



**Universitat  
Pompeu Fabra**  
*Barcelona*

**TIDE** Research Group  
on Interactive and Distributed  
Technologies for Education



# Learning design technologies: supporting collective and inclusive approaches

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**Davinia Hernández-Leo**

**TIDE, Universitat Pompeu Fabra, Barcelona**

twitter: @davinia.hl @TIDE\_UPF

website : <http://www.upf.edu/web/tide>

Seminar series on "**Dispositions for training teachers in Europe**", Eutopia Connected Research Community (CRC) "Research for inclusive education", CY Cergy Paris University, 6 March 2023





# UPF, ICT Department



<https://www.youtube.com/watch?v=8dgvWkICCr8>

Public, Young, Urban, International



<https://www.youtube.com/watch?v=FjAuggfITVE>



## TIDE research group

<https://www.upf.edu/web/tide/people>



**Inclusive education is multifaceted.**

**From a perspective of designing learning activities,  
what do we mean by *inclusive education*?**

<http://tiny.cc/eutopia-inclusive>

## Inclusion, multiple perspectives, in this presentation:

- Equal opportunities for participation
- Guidance in designing for learning
- Collective efforts in designing and sharing designs for learning
- Co-design, involving students
- Regulation of learning processes



**Learning Design**



## Learning Design

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Support teachers in designing the “best possible” conditions for their students to learn, documenting them, making their design ideas explicit and sharable.

(Agostinho, 2011; Conole, 2012; Koper et al., 2004; Laurillard, 2013; Mor, Craft & Hernández-Leo, 2013; Wasson & Kirschner 2020; ...)



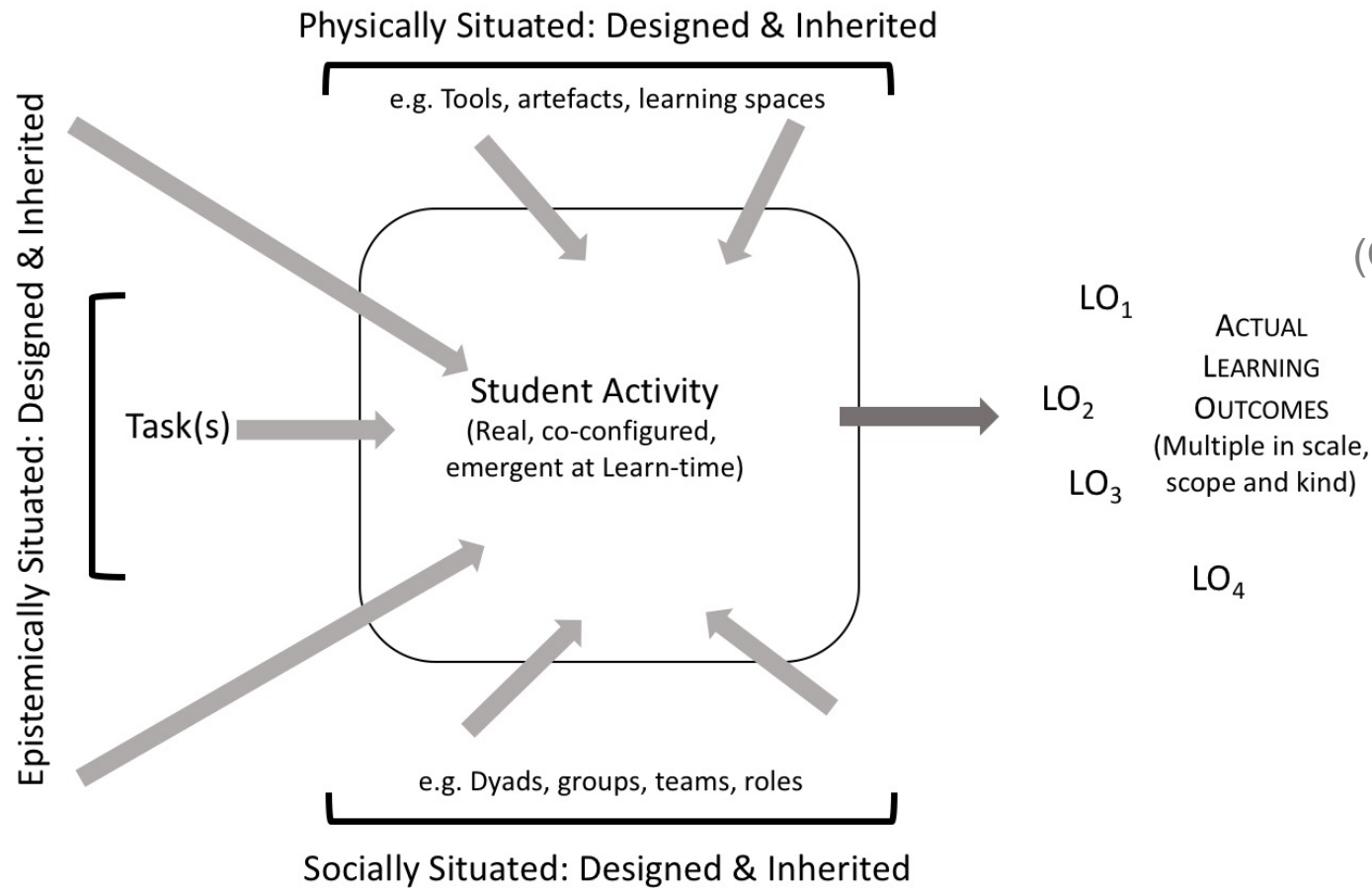
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# Learning Design

What can be designed?



# Learning Design



## ACAD framework

(Carvahlo & Goodyear, 2015)



**Learning Design, the case of designing for  
Collaborative Learning**

**And about equal opportunities for participation**



**Collaborative Learning**

**Computer-Supported Collaborative Learning**

## **Collaborative Learning**

social interactions triggering learning mechanics

## **Computer-Supported Collaborative Learning**

networked computers (software, multiple devices) can facilitate these interactions

## Productive collaborative Learning

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- Genuine collaboration requires systematic efforts to learn together:
  - free collaboration does not necessarily lead to fruitful learning (Dillenbourg, 2002)
  - learners should be engaged in processes involving social knowledge-intensive interactions (Roschelle & Teasley, 1995; Johnson & Johnson, 1999; Barron, 2003)
  - design science: designing for collaborative learning

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## Collaborative Learning scripts

An approach to enhance effective collaboration:

Guide / structure collaboration in a way that the probability of reaching successful learning situations increases

(Dillenbourg, 1999)

# Collaborative Learning scripts

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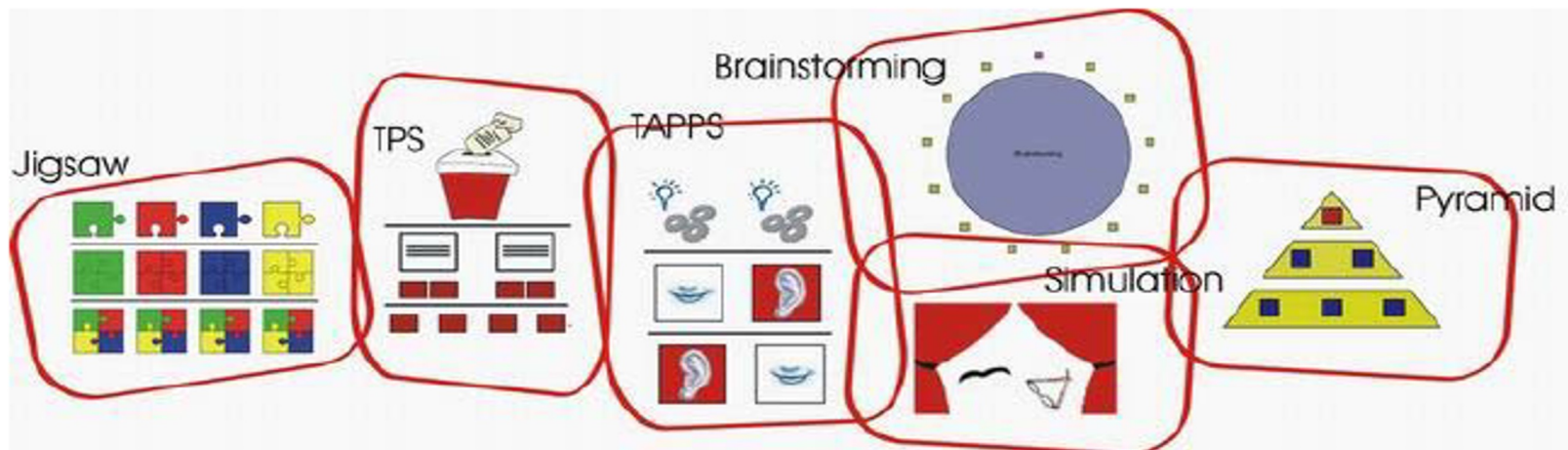
## Macro-scripting

Macro-scripts structure the collaborative learning flow (aspects of their learning design: activity sequence, roles, group formation, resource allocation) to trigger potentially effective social interactions.

(Dillenbourg & Tchounikine, 2007; Kobbe et al., 2007)

# Patterns for the design of Collaborative Learning

## Collaborative learning flow patterns



(Hernández-Leo et al., 2007)

Promote: participation – interaction, positive interdependence, individual accountability, knowledge building

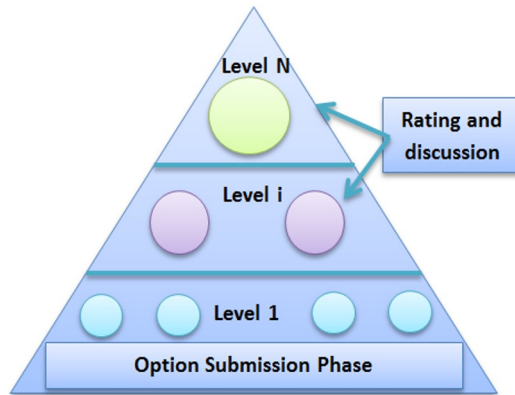


# Authoring tools

The image displays the TIDE authoring tool interface, which is used for designing learning activities. The main window, titled "Unit of Learning", shows an "Activity Flow" design. On the left, a "Structure" pane lists "CLFP Pyramid" with three levels. A "Number of levels" dialog box is open, asking "How many levels should be in the pyramid?" with a range from -10 to 2. The main design area shows a pyramid structure with three levels (Level 1, Level 2, Level 3) and a "Share" button. A "Think" activity is shown with a row of red squares. A "Pair" activity is shown with four document icons labeled "abc" and a row of red squares. A "Jigsaw Group" activity is shown with four groups of four puzzle pieces each. A "Share" button is also present. A "Number of levels" dialog box is open, asking "How many levels should be in the pyramid?" with a range from -10 to 2. A "Share" button is also present. A "Number of levels" dialog box is open, asking "How many levels should be in the pyramid?" with a range from -10 to 2. A "Share" button is also present.

Two "Expert group" configuration windows are shown on the right. The top window shows the "Expert group" configuration, including a description of the role and a list of activities. The bottom window shows the "Subproblem Discussion" activity configuration, including a description of the activity and a list of resources.

## ■ PyramidApp



<https://www.upf.edu/web/tide/tools>

Manathunga, K., & Hernández-Leo, D. (2018). Authoring and enactment of mobile pyramid-based collaborative learning activities. *British Journal of Educational Technology*, 49(2), 262-275.

**B I @**

Student task: ⓘ

What do we mean by efficient and effective mobile collaborative learning?

Mode for students log-in: ⓘ Name/Surname ▾

Min. number of students: ⓘ 30 ✕

Number of students per group at initial group level: ⓘ 4

No. of levels: ⓘ 3


Number of groups at initial group level: ⓘ 7


Number of highly rated options: ⓘ 3


Social awareness : ⓘ Yes


Time settings
Keywords
Alerts settings


Files Apps Physical Communic Social MOOCs


 Text File


 Picture or image


 Video


 Power Point

 Pdf File

 Audio File

 Spread sheet

 Source Code



 Other Files

Classe1 11/04/2018 7:00 60

1, 2, 11/04/2018 8:00 0


30 Neutre

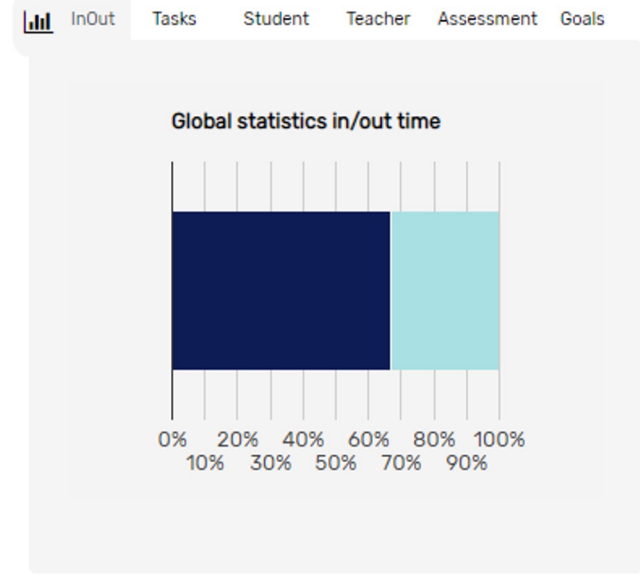
Introducció a les equacions de segon grau.  
Com resoldre les equacions de segon grau.



30 Aplicar 2

Exercici: Identificar els components de les equacions de segon grau.  
Exercici: Resoldre una equació de segon grau.





Activities

	dc. 11 d'abril					dj. 12 d'abril					dv. 13 d'abril			
	04:00	08:00	12:00	16:00	20:00	00:00	04:00	08:00	12:00	16:00	20:00	00:00	04:00	08:00
													Classe2	
							Deures							

Albo, L., & Hernandez-Leo, D. (2021). edCrumble, a data-enriched visual authoring design tool for **blended learning**. IEEE TLT. 10.1109/TLT.2020.3040475



<https://www.upf.edu/web/tide/tools/>

# LdShake (Hernández-Leo et al., 2011), ILDE (Hernández-Leo et al., 2018), community environments for learning design

The screenshot shows the ILDE user interface. At the top, there is a navigation bar with 'New design', 'My designs', 'Browse designs', 'Community', and 'About'. A search bar is also present. Below the navigation bar, there is a sidebar menu with categories like 'All my projects', 'Created by me', 'Shared with me', 'Trashed', 'All my designs', 'Created by me', 'Shared with me', 'Trashed', 'All my implementations', 'Created by me', 'Shared with me', and 'Trashed'. The main content area displays a list of designs with columns for design name, author, and date. The design 'Efficient and effective mobile collaborative learning' is highlighted.

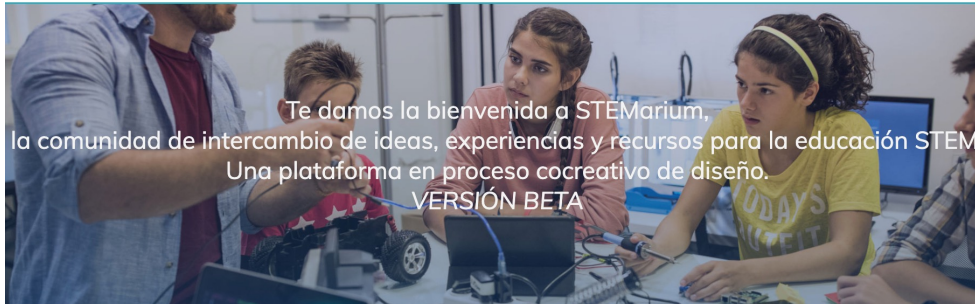
Design Name	Author	Date
Efficient and effective mobile collaborative learning	Davinia HERNANDEZ LEO to 0 editors, i	a day ago
Information sources, role in process Friday	Davinia HERNANDEZ LEO to 0 editors, i	2 days ago
Information sources, role in process	Davinia HERNANDEZ LEO to 0 editors, i	5 days ago
Plariagirm T1 - 2	Davinia HERNANDEZ LEO to 0 editors, i	29 Sep
Plagio T2 2	Davinia HERNANDEZ LEO to 0 editors, i	29 Sep
AI-Education ITIC - T1	Davinia HERNANDEZ LEO to 0 editors, i	29 Sep
Plagio T2	Davinia HERNANDEZ LEO to 0 editors, i	29 Sep
AI-Educación ITIC - T2	Davinia HERNANDEZ LEO to 0 editors, i	28 Sep
Plagio T3	Davinia HERNANDEZ LEO to 0 editors, i	26 Sep
AI-Educación ITIC - T3	Davinia HERNANDEZ LEO to 0 editors, i	26 Sep
Plagiarism T1	Davinia HERNANDEZ LEO to 0 editors, i	25 Sep
CSCAT asesores UE	Davinia HERNANDEZ LEO to 1 editor, al	3 Jun
CSCAT padres	Davinia HERNANDEZ LEO to 1 editor, al	5 Apr
Untitled design	Davinia HERNANDEZ LEO to 0 editors, i	30 Mar
List differences between a LMS and a MOOC platform 2022	Davinia HERNANDEZ LEO to 1 editor, al	2 Mar
errors in code	Davinia HERNANDEZ LEO to 1 editor, al	14 Feb
Analyze case 2	Davinia HERNANDEZ LEO to 1 editor, al	14 Feb
AT Case Study - design 1	Davinia HERNANDEZ LEO to 0 editors, i	14 Feb
AT Case Study - design 2	Davinia HERNANDEZ LEO to 1 editor, al	12 Feb

The screenshot shows the design page for 'Efficient and effective mobile collaborative learning'. It includes a title, a description, a license (Creative Commons Attribution 4.0 International), and a public link. Below the text, there is an 'Activity Summary' section featuring a diagram of a triangle with a red circle at the top and four yellow circles at the bottom. The triangle is labeled 'Group levels(s)' and 'Level 1 - Individual level'. Below the diagram, there is a 'STUDENT TASK' section with the text 'What do we mean by efficient and effective mobile collaborative learning?'.

The screenshot shows the design page for 'Jigsaw Michael'. It features a hierarchical diagram with a central node 'Jigsaw Michael' and several sub-nodes. Below the diagram, there is a 'Design Pattern' section with the text 'Jigsaw Duplicated Jigsaw X' and a 'Problem' section.



<https://ildeplus.upf.edu/DTIPS/>



Te damos la bienvenida a STEMarium, la comunidad de intercambio de ideas, experiencias y recursos para la educación STEM. Una plataforma en proceso cocreativo de diseño. **VERSIÓN BETA**



El bosc, un amic desconegut

ARC



Com passen a la sang les substàncies nutritives?

ARC



Som enginyers! Fem avions de paper!

ARC

### Repositorio de recursos

Necessites inspiració? Descobreix els darrers materials d'educació STEM compartits. Aquí trobaràs exemples de pràctiques reals que pots aplicar directament a l'aula o que t'ajudin a dissenyar nous recursos o projectes adaptats al teu alumnat.

MÁS



FAQS

Search projects

Community

Repository

The Toolbox

LOGIN

## Welcome to D-TIPS!

D-TIPS (Design Thinking in Primary Schools) aims to help with the development of abilities such as **critical thinking, reflection, self-regulation, and collaboration**. By developing these skills in children schools can contribute to mitigating major challenges in society.

upf. TIDE Plataforma D-TIPS ILDE+

# D-TIPS: "Design Thinking in Primary Schools"

Co-funded by the Erasmus+ Programme of the European Union

POWERED BY:



Explore, find, and share learning activities teaching environmental awareness

Includes activities using smart IoT planters in learning spaces



**The Garden of Happiness**

Christos  
Rodosthenous

👍 4 👁 13 💬 0



**Automated caring for indoor plants**

Konstantinos  
Charonis

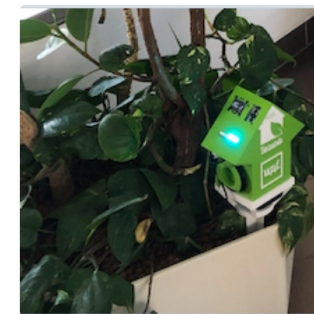
👍 2 👁 10 💬 0



**Journaling experience:  
Learning the basics of...**

ARIEL ORTIZ  
BELTRAN

👍 1 👁 13 💬 1



**Taking care of plants along  
the semester: competition**

Bernardo  
Tabuenca

👍 0 👁 4 💬 0

Only questions with english translations

Clear selection

Download selection

SORTING

**Χημεία / Περιοδικός πίνακας και στοιχεία**

Sakis Mar

👍 👁 🗨

**Βιολογία / Μυσκελετικό σύστημα**

Sakis Mar

👍 👁 🗨

**Φυσική / Επιστημονική Μέθοδος - Μέτρηση**

Sakis Mar

👍 👁 🗨

**Βιολογία / Κυκλοφορικό σύστημα**

Sakis Mar

👍 👁 🗨

**Πεπτικό Σύστημα - Βιολογία**

**Energian käsittely**

**Hyvinvointi ja turvallisuus**

**Hydrologinen kierto**

The Augmented Assessment Project aims to address the gap that exists in assessing newly arrived migrant students' prior knowledge in the fields of Science and Mathematics, by utilising augmented reality for assessment.

**The Partners**

UPF | TIDE Research Group on Intelligent and Distributed Technologies for Education | ilde+ | Follow us: <https://augmented-assessment.eu>

## BLENDI PLATFORM



### Tools & Tips

Tools & tips for using blended learning in schools attending students' diverse needs



### Collaborative lesson plans

Use BLENDI platform for creating collaborative lesson plans



### Students' feedback App

Get students' feedback regarding lessons using the BLENDI App





<https://ildeplus.upf.edu/BLENDI/>



TOOLS & TIPS COLLABORATIVE LESSON PLANS FEEDBACK APP ABOUT BLENDI

CREATE COLLABORATIVE LESSON PLANS COMMUNITY

Davinia HERNANDEZ LEO

ALL USERS | A | B | C | D | E | F | G | H | I | J | K | L | M | N | O | P | Q | R | S | T | U | V | W | X | Y | Z

1/4



TOOLS & TIPS COLLABORATIVE LESSON PLANS FEEDBACK APP ABOUT BLENDI

CREATE COLLABORATIVE LESSON PLANS COMMUNITY

Davinia HERNANDEZ LEO

ALL | MY PROJECTS | EDITABLE PROJECTS | TOP 10 VIEWED | TOP 10 COMMENTED | TOP 10 LIKED



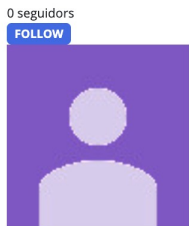
AIKATERINI SARAKINI



ANASTASIA PROTOPSALTI



ANDREA MORELLO GENDRE



APOLLOKURT@GMX.DE



APOSTOLOS TZIOVARAS



ARNAU VILASECA TERSA

EDUCATION LEVEL

EDUCATIONAL AREAS

LESSON PLAN LANGUAGE

ALPHABETIC

1/3



1798 Irish Rebellion

Rachel Reynolds

1 4 0 0/3



Apostol's copy of Model Blended Learning

Apostolos Tziouvaras

1 6 0 0/3



BLENDI workshop

Laia Albó

0 28 0 0/3



Cleo's copy 'Models of blended learning'

Kleo Kaloerakou

1 9 0 0/3

# Albó, L., Stylianidou, N., Chalatsis, X., Dieckmann, M., & Hernández-Leo, D. Including Students' Voices in the Design of Blended Learning Lesson Plans. EC-TEL 2021

### We R all Refugees

The first global theme in the Greek syllabus for English as a Foreign Language at senior high-school is 'Refugees'. This learning design covers 12 lessons in a class of 20 pupils from various ethnic and cultural backgrounds.



#### STAVRIANASOU

Teacher of English as a Foreign Language at High School  
3rd Upper Secondary School of Nea Philadelphia, Athens, Greece  
Foreign Languages  
Secretary of LITTA (Lozanov's International Teacher Trainers Association)

2 followers

[FOLLOW](#)



We R all Refugees

**EDUCATION LEVEL:**  
Upper secondary education

**EDUCATIONAL AREAS:**  
Linguistic

**DIGITAL COMPETENCE:**  
Interacting through digital technologies  
Engaging in citizenship through digital technologies  
Integrating and re-elaborating digital content  
Creatively using digital technologies

**LESSON PLAN LANGUAGE:**

#### 1 - LEARNING OBJECTIVES:

**Knowledge: getting-to-know each other; facts about refugees across time**

**Comprehension: spoken English in face-to-face communication and videos as well as written English in factual texts**

**Analysis: Identifying the causes and effects of an issue**

**Synthesis: Design collaborative local action plans for refugees**

**Evaluation: Define the criteria for evaluating action plans**

**Language: vocabulary about Refugees, Present and Past tenses**

**Affective learning outcomes: empathy for refugees, awareness of refugee problems, solidarity**

**Psychomotor skills: Create short videos about refugees**



[DISCUSS LEARNING OBJECTIVES](#)

#### 2 - ACTIVITIES AND TOOLS:

1. **Video assignment** (flipped classroom activity) - individual / online / asynchronous

[EdPuzzle](#)

2. **Introduction** (experiential presentation of the theme) - whole class / face to face / synchronous

[Youtube](#)

3. **Brainstorming** (who?, when?, where?, why? how?) - whole class / face to face / synchronous

[Stormboard](#)



[DISCUSS ACTIVITIES AND TOOLS](#)

# Teachers - wellbeing

Hakami, E., & Hernandez-Leo, D. (2021). Investigating the **Well-being Impacts of Educational Technologies** Supported by Learning Analytics: An application of the initial phase of IEEE P7010 recommended practice to a set of cases. LAK

Hakami, E., & Hernandez-Leo, D. (2021). **Teachers' views about the impact of Learning Design Community platforms on Well-being.** SIIE





**A role for Learning Analytics  
to support learning design**

## Data Analytics in teaching & learning

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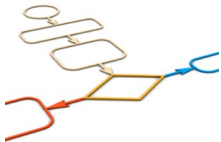
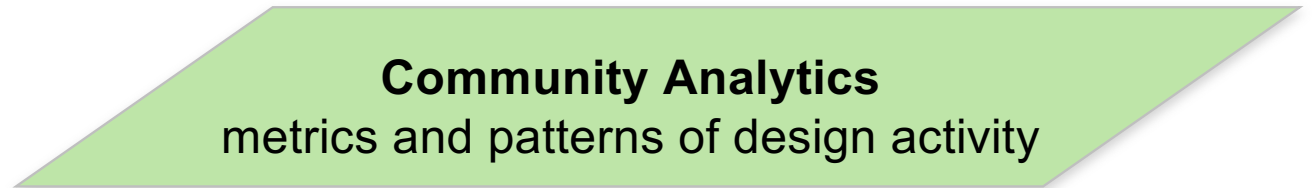
- **Learning Analytics (LA)**: “the measurement, collection, analysis, reporting of data about learners and their contexts, for purposes of understanding and optimizing learning and the environments in which it occurs” SoLAR (Ferguson, 2012)
- **Social Learning Analytics** (Buckingham-Shum & Ferguson 2012) & **Community analytics and visualizations** (Klamma, 2013; Vasileva and Sun, 2007), including Social Network Analysis (SNA) (de Laat & Schreurs, 2013)

# Understanding and supporting learning design with analytics

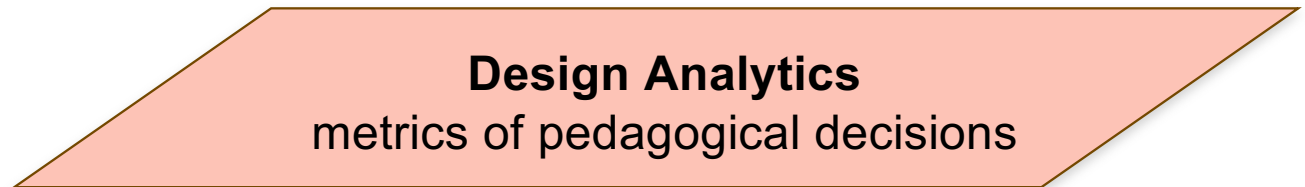
## ANALYTICS LAYERS FOR LEARNING DESIGN FRAMEWORK (AL4LD)



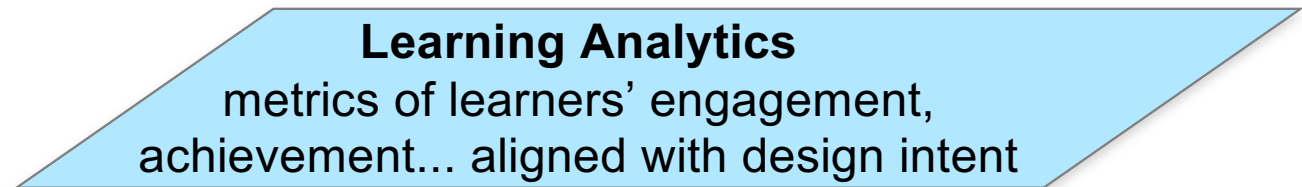
Community of practitioners  
and related stakeholders



Learning Design (LD) tools



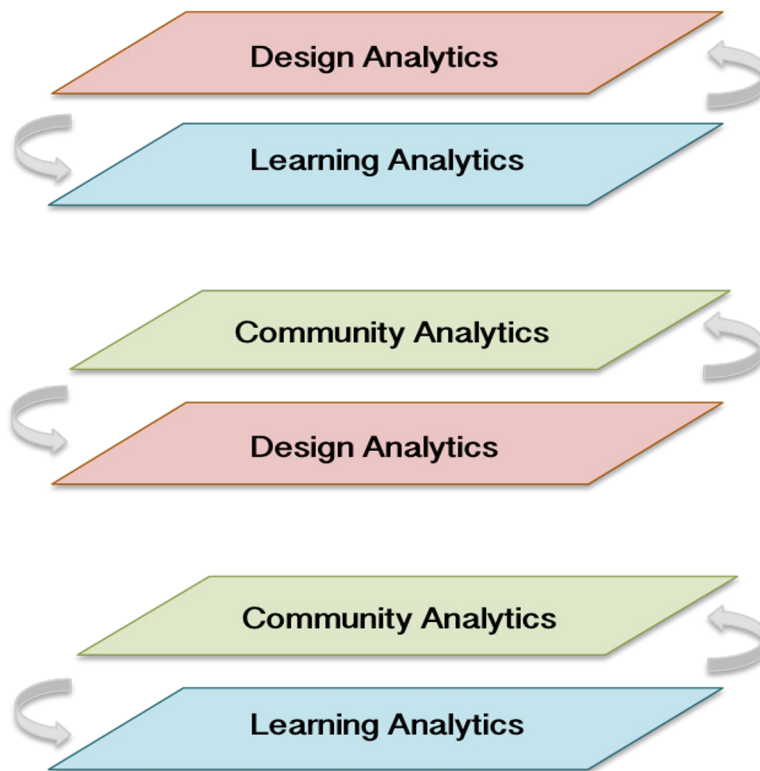
Learners  
experiencing  
learning designs



# Understanding and supporting learning design with analytics

## AL4LD Framework

### Interactions between layers



### Functions:

Design Analytics can offer a framework for interpreting Learning Analytics.  
Learning Analytics aligned with the design intent support further design iterations (redesign).

Design Analytics can contribute to Community Analytics, with details of the properties of the learning designs created within a community.  
Community Analytics aligned with design properties can offer pointers for inspiration during the design process and opportunities for community inquiry.

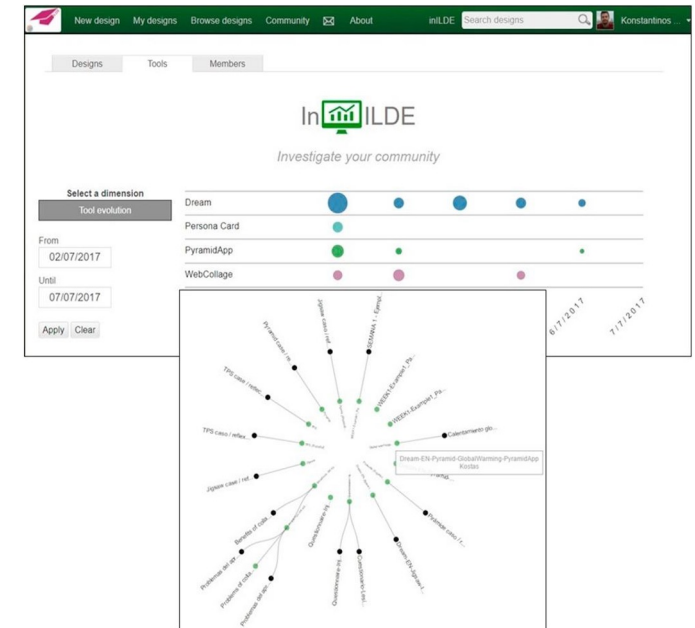
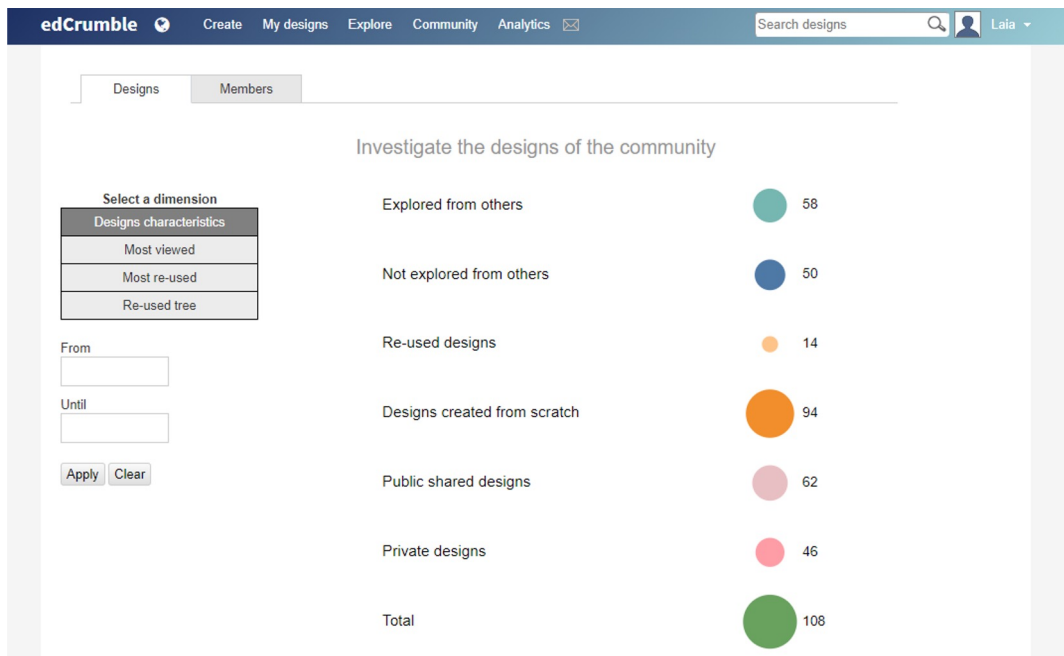
Learning Analytics can contribute to Community Analytics, with details of the impact in learning settings of the designs created within a community.  
Community Analytics linked with Learning Analytics can offer opportunities for community inquiry.

# Analytics for learning design

- Understanding community behaviour
- Triggering orientation and inspiration



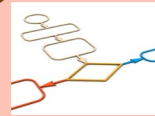
**Community Analytics**  
metrics and patterns of design activity



Michos, K., Hernández-Leo, D., (2018) Supporting awareness in communities of learning design practice, *Computers in Human Behavior*, 85, 255-270.



# Analytics for learning design

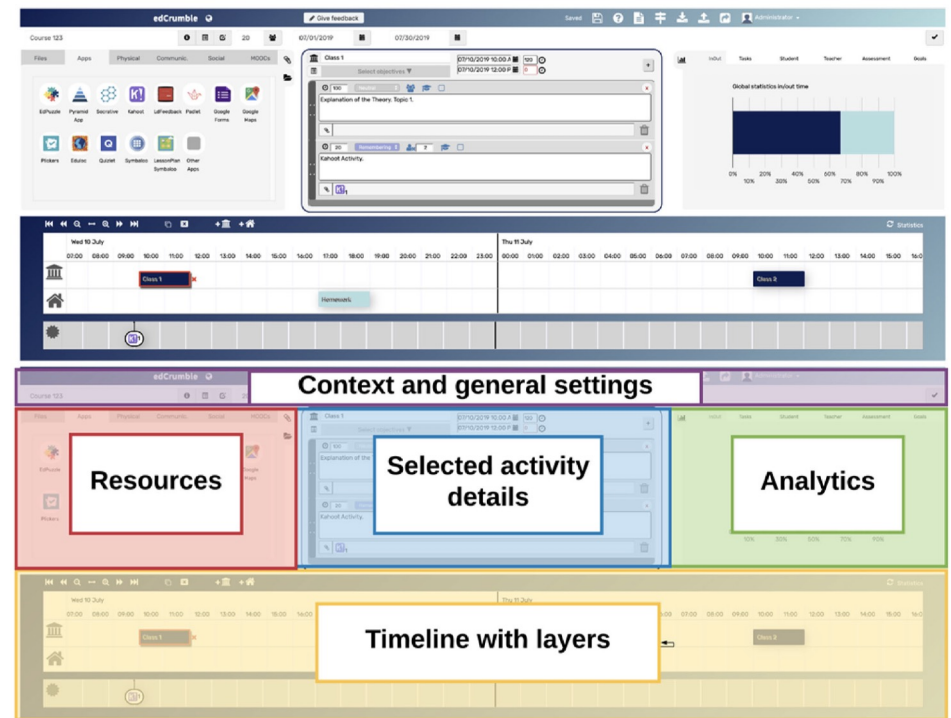


## Design Analytics metrics of pedagogical decisions

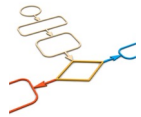
- Categorise learning designs
- Support awareness and reflection about design decisions during the learning design process



Albo L, Hernández-Leo D.  
edCrumble: designing for learning  
with data analytics. EC-TEL 2018.  
*Best Demo Award.*



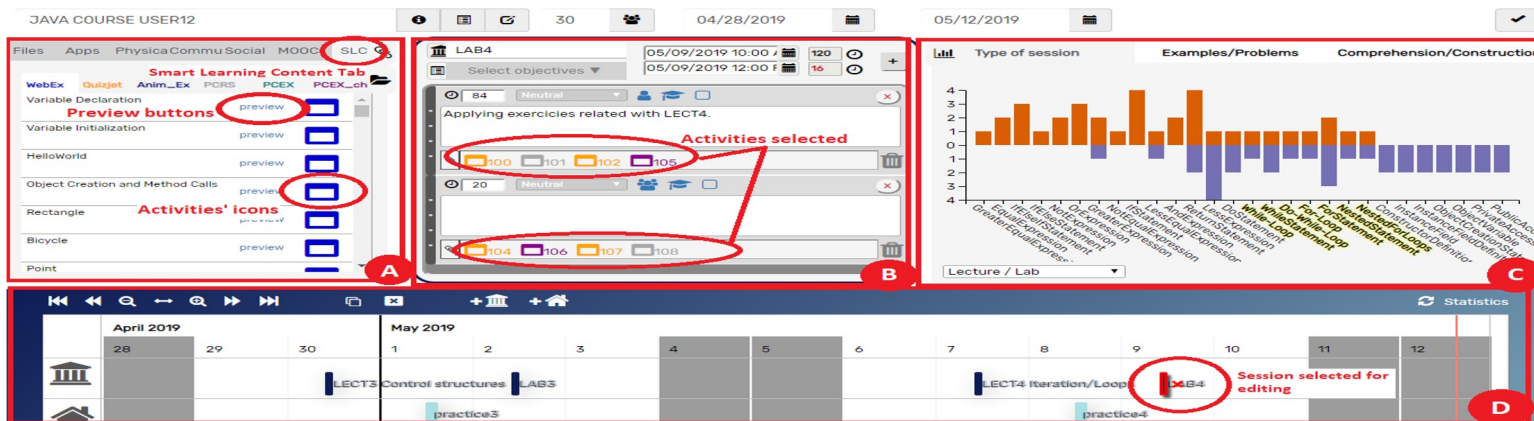
# Analytics for learning design



Learning Design (LD)  
tools

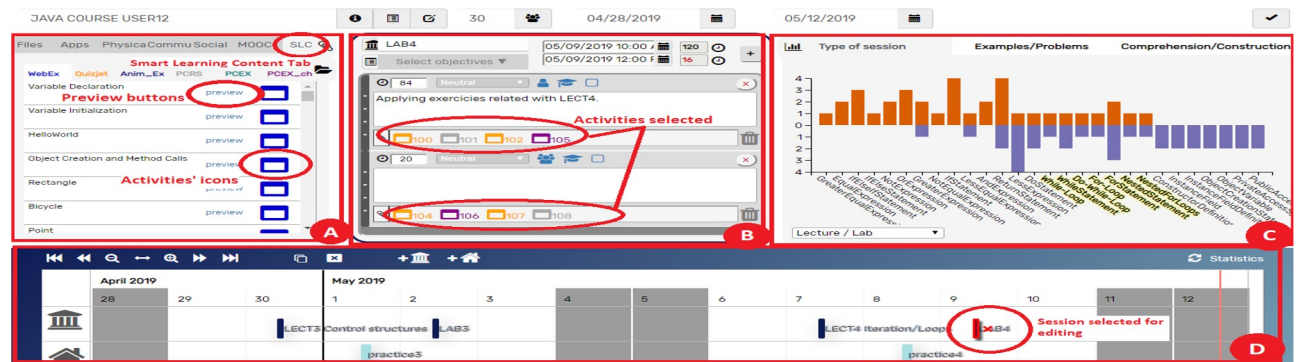
**Design Analytics**  
metrics of pedagogical decisions

- Concept-level design analytics
- Visualizations uncovering facets of learning activities being authored
- Smart learning content, programming activities, edCrumble



# Analytics for learning design

Albó, L., Barria-Pineda, J., Brusilovsky, P. & Hernández-Leo, D. (2021) Knowledge-Based Design Analytics for Authoring Courses with Smart Learning Content. Int J Artif Intell Educ.



## Design analytics:

allows the teachers to reduce the cognitive load (especially in terms of mental demand)

facilitates the choice of the most appropriate activities without affecting the overall design time

**improves the overall learning design quality** and helps teachers avoid committing design errors

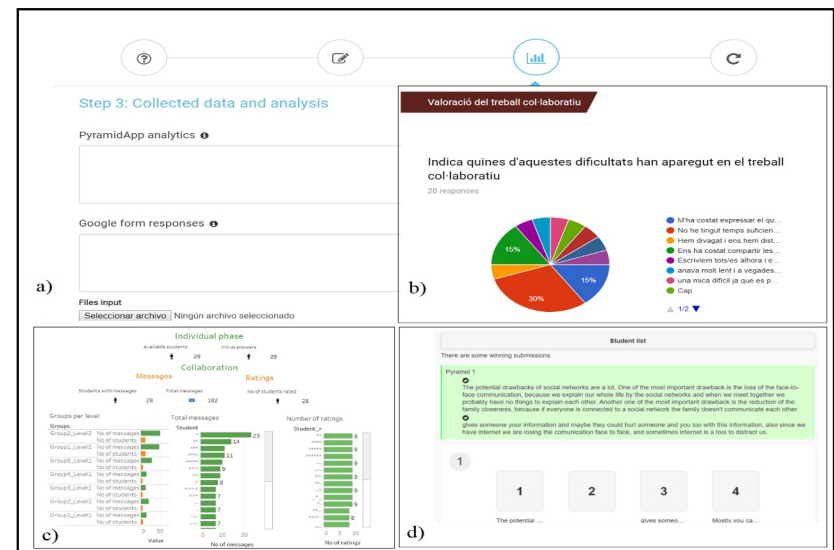


## Learning Analytics metrics of learners' engagement, achievement... aligned with design intent

- Accumulated evidence of design's impact
- Support awareness and reflection about effects of designs, redesign
- Teacher-led inquiry, collective inquiry

Michos, K., Hernández-Leo, D., & Albó, L. (2018). **Teacher-led inquiry in technology-supported school communities.** *BJET*

Michos, K., & Hernández-Leo, D. (2020). **CIDA: A collective inquiry framework to study and support teachers as designers in technological environments.** *CAE*



Michos, K., Lang, C., Hernández-Leo, D., Price-Dennis, D., (2020) **Involving teachers in learning analytics design: lessons learned from two case studies.** *LAK*



## Orchestration of learning designs



- *(Classroom) orchestration*: **real-time coordination** of collaborative learning processes at **different social levels** (individual, small groups, whole class), using **a variety of resources and tools** (both ICT and non-ICT) in a synergic way to maintain progress towards the learning outcomes (Moor, 2001; Dillenbourg, Järvela & Fischer, 2009; Prieto et al., 2018)
- Usually by teachers



**Orchestration: monitoring & regulation  
when needed (e.g. facilitating inclusion)**



**Can technology support?**

**Orchestration technology: the case of PyramidApp**

# PyramidApp



Design



Enactment

Orchestration



The screenshot shows the user interface of the PyramidApp. At the top, it says 'Improving' with a timer at '06:05' and 'Logged as Alexandre.argente'. Below this, there is a section for 'Online users' with names 'Al...' and 'Ro...'. A main instruction reads: 'Use this collaborative text editor to formulate an improved option:'. There is a large empty text area for input. Below that, a section titled 'Options rated in the previous stage:' shows two items: 'this is an individual option' with a rating of 5.00, and 'this is a submission from roberto' with a rating of 4.00. A status message says 'The activity has been paused'. At the bottom, there is a 'Write a suggestion...' input field with a submit button.





From Classroom activities to uses embedded in other educational systems (social media), to MOOCs

Amarasinghe, I., Hernández-Leo, D., Manatunga, K., Beardsley, M., Bosch, J., Carrió, M., Chacón-Pérez, J., Jimenez-Morales, M., Llanos, D., Lope, S., Martinez-Moreno, J., Santos, P., Vujovic, M. (2021).

**Collaborative Learning Designs using Pyramid App.**  
CIDUI

**Active Educational Module**

Tu grupo actual es testing ¿Necesitas cambiar de grupo?

Cambiar de grupo

**My digital self**

Individual Mode

Current Task: Social media and your

0% Script Progress

Improving 06:05

Logged as Alexandra. argente

Online users

Al... | Ro...

Use this collaborative text editor to formulate an improved option:

Options rated in the previous stage:

this is an individual option	5.00
this is a submission from roberto	4.00

The activity has been paused

Write a suggestion...

Tom

Son of Instareal CEO  
Instareal Profile  
@thomas

¿Hola, cómo estás? Soy Tom, el hijo de la directora ejecutiva de Instareal.

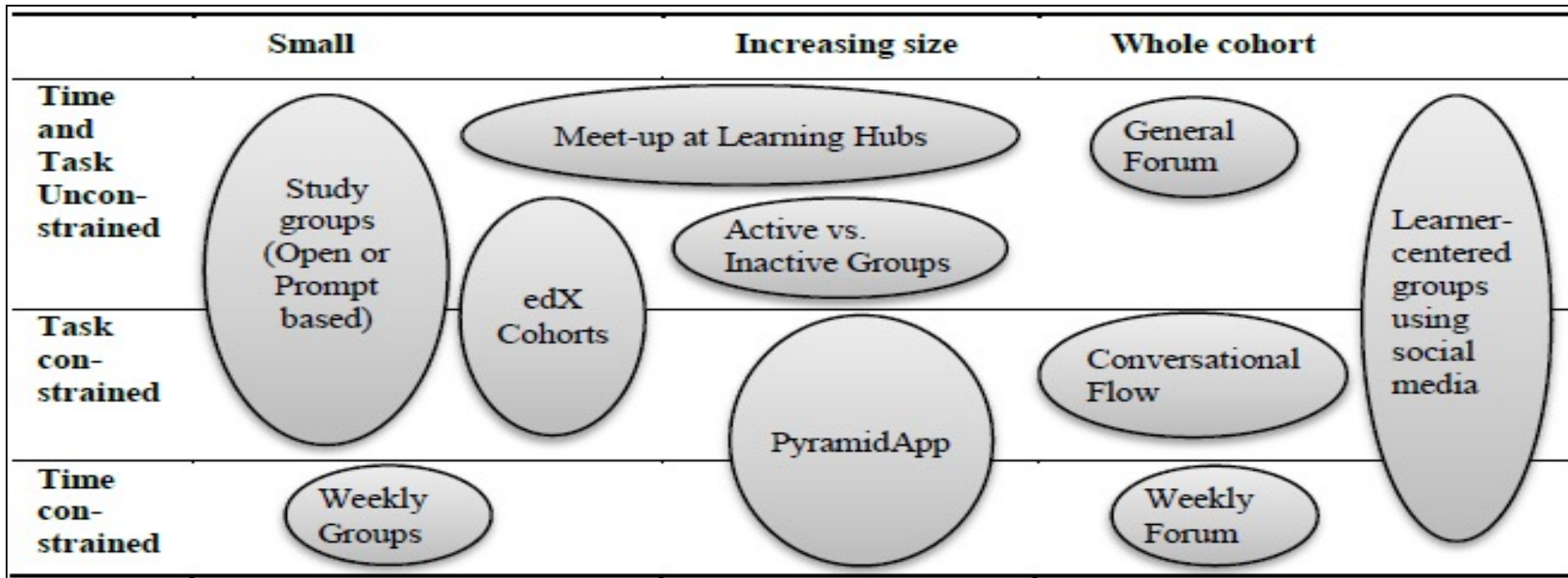
00:00 00:24

¿Por qué experimentamos adicción a las redes sociales?

Hola, ¿Por qué me escribes? ¡Buenas! ¡Hola! Es un placer conocerte

Hernandez-Leo, D., Theophilou, E., Lobo, R., Sánchez-Reina, R., Ognibene, D., (2021) **Narrative scripts embedded in social media towards empowering digital and self-protection skills,** ECTEL.

# Social Learning Space grid, examples (MOOCs)



Manatunga, K., Hernández-Leo, D., Sharples, M., (2017) A Social Learning Grid for MOOCs: Exploring a FutureLearn Case, eMOOCs



# Orchestration technology in PyramidApp

(Amarasinghe & Hernández-Leo, 2021)

Synergies Between Humans and Machines to Support  
the Orchestration of CSCL Scripts at Different Scales

## Human-in-Control

## Machine-in-Control

Small-scale CSCL  
activities in the  
classroom learning  
context

Mirroring  
Dashboards

Guiding  
Dashboards

Adaptive Groups  
using Predictions

Large-scale CSCL  
activities in the  
distance learning  
context

Elasticity &  
dynamism  
mechanisms

Orchestration  
Agents

Adaptive Groups  
using Predictions

Positioning of different LA interventions to support orchestration at different scales



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# Orchestration technology in Pyramid App

Some examples where the machine can help...

## Flexible CSCL Orchestration Technology: Mechanisms for Elasticity and Dynamism in Pyramid Script Flows

Kalpani Manathunga and Davinia Hernández-Leo  
kalpi.nisansala@gmail.com, davinia.hernandez-leo@upf.edu  
ICT Department, Universitat Pompeu Fabra, Barcelona

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Research Article

JUCS - Journal of Universal Computer Science 24(8): 1034-1051  
<https://doi.org/10.3217/jucs-024-08-1034> (28 Aug 2018)

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## Sustaining Continuous Collaborative Learning Flows in MOOCs: Orchestration Agent Approach

▼ [Ishari Amarasinghe](#), [Davinia Hernández-Leo](#), [Kalpani Manathunga](#), [Anders Jonsson](#)



# Orchestration technology in Pyramid App

Some examples where the machine can help...

Data-informed design parameters for adaptive collaborative scripting in across-spaces learning situations

[Ishari Amarasinghe](#) , [Davinia Hernández-Leo](#) & [Anders Jonsson](#)

[User Modeling and User-Adapted Interaction](#) **29**, 869–892 (2019) | [Cite this article](#)

[Journals & Magazines](#) > [IEEE Transactions on Learning...](#) > [Volume: 13 Issue: 4](#) 

## An Actionable Orchestration Dashboard to Enhance Collaboration in the Classroom

**Publisher: IEEE**

[Cite This](#)

 [PDF](#)

[Ishari Amarasinghe](#)  ; [Davinia Hernández-Leo](#)  ; [Konstantinos...](#) [All Authors](#)

# Orchestration dashboards

LA Dashboards: Single displays that aggregate different indicators about learner(s), learning process(es) and/or learning context(s) into one or multiple visualisations (Schwendimann et al., 2016)

## Guiding support (Sollar et al., 2005)

### Mirroring

Present information  
Interpretation is upto the teacher

### Alerting

Present information & alerts  
Alerts highlight critical moments

### Advising (van Leeuwen et al., 2019)

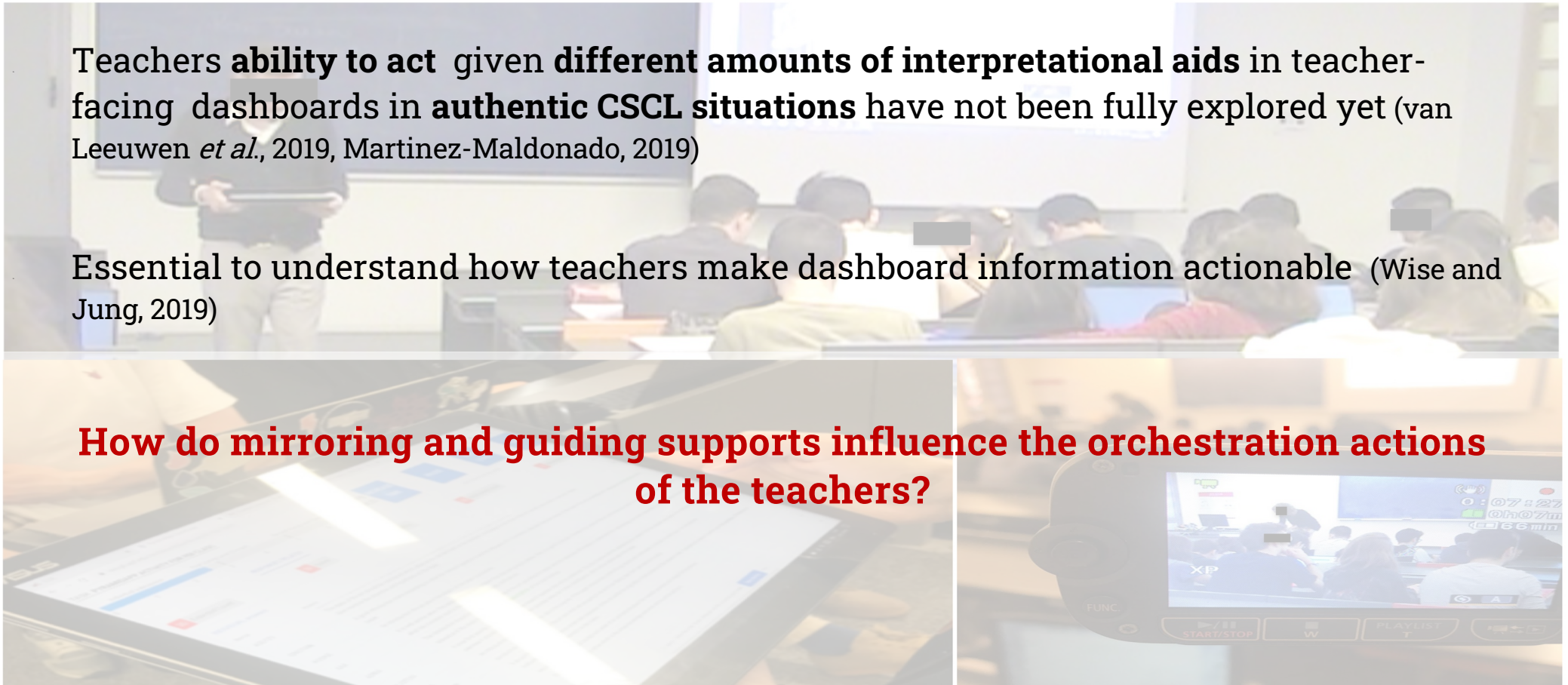
Present information & alerts  
Alerts highlight critical moments  
Provide further advice to take actions  
e.g., different ways to support students

# Orchestration dashboards: study

Teachers **ability to act** given **different amounts of interpretational aids** in teacher-facing dashboards in **authentic CSCL situations** have not been fully explored yet (van Leeuwen *et al.*, 2019, Martinez-Maldonado, 2019)

Essential to understand how teachers make dashboard information actionable (Wise and Jung, 2019)

**How do mirroring and guiding supports influence the orchestration actions of the teachers?**





# Orchestration dashboard: PyramidApp

**TASK PYRAMIDAPP ACTIVITY FOR RM CLASS**

Individual submission | First Voting Level (Groups) | Second Voting Level (Groups)

Remaining time 00:00

**INCREASE TIME** **PAUSE** **NEXT LEVEL** **END**

**RESPONSES RELATED** PARTICIPATION RELATED

**15** Expected Count **0** Online **0** Offline **15** Initial answer count **2** Winning answer count

**INDIVIDUAL answers**

Names of the students	Answers
[Redacted]	If it provides information about what tools they used and how they find their resources and based on which criteria they decide to go for what tools and resource
[Redacted]	1. Datasets used are indicated, and if they could be publically available it is nice to footnote some links 2. Computational approach well described enough for the reader to follow, but not with an insane amount of <b>details</b> if there is another seminal paper that could be referenced 3. Evaluation <b>methods</b> mentioned.
[Redacted]	it needs to be clear and specific. Needs to give enough <b>details</b> to understand just which <b>methods</b> are used while doing this research. Should be related to study area, meaning not an unrelated method should be used.
[Redacted]	The <b>methodology</b> should describe all the methods that have been used in order to justify the results and also
[Redacted]	It mentions the problem that they want to solve, describe the <b>methodology</b> , describe the instrument of measurement..
[Redacted]	- Explain the <b>dataset</b> - variance, length, general characteristics - Algorithm theory and use of it in the dataset
[Redacted]	Numbered equations Logical ordering (chronological for example) Explicit on all detail Clear and concise Sections if needed Well referenced
[Redacted]	for me it should ask and be able to answer different questions. It should not repeat itself just without any reason, I appreciate the appropriate usage of <b>details</b>

**INTERMEDIATE rated answers**

**WINNING answers**





# Orchestration dashboard: PyramidApp

**TASK PYRAMIDAPP ACTIVITY FOR RM CLASS**

Individual submission | First Voting Level (Groups) | Second Voting Level (Groups) | Remaining time 00:00

1 2 3 4 5 6 7 8

**INCREASE TIME** **PAUSE** **NEXT LEVEL** **END**

RESPONSES RELATED | PARTICIPATION RELATED

17 Expected Count | 0 Online | 0 Offline | 19 Initial answer count | 2 Winning answer count

**INcrease time for rating submission**

2 groups had not finished first-rating level yet!  
Select how much time you would like to increase & click "OKAY" to increase time.  
Click "CANCEL" to close the alert & proceed!

Increase Time 1 min

OKAY CANCEL

Name	Answer
AMORSI	- should contextualize th - should have a some of - should provide the auth - should explain paper of - evaluation strategy - should go in some deta
CLOTHILDEB	The introduction should Balance should be found the importance of your own paper. As for any part of a research paper, the introduction should be clear and concise.
GHASEM	If it provide a good explanation to the subject and clear the path it wanna go during the paper and maybe by drwaing the whole idea
HAMIT	Introduction should be compatible with the <b>structure</b> of the article. Reader may want to learn very briefly about input information or ideas, methods that are being used and results that are obtained according to all content of the paper. Introduction should retrieve readers attraction and lead him/her to learn more about the topic. This is, however, come true by using hook sentences, samples from findings etc.

INTERMEDIATE rated answers

WINNING answers

# Orchestration dashboard: PyramidApp

Amarasinghe, I., Hernández-Leo, D. & Ulrich Hoppe, H. (2021) **Deconstructing orchestration load: comparing teacher support through mirroring and guiding**. Intern. J. Comput.-Support. Collab. Learn

## Guiding Condition

- More targeted interventions at the individual & group level
- More interventions (to address needs and optimize time)
- Alerts helped to upfront critical moments reducing the **orchestration load** (assist sense-making – diagnosis of the situation)
- Receiving alerts about known information did not add value

# Orchestration load: multimodal LA

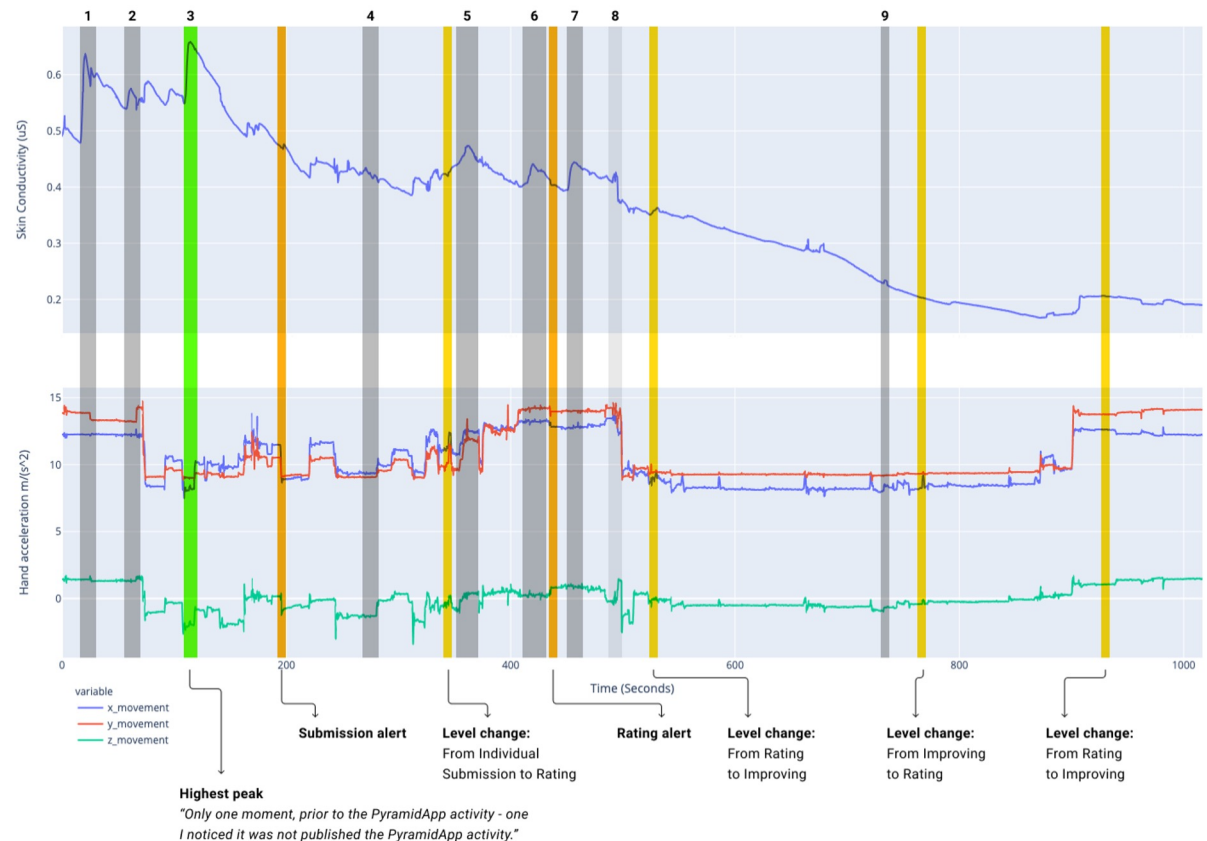
Crespi, F., Amarasinghe, I., Vujovic, M., & Hernández-Leo, D. (2022). **Estimating Orchestration Load in CSCL Situations Using EDA.** ICALT

Over 90% of SCRs concurred with teacher actions related to orchestration.

There were a **higher count of self-reported stressful moments in the mirroring condition.**

Occurrences related to orchestration:

- Instructing Students
- Time Management
- Technical problems
- Assessing students progress



# PyramidApp: about engagement

- Anonymous vs. identified mode (student preferences and behaviour, Valemazan et al., 2022)
- Social awareness (mirroring group participation, Theophilou et al. 2021)
- Playfulness (game mechanics in Pyramid CLFP, Lobo et al, 2021)
- Wellbeing (Hakami, El Aadmi, et al. 2021, 2022)

Level 2/3 - Collaborate with Peers to write an Improved Option

Logged as User8 🕒 02:45

Collaborate with your peers to formulate an improved option... [Read more](#)

Collaborative text editor: Discuss with your peers: Online users 1

Formulate a new option...

Options rated in the previous stage:

Option	Average Rating
Option 6	3.50
Option 4	3.50
Option 2	4.00
Option 8	2.75

Write a suggestion...

User8 Hey we can discuss  
User2 Yes I agree!  
User6 Let's improve!  
User4 Okay, I will be the writer!

User6  
User4  
User8  
User2



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## PyramidApp: about engagement

- Anonymous vs. identified mode
- Your opinion: **Does anonymous mode facilitate inclusion?**

<http://tiny.cc/eutopia-inclusive2>

## PyramidApp: about learning

- The pedagogical envelope (prior activities), type of task, pyramid design elements, engagement, (epistemic) orchestration

Amarasinghe, I., Hernández-Leo, D., Theophilou, E., Sanchez-Reina, R., Lobo, R., (2021) **Learning gains in Pyramid computer-supported collaboration scripts: factors and implications for design**, CollabTech.

Albó, L., Beardsley, M., Amarasinghe, I., Hernández-Leo, D., (2020) **Individual versus computer-supported collaborative self-explanations: how do their writing analytics differ?** ICALT

- Teacher-led **debriefing**

Amarasinghe, I., Hernández-Leo, D., Manathunga, K., Chacón Pérez, J., & Dimitriadis, Y. (2022). **Teacher-Led Debriefing in Computer-Supported Collaborative Learning Pyramid Scripts**. CSCL

Dieckmann, M., Hernández-Leo, D., & Amarasinghe I., (2022) **Flagging** in teacher-facing orchestration dashboards: factors affecting its use in Pyramid CSCL **debriefing**, ICALT.



**Learning design technologies:  
supporting collective and inclusive  
approaches**

## Inclusion, multiple perspectives, in this presentation:

- Equal opportunities for participation
- Guidance in designing for learning
- Collective efforts in designing and sharing designs for learning
- Co-design, involving students
- Regulation of learning processes



## Design for collaborative learning

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- Learning design:
  - Case of designing for effective collaborative learning, favoring equal participation
  - CSCCL scripts and patterns, authoring tools
- Community platforms, co-design (also with learners)
- Analytics layers for learning design:  
community, design and learning analytics
- Design & redesign

## Orchestration of collaborative learning

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- Need for adaptations in real-time, automatic vs. human-in-control and combinations
- Mirroring vs. guiding dashboards
- Orchestration load
- Factors affecting engagement and learning gains
  - In terms of equal participation: social awareness, socially-shared self-regulation, identification mode



# Current/future work includes...



[European Conference on Technology Enhanced Learning](#)

↳ EC-TEL 2022: **[Educating for a New Future: Making Sense of Technology-Enhanced Learning Adoption](#)** pp 521–527 | [Cite as](#)

## Exploring Teacher’s Orchestration Actions in Online and In-Class Computer-Supported Collaborative Learning

[Lubna Hakami](#) , [Ishari Amarasinghe](#), [Eyad Hakami](#) & [Davinia Hernandez-Leo](#)

DOI: 10.1111/jcal.12711

SPECIAL ISSUE ARTICLE

Journal of Computer Assisted Learning

## Learning analytics support to teachers' design and orchestrating tasks

[Ishari Amarasinghe](#)<sup>1</sup>  | [Konstantinos Michos](#)<sup>1,2</sup>  | [Francisco Crespi](#)<sup>1</sup> | [Davinia Hernández-Leo](#)<sup>1</sup> 

## Current/future work includes...

Hernández-Leo, D., (2022) **Directions for the responsible design and use of AI by children and their communities: Examples in the field of Education**, In Charisi, V., Chaudron, S., Di Gioia, R., Vuorikari, R., Escobar Planas, M., Sanchez Martin, J.I. and Gomez Gutierrez, E., **Artificial Intelligence and the Rights of the Child : Towards an Integrated Agenda for Research and Policy**, EUR 31048 EN, Publications Office of the European Union, Luxembourg, 2022, ISBN 978-92-76-51837-2, doi:10.2760/012329, JRC127564, pp. 73-74.

**Artificial Intelligence and the Rights of the Child**  
Towards an Integrated Agenda for Research and Policy

Artificial Intelligence-based systems are increasingly used by children, with one in three internet users globally being under 18 years old. This new report from the Joint Research Centre:

- **recommends requirements for trustworthy AI** to be designed in line with children's fundamental rights and to be developed sustainably as AI-based systems use many resources and energy
- **highlights methods for effective engagement** between stakeholders (policymakers, industry, children, teachers, and parents) so that conflicting priorities are balanced to ensure children's rights are respected by AI-based tools
- **identifies knowledge gaps** requiring further research that need to be addressed as priority in the short- and medium-term.

<https://europa.eu/!thThYh>



# Thank you!

**davinia.hernandez-leo@upf.edu**

**twitter: @daviniah1 @TIDE\_UPF**

**website : <http://www.upf.edu/web/tide>**