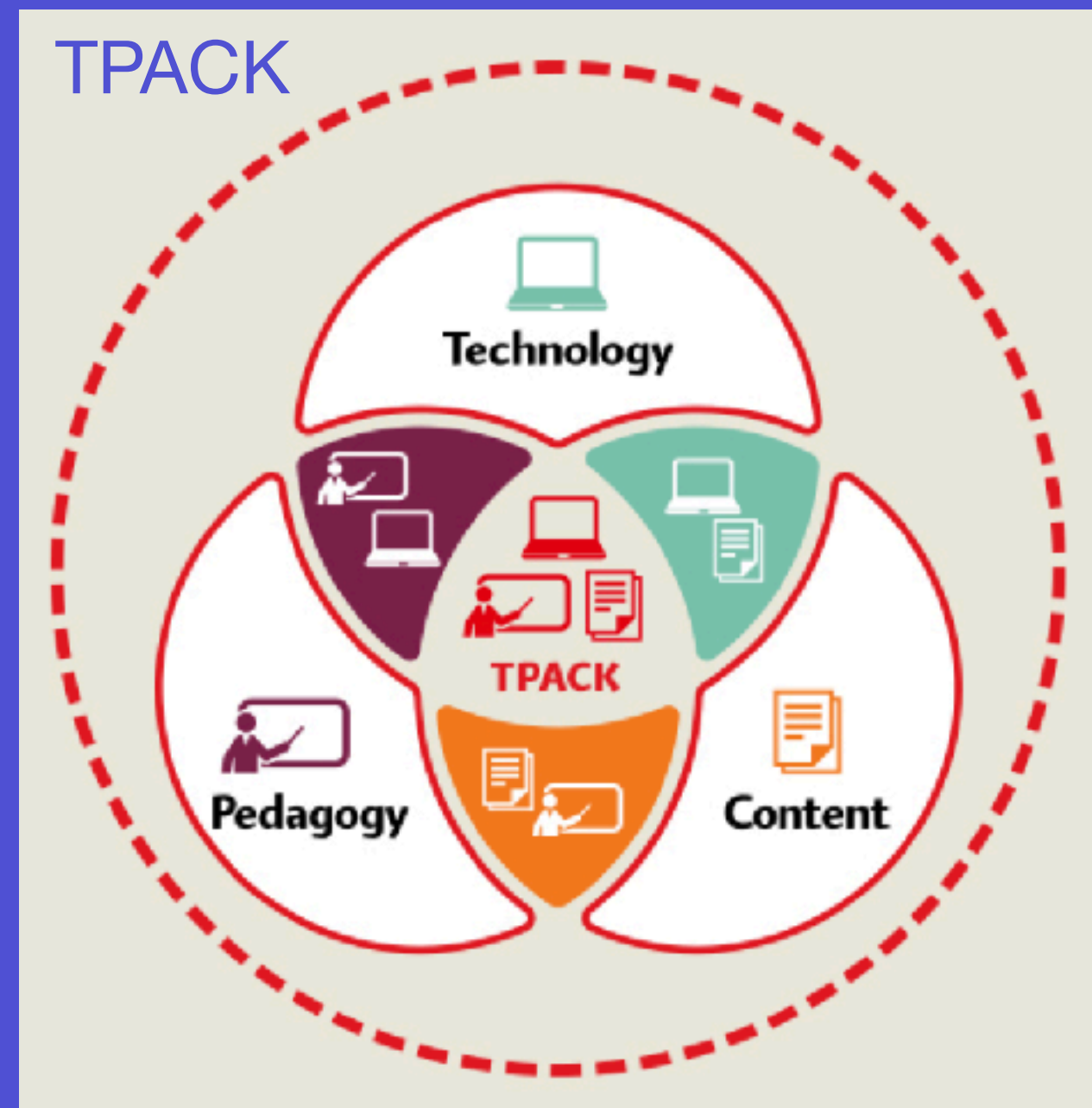




# Techno-Pedagogical Design

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



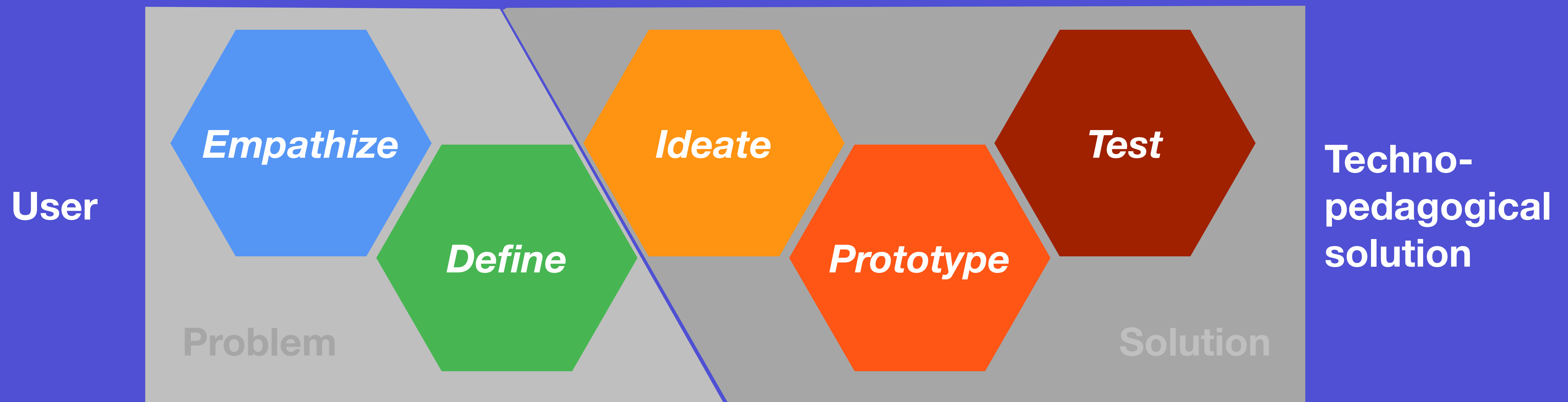
# Techno-Pedagogical Design





# 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

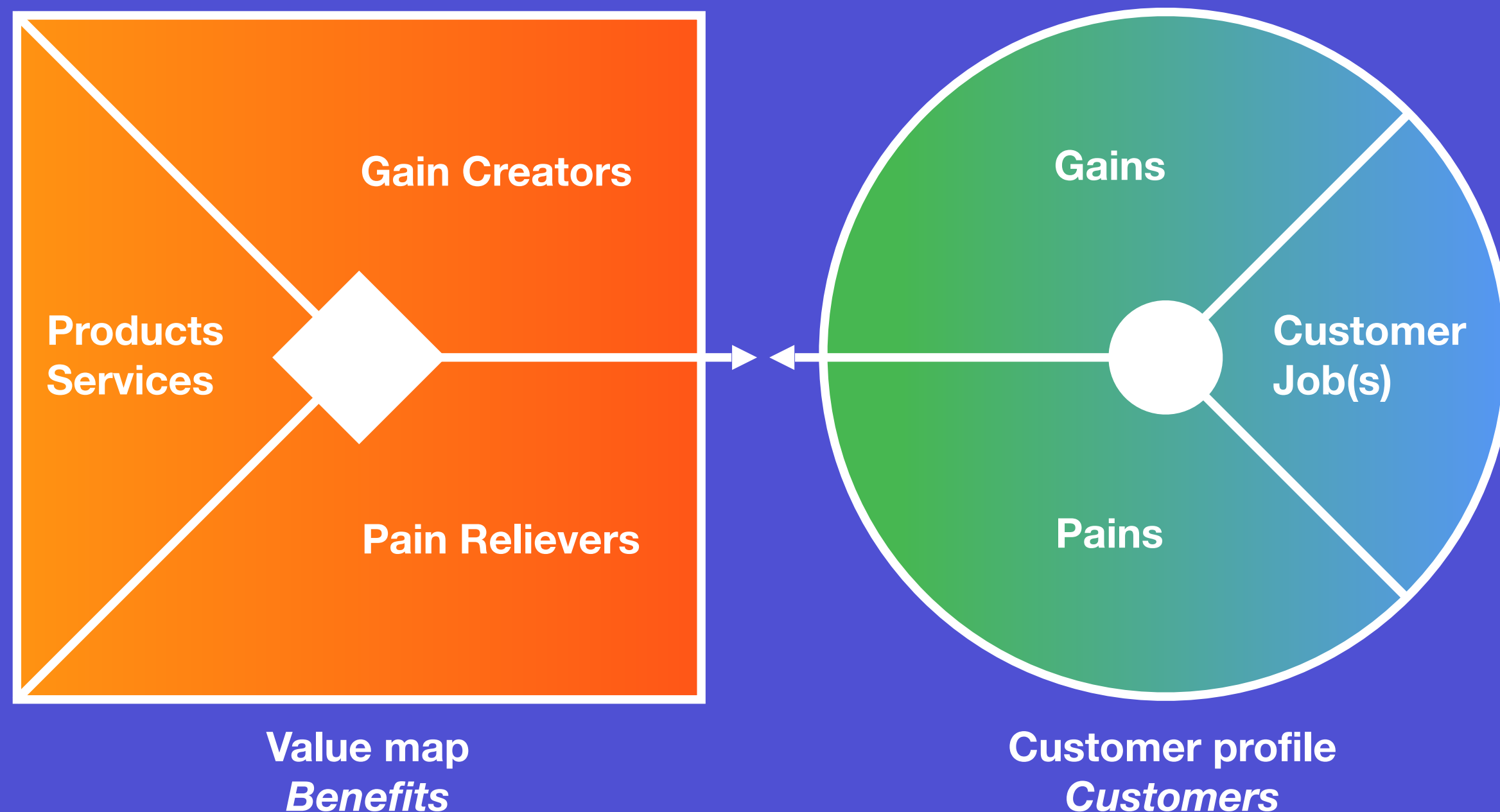


The **design thinking** process is useful for both **educators** and **learners**



# 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**



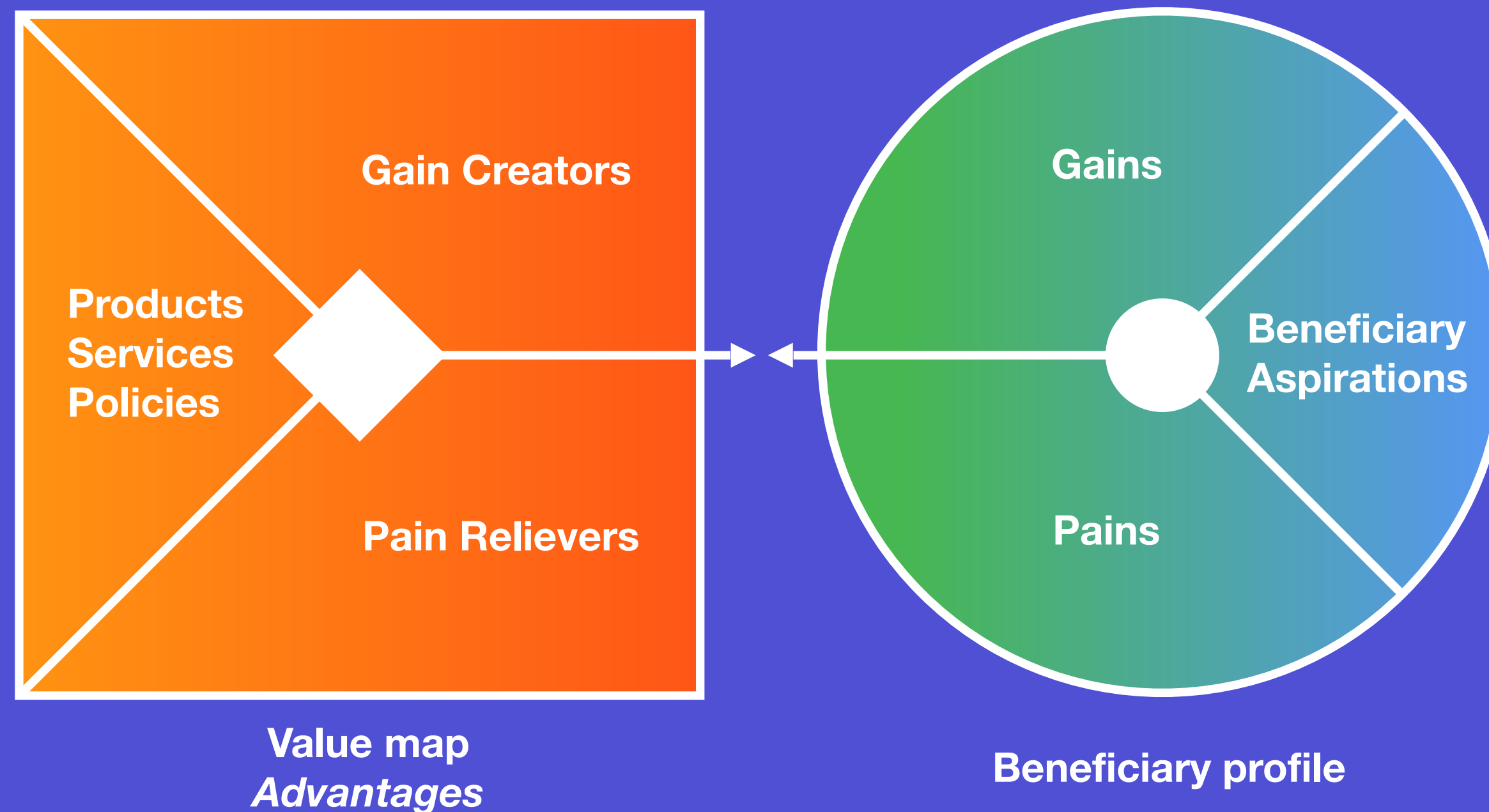
**Jobs:** Important to insignificant  
**Gains:** Essential to nice-to-have  
**Pains:** Extreme to moderate

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



## SUSTAINABLE DEVELOPMENT GOALS

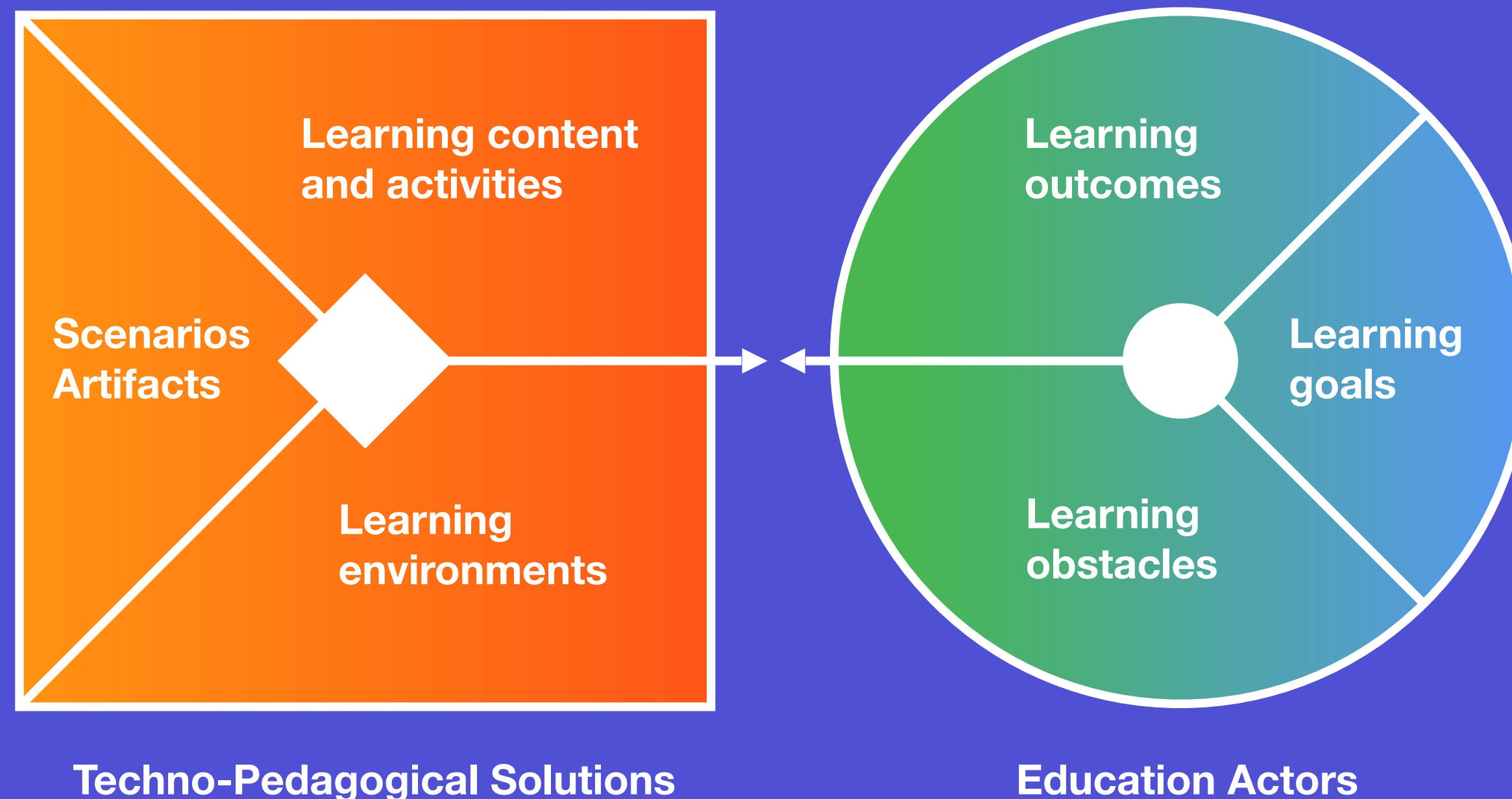


D. Gillet, I. Vonèche-Cardia, and J. La Scala,  
Introducing Alternative Value Proposition Canvases for  
Collaborative and Blended Design Thinking Activities in  
Science and Engineering Education, IEEE TALE, 2022



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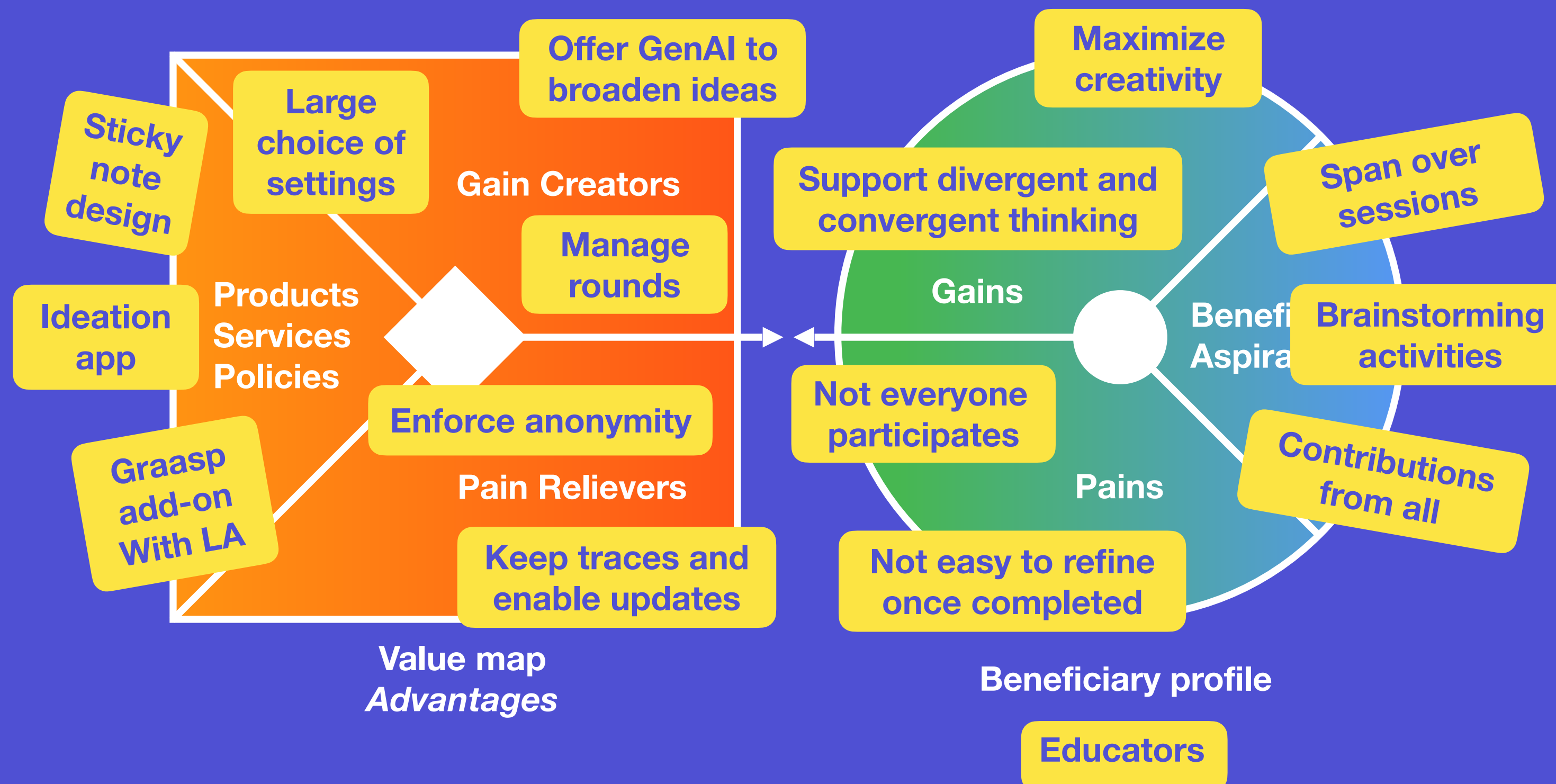
Sonia Sahli and Denis Gillet, "Designing a Generative AI Solution for Creating Summative Assessments in Higher Education", ICL 2025



# 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

The screenshot displays the 'Collecting responses, round 1' interface. At the top, there are navigation buttons: 'PAUSE', 'PREVIOUS STEP', 'Collecting responses, round 1', and 'NEXT STEP'. Below this, a 'Round 1' indicator is shown. The main instruction is 'Define the main features of your application, OmniDex.' followed by a project description: 'Project description: OmniDex lets you create multiple collections (Dexes) of anything you want. All you need is a title and image for each item, and you're done!'. A light blue box contains the instruction: 'Choose a proposal from one of your colleagues, or create a new one.' Below this, a section titled 'PROPOSE A NEW RESPONSE' shows a grid of proposals. The first proposal is 'AI GENERATED' and lists features: 'intuitive UI, quick Dex creation, seamless image uploading, customizable categories, search/filter options, drag-and-drop organization, and social sharing for collaboration.' It has 2 likes. The second proposal is 'we see what we're missing in gray' with 0 likes. The third proposal is 'Implement a "panini" mode (take a photo of the object to complete your omnidex collection) but no image recognition, you can put whatever you want' with 4 likes and is marked as a 'Parent idea'. The bottom row shows 'YOU WROTE THIS' proposals: 'each collection item as a card (minimum image and description)' with 3 likes, 'Implement a "panini" mode (take a photo of the object to complete your omnidex collection)' with 1 like, and 'ability to define a card template, e.g. I want my cards in the "flowers" collection to have a "scientific name" field.' with 0 likes.

# 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

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