Socially Shared Planification in Team Based Learning

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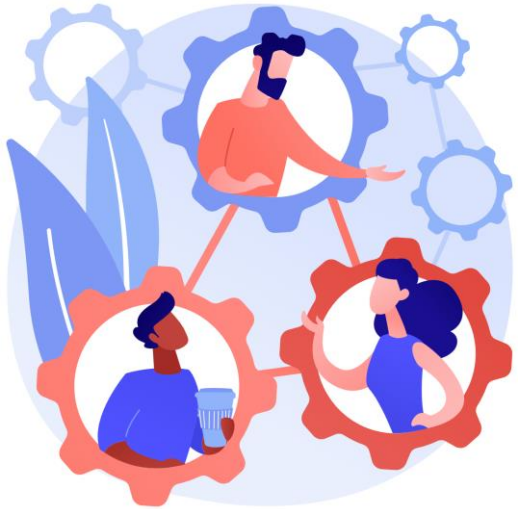
PC2 PILOT – 04 February 2025

Context

Problem and **Project Based Learning** in **higher educations**

- 1st common year of STEM : "*Design of belay glasses for climbing*" (team of 6, 4 weeks duration)
- 2nd year preparing engineering school : "*Design a solar panel able to follow sun trajectory*" (team of 4 - 3 months duration)
- 3rd year civil engineering : "*Conduct a regulation study to build a school*" (team of 4 - 3 weeks duration)



Context

Project Based learning

*a pedagogy in which students are given an **ill-structured task** and which is typically comprised of six key features: a focus question, learning goals, engagement in scientific practices, **collaboration**, **scaffolding with learning technologies**, and creation of tangible products* (Krajcik & Shin, 2014)

A research field : Computer Supported Collaborative Learning (CSCL)

Context

Typical issues to adress

- Dysfunctional group-work
- Students tends to get away from collaborative interactions
- Unequally benefit to all student’s (Cohen & Lotan, 2014)

- Few direct and explicit support (Dignat & Büttner, 2018)

Conceptual framework

Learning regulation

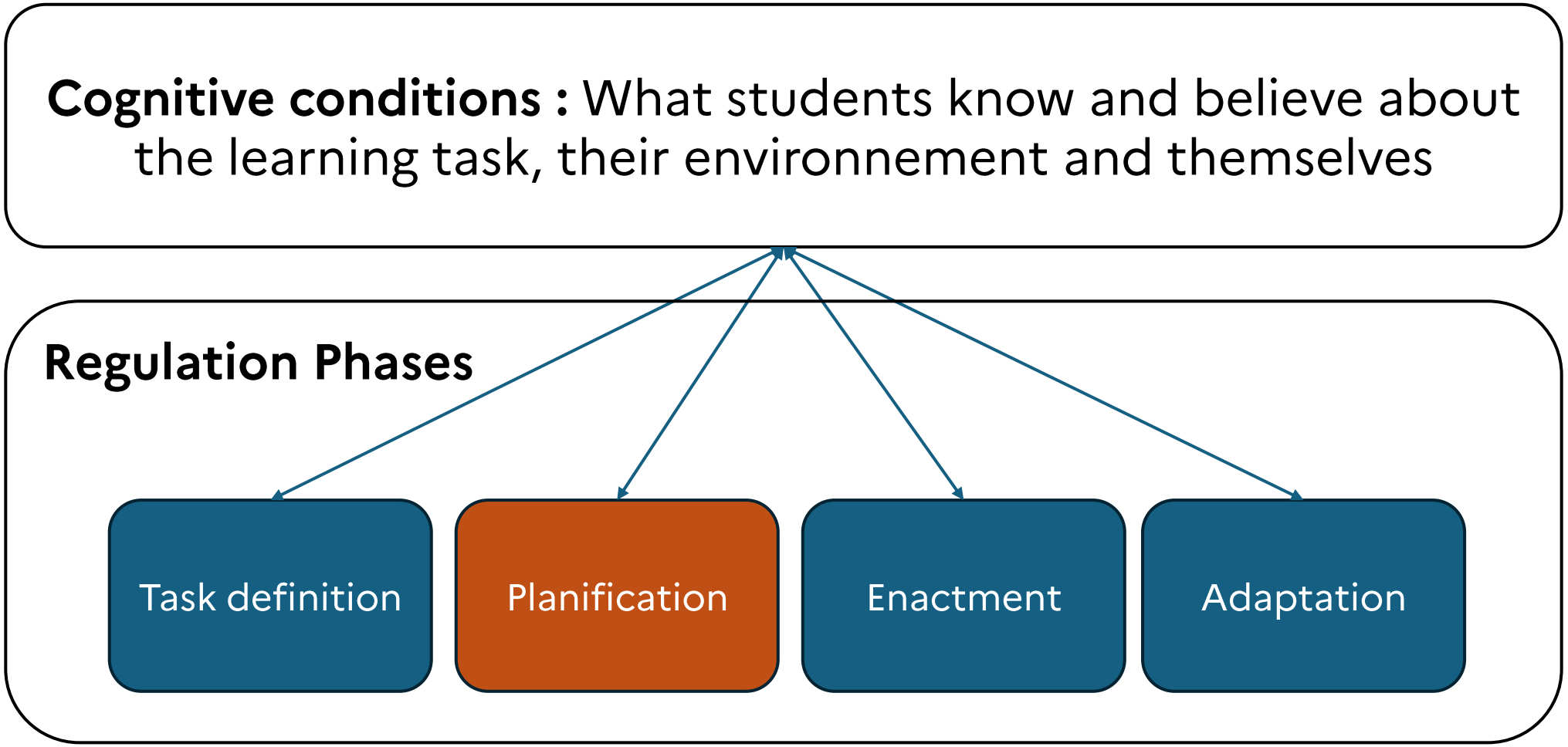
The active and conscious pursuit of a defined learning goal through planning, achieving, monitoring, controlling and reflecting on internal […] and external […] factors before, during and after learning (cited in Berger & Cartier, 2011)

- **Top-Down regulation** : from task **definition**
- **Bottom-Up regulation** : from task **enactment**

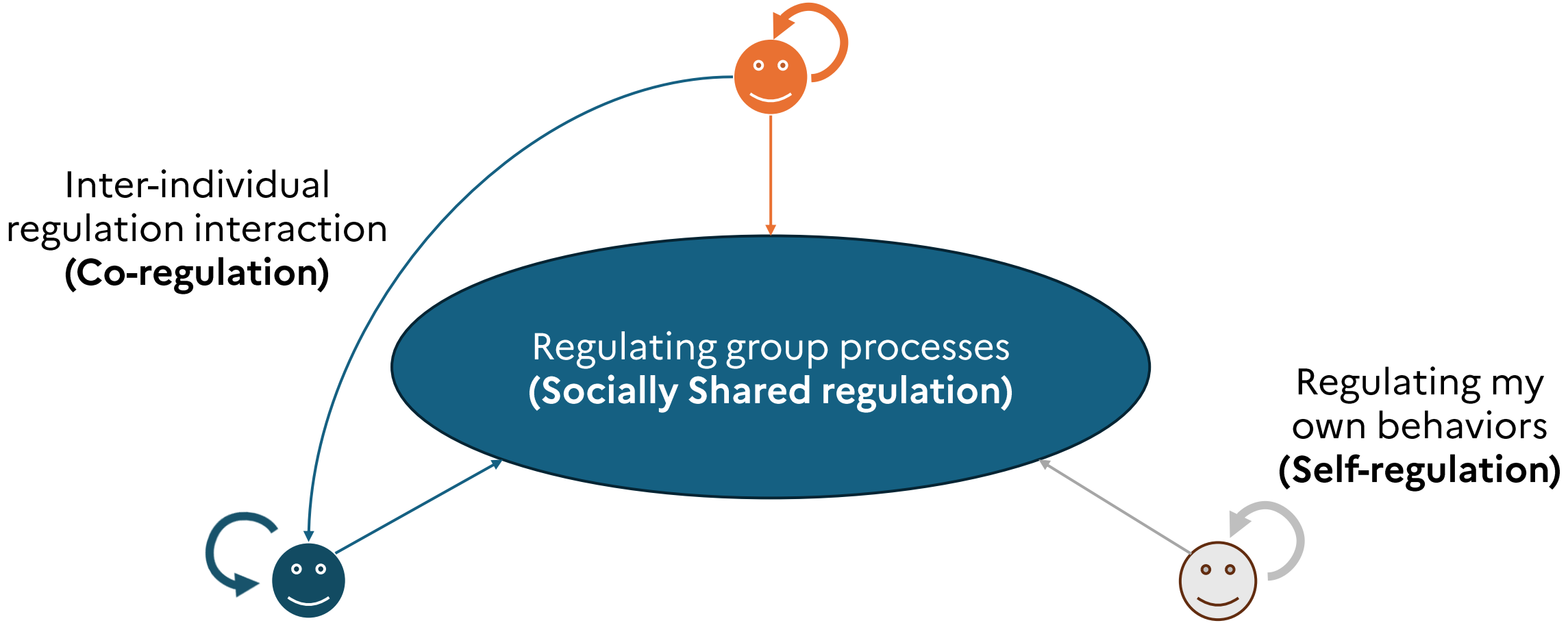
Interest :

- Self-regulated students tends to benefit more from TEL (Greene et Azevedo, 2011)
- Regulated groups tends to benefit more from CL (Jarvela et al, 2011)

Conceptual framework – COPES Architecture (Winne & Hadwin, 1998)



Conceptual framework
Collective Regulation



Conceptual framework – Collective Regulation

Cognitive conditions

Conditions & processes
« Taken as shared »

Cognitive conditions

Cognitive conditions

LabNBook (d'Ham et al., 2019)

- Online learning experience platform (LXP)
  - Used by 4500+ / year
  - In real secondary and higher education context
- Teaching and learning experimental sciences
- Developped and hosted in Grenoble
  - Open source and data mastery
- Our choice to implement and test
  - Learning design principles
  - Tools to support learning regulation in PBL

Collaborative features

Collaborative support :

- Shared writing space
- Comments
- Instant messages
- Edition awareness

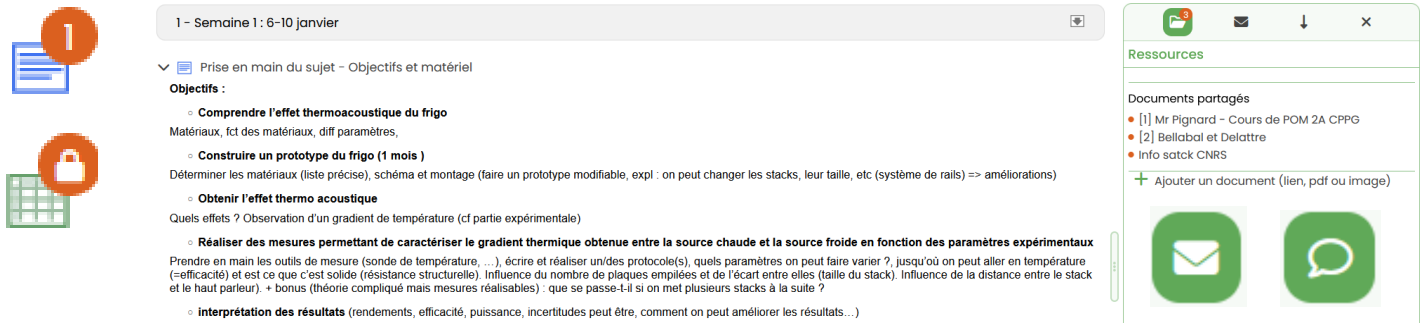
➢ Enactment phase already supported

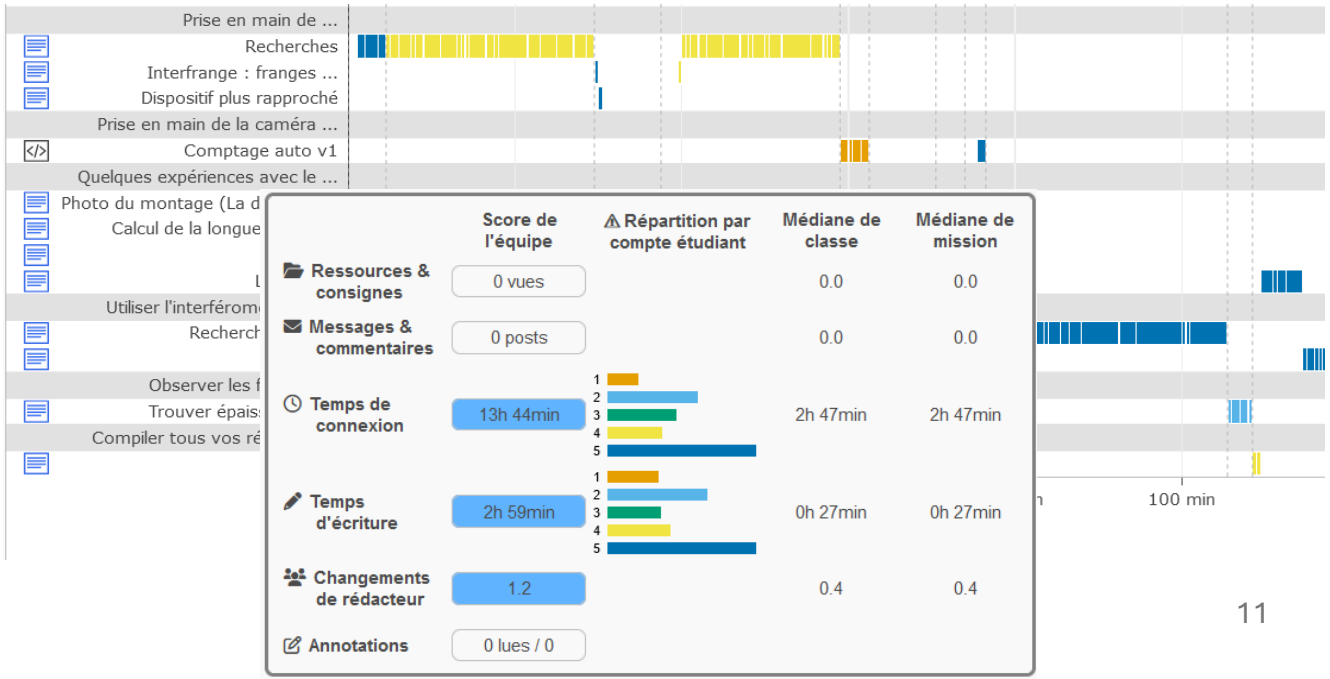
Teacher orchestration :

- Group management
- Learning Analytics Dashboard
- Annotations

Identified gaps :

- Shared task definition
- Collective planning





PhD Research questions

- What mechanisms influence learners' individual and group activity planning and their adaptation?
- What learning design principles support the definition of goals and the planning of learning activity in CSCL ?
- How do learners use the tools available on learning platforms to plan their individual and collective activity?

Expected contributions to PILOT

Axis 1 : Understanding current and future forms of long-term collaboration

- **C1** – Use case in CSCL

Axis 3 : Conceptual frameworks for long-term collaboration

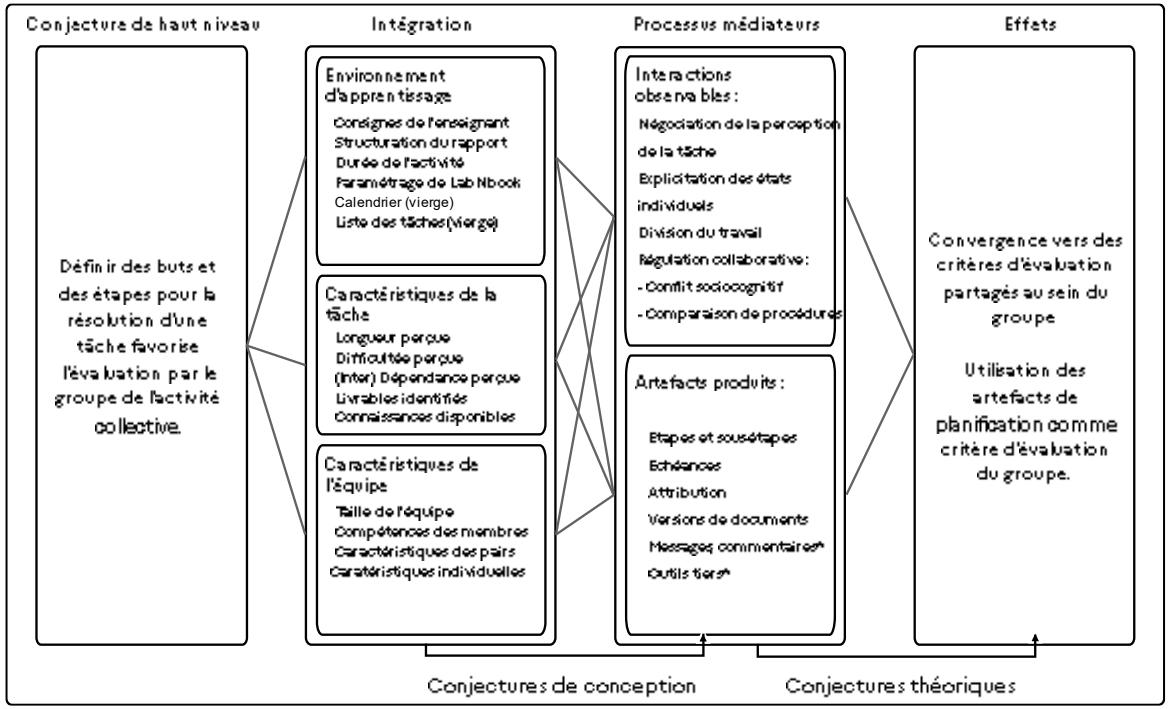
- **C2 -** Collective Planning model for shared regulation
- **C3** – CSCL Design principles

Design Based Research (Wang & Hannafin, 2005 ; Sanchez & Monod Ansaldi, 2015)

	1st design phase			1st assessment phase	
	Analysis	Design	Developpment	Implementation	Assesment
Studies	**Study 1 :** Interview survey	**Study 2 :** Utility assessment	**Study 3 :** Usability assessment		**Study 4 :** Case study
Results	Planification factors model	Low fidelity prototypes	High fidelity prototypes	Adapted learning situation	1st design principles 1st planification model
	Conjecture Map				
Stakeholders	**Learners** (n=14)	**Learners** (n=2)	**Learners** (n=14)	**Teachers** (n=2)	**Teachers** (n=2)
		LabNbook **Designers**	LabNbook **Designers**		
		LabNbook **Developpers**	LabNbook **Developpers**	LabNbook **Developpers**	**Learners** (n=108)
Progress	**Done**				***In progress***

Contribution 1 : Use case

- Characteristics of learning environment
- Observable collaborative regulation interactions
- Linking interactions to outcomes (learning variables)



Contribution 1 : Study cases

	1st design phase			1st assessment phase	
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Contribution 2 : Collective Planning model for Socially Shared Regulation

Environment conditions

Instructions
Scaffolds
Time allowed
Technological affordances

Task conditions

Lenght
Difficulty
Dependances

Group conditions

Size
Others perceptions
Self perceptions
Individual constraints

Contribution 2 : Collective Planning model for SSRL

	1st design phase			1st assessment phase	
	Analysis	Design	Developpment	Implementation	Assesment
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Progress	**Done**				***In progress***

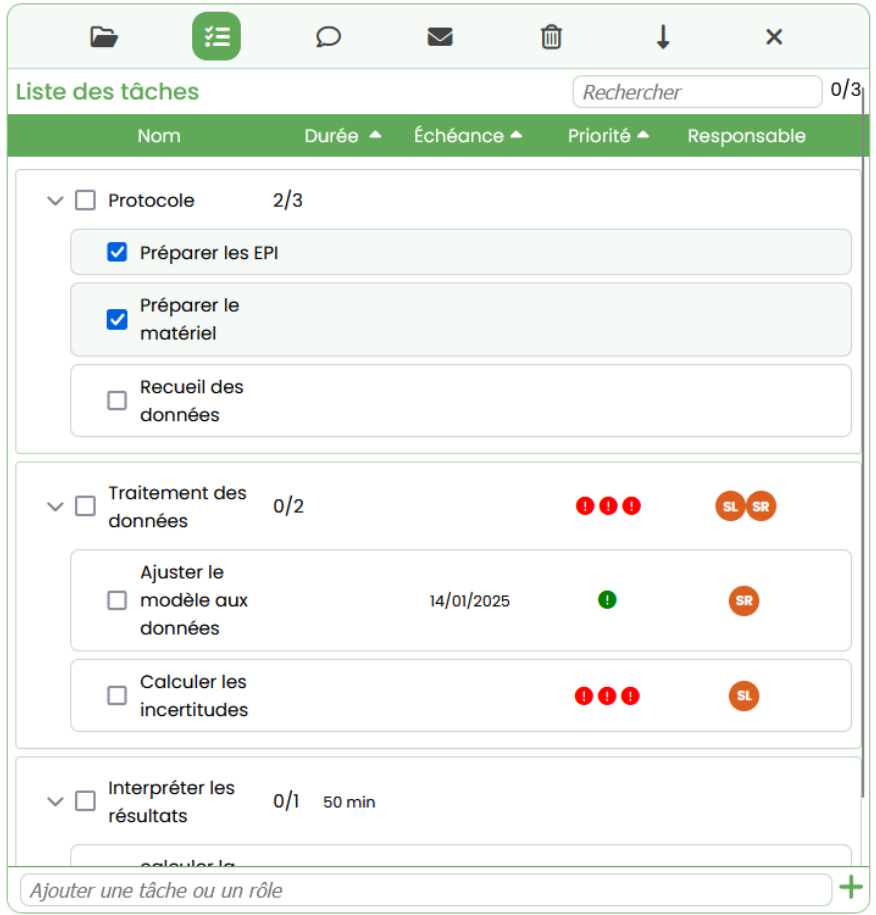
Contribution 3 : CSCL Design principles

Now :

- Shared tasks for co and socially shared regulation
- Individual tasks for self-regulated learning
- Interfaced with monitoring interfaces (calendar)

Next : What kind of teachers' guidance ?

Goal : Formulation of guidelines for using results and design principles in similar teaching situations.



Contribution 3 : Design principles

	1st design phase			1st assessment phase	
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Conclusions

- 3 contributions to PC2 PILOT
  - Focusing on use case and collaborative practices
- Case studies currently in progress
  - January – May
  - May – June
  - September – December
- Look out for next results !

Thank you for your attention

Bibliographie

- Krajcik, Joseph & Shin, Namsoo. Project-based learning. (2014). 10.1017/CBO9781139519526.018.
- Dignath, C., Büttner, G.: Teachers' direct and indirect promotion of self-regulated learning in primary and secondary school mathematics classes – insights from video-based classroom observations and teacher interviews. Metacognition Learning. 13, 127–157 (2018). https://doi.org/10.1007/s11409-018-9181-x.
- Cohen EG, Lotan RA. Designing groupwork: strategiesfor the heterogeneous classroom.Third. New York: Teachers College Press; 2014
- Berger, J.-L., Cartier, S.C.: Introduction. In: L'apprentissage autorégulé. pp. 15–19. deboeck supérieur (2023).
- Greene, J.A., Moos, D.C., Azevedo, R.: Self-regulation of learning with computer-based learning environments. New Drctns for Teach & Learn. 2011, 107–115 (2011). https://doi.org/10.1002/tl.449.
- Winne, P.H., Hadwin, A.F.: Studying as self-regulated learning. In: Metacognition in educational theory and practice. pp. 277–304. Lawrence Erlbaum Associates Publishers, Mahwah, NJ, US (1998).
- Pressley, M., & Afflerbach, P. Verbal protocols of reading: The nature of constructively responsive reading. Hillsdale, NJ: Erlbaum, (1995).
- D'Ham, C., Girault, I., Marzin, P.: LabNbook, plateforme numérique support des pédagogies actives et collaboratives en sciences expérimentales. In: 9ème Conférence sur les Environnements Informatiques pour l'Apprentissage Humain. , Paris (2019).
- Wang, F., Hannafin, M.J.: Design-Based Research and Technology-Enhanced Learning Environments. Educational Technology Research and Development. 53, 5–23 (2005).
- Sanchez, É., Monod-Ansaldi, R.: Recherche collaborative orientée par la conception: Un paradigme méthodologique pour prendre en compte la complexité des situations d'enseignement-apprentissage. educationdidactique. 73–94 (2015). https://doi.org/10.4000/educationdidactique.2288.

A mixed methods case study

Measures	S1	S2 – S9	S10	S11	S12	May
Observation	X			X	X	
Questionnaire Survey	x			x		
Log Data	x	x	x	x	x	
Students interview						x
Teachers interview						x
Grades						x

QR2 - Quels processus influencent la planification de l'activité d'apprentissage en équipe ?

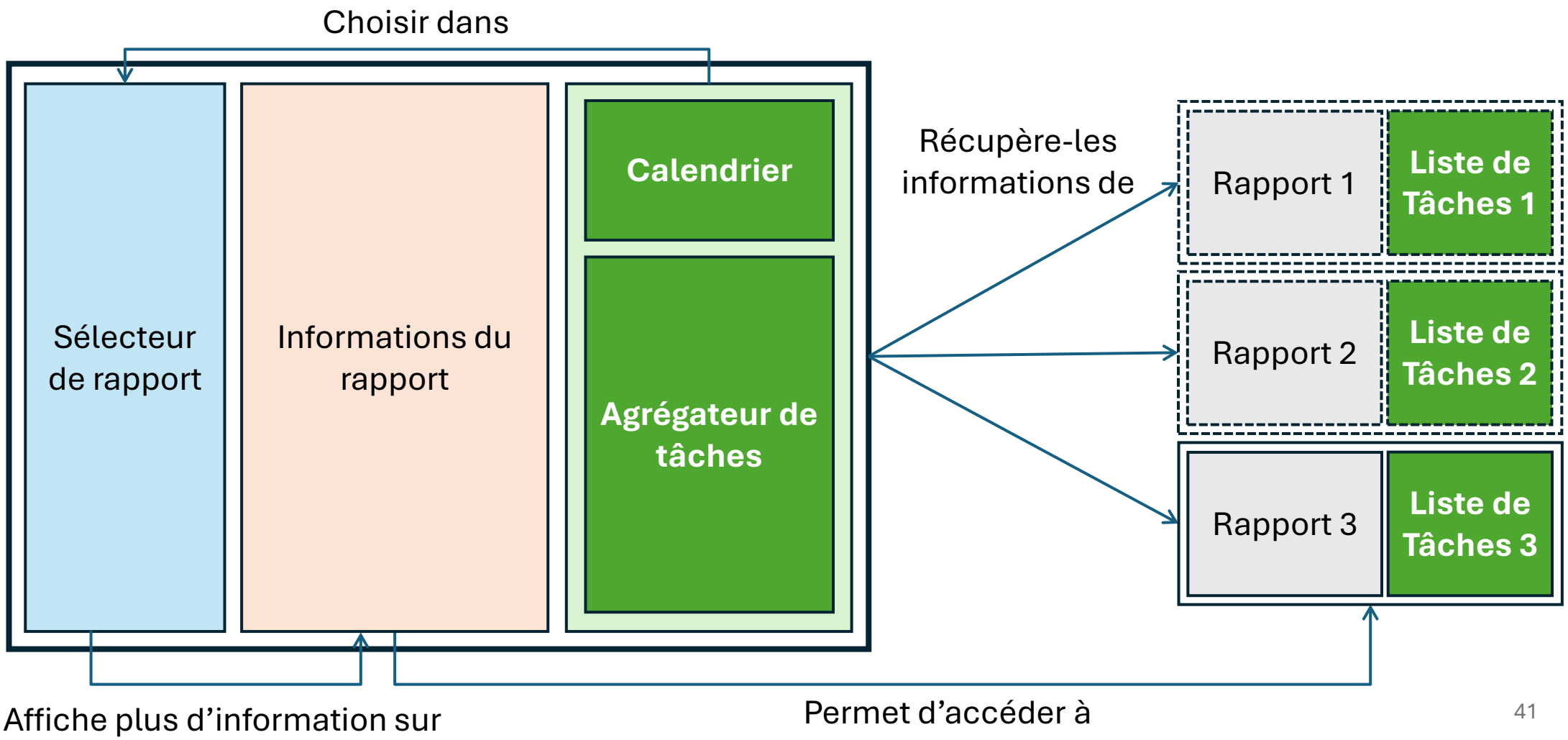
- Choix de **critères de réussites** :
  - Orientation de performance principalement évoquée
  - Orientation de maitrise si la perception des caractéristiques de la tâche le permet
    - Pour soi (E4)
    - Pour les membres de l'équipe
- La sélection des **stratégies de planification** :
  - Rappel de stratégies naïves, connues ou suggérées par l'enseignant
  - Sélection selon le temps et les ressources disponibles (E13 – E4)
- **Distribution** de la planification dans le temps
  - Selon la priorisation accordée à la tâche à un instant T (E3)
  - Selon des stratégies de l'apprenant (E2)

QR1 - Quels comportements de planification rapportent les étudiant·e·s dans des activités d'apprentissage en équipe ?

- Planification collective largement orienté vers **l'optimisation du temps de travail**
  - Attribution des tâches en parallèle
    - Pouvant être attribuée à des groupes
    - Semble influencé par le type de tâche demandé
  - Utilisation de script de collaboration (E13 ; E14)
    - Même si adapté par les apprenants
- Ordonnancement selon les caractéristiques de la tâche
  - Facilité perçue
  - Dépendances (E2)
- Modalité d'attributions des tâches variables (E3)
  - Dépend de l'orientation des buts pour la tâche (E4)
- Planification « rythmée » par les temps d'enseignement en présentiel (E5)

➢ ***La planification prévue diffère de la performance réalisée***

Relations entre les outils



Recherche Orientée par la Conception (adapté de Sanchez, 2022)