

An Approach for Unified Personalization of Learning



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Personalization of Learning

- Adaptation of
 - Each learner's specificities
 - Teachers' habits
 - Context of teaching situation
- Support
 - Paper activities and educational software
- Long and complex task
 - Diversity of learners
 - Variety of learning situations
 - Variety of domains

Outline

- Use case
- State of the Art
- PERSUA2 Model
- Exploitation Process
- Implementation
- Evaluations
- Future work

Personalization of Pedagogical Activities in Classroom

- Eight-year-old French pupils

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- Utilization of geography pedagogical software
 - ⇒ A **numerical profile** for each student at the end of each session
 - ⇒ A domain: Geography

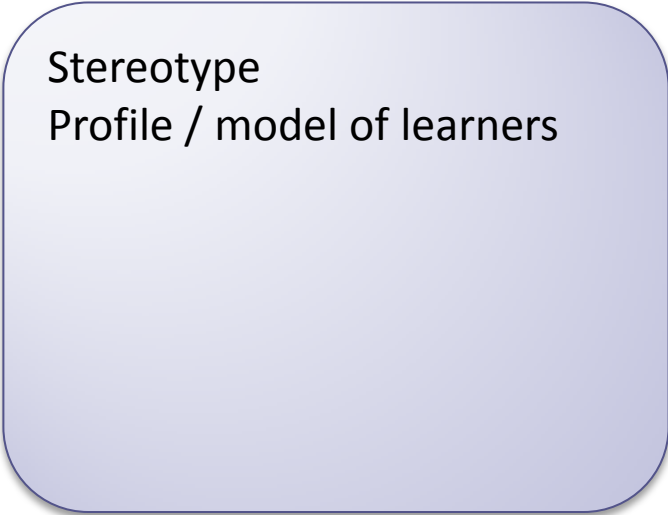
Personalization of Pedagogical Activities in Classroom

- Eight-year-old French pupils
- Utilization of geography pedagogical software
 - ⇒ A **numerical profile** for each student at the end of each session
 - ⇒ A domain: Geography
- National evaluations at the beginning of year
 - ⇒ A diagnosis for each student = **paper and pencil profile**
 - ⇒ Information on successes, mistakes and difficulties
 - ⇒ Two domains: Mathematics et French

Personalization of Pedagogical Activities in Classroom

- **Teacher wants:**
 - Personalize paper and pencil worksheets for each student
 - Define the parameters of the geography software to have sessions suited to each student
- **Teacher should take into account:**
 - Knowledge of student on the domain of worksheet or pedagogical software
 - Knowledge of student on other domain (French, etc.)

What help when personalization ?



Stereotype
Profile / model of learners

Individualities of learners

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Profile / model of learners

Individualities of learners

Authoring tools
Configurable software
Pedagogical scenario

Adaptation of activities
to teachers' habits

What help when personalization ?

Assignment of activities to a learner

By the learner / software
By the teacher

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What help when personalization ?

Assignment of activities to a learner

By the learner / software
By the teacher

⇒ Acquisition of teachers' expertise

Stereotype
Profile / model of learners

⇒ Access of data

Individualities of learners

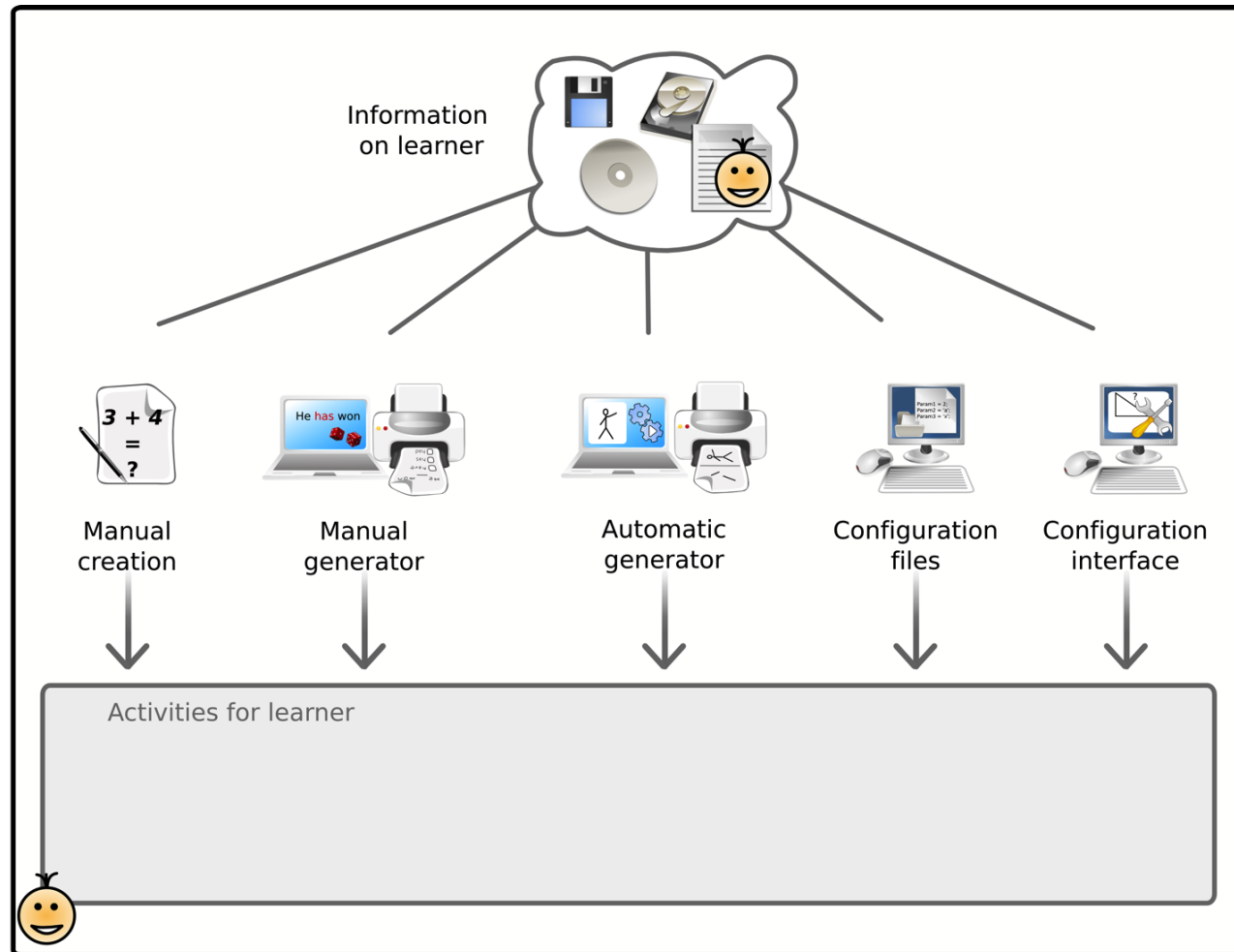
~~Unified approach~~

Authoring tools
Configurable software
Pedagogical scenario

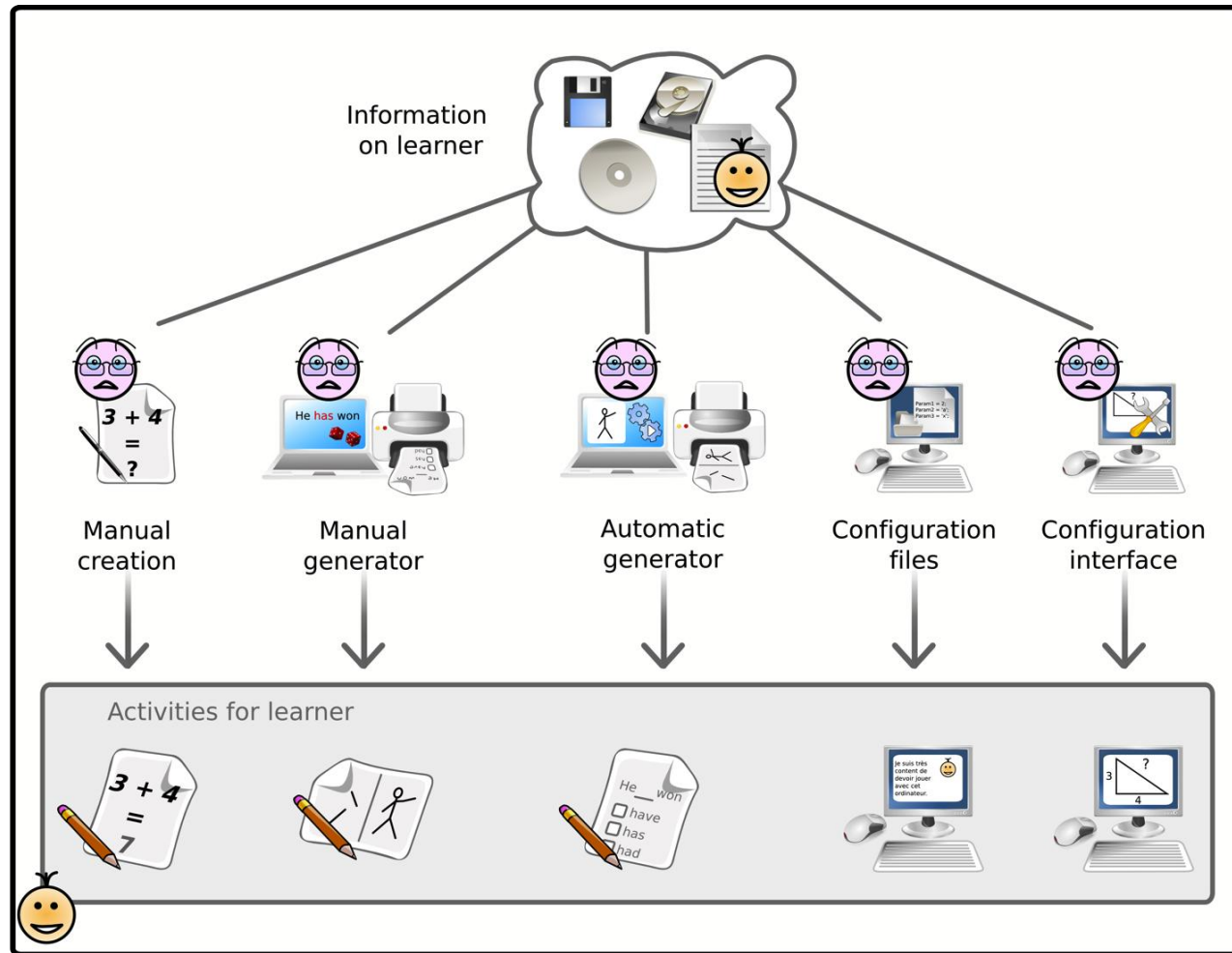
⇒ Take into account
⇒ Heterogeneity
⇒ ILEs without configuration interface

Adaptation of activities to teachers' habits

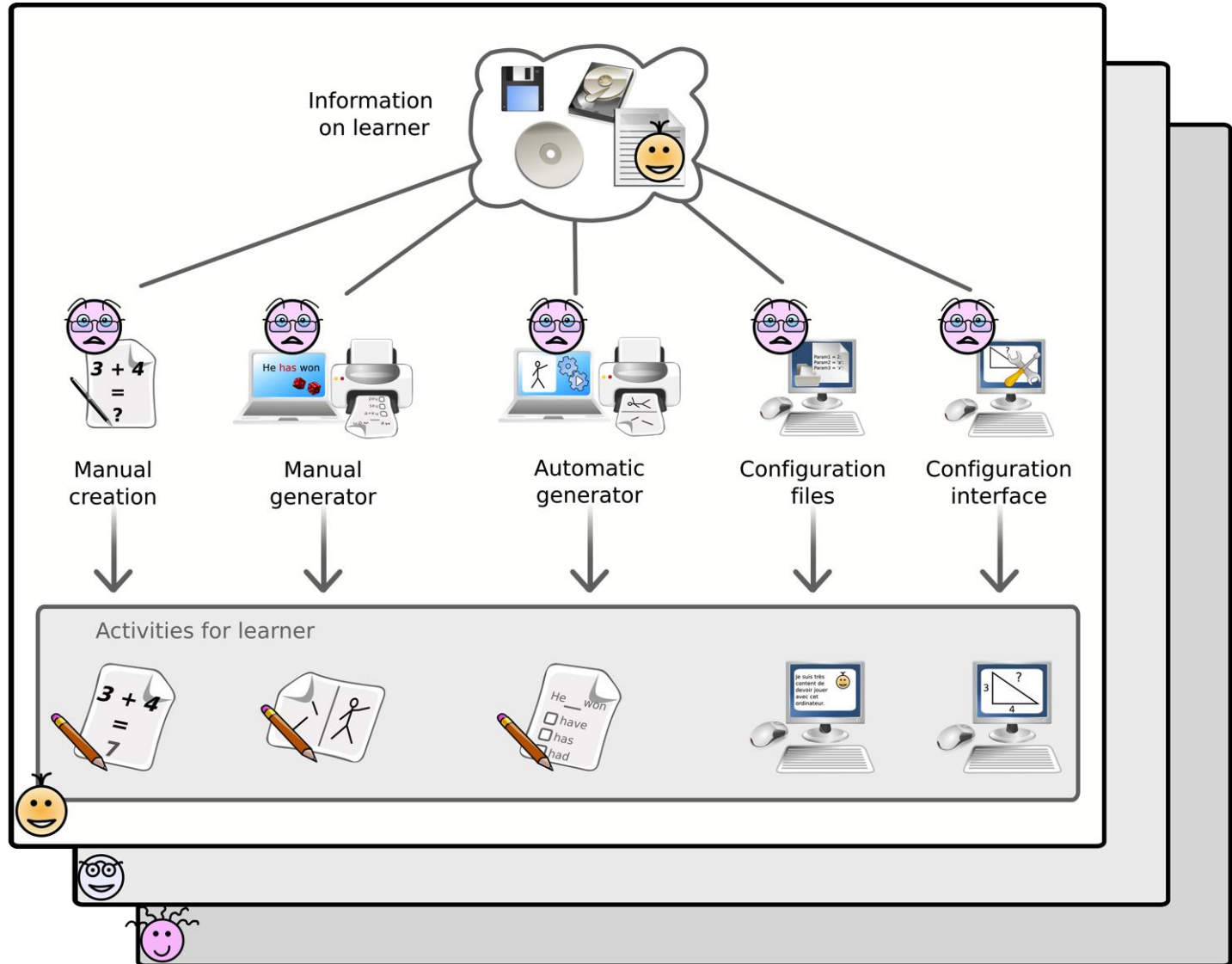
Currently



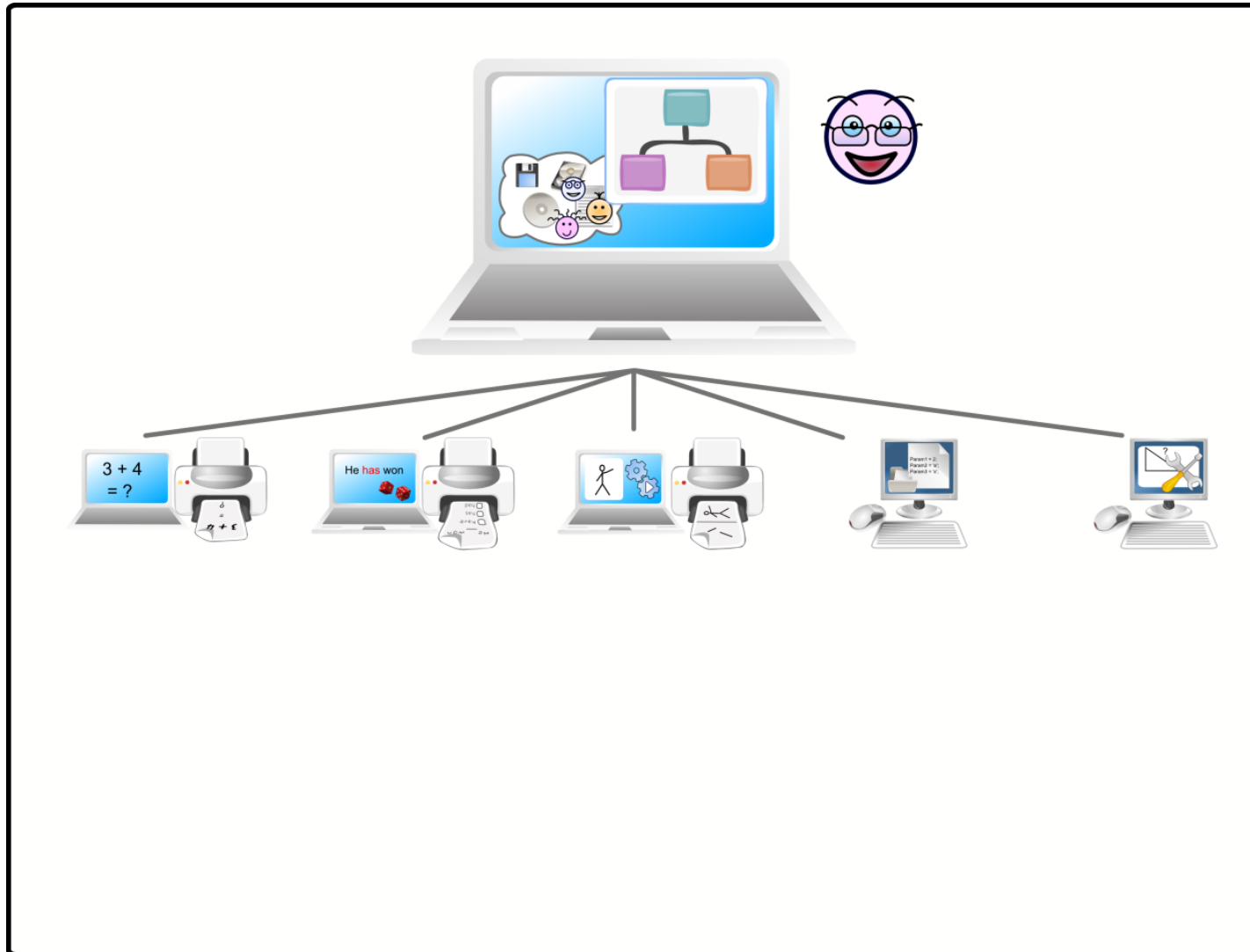
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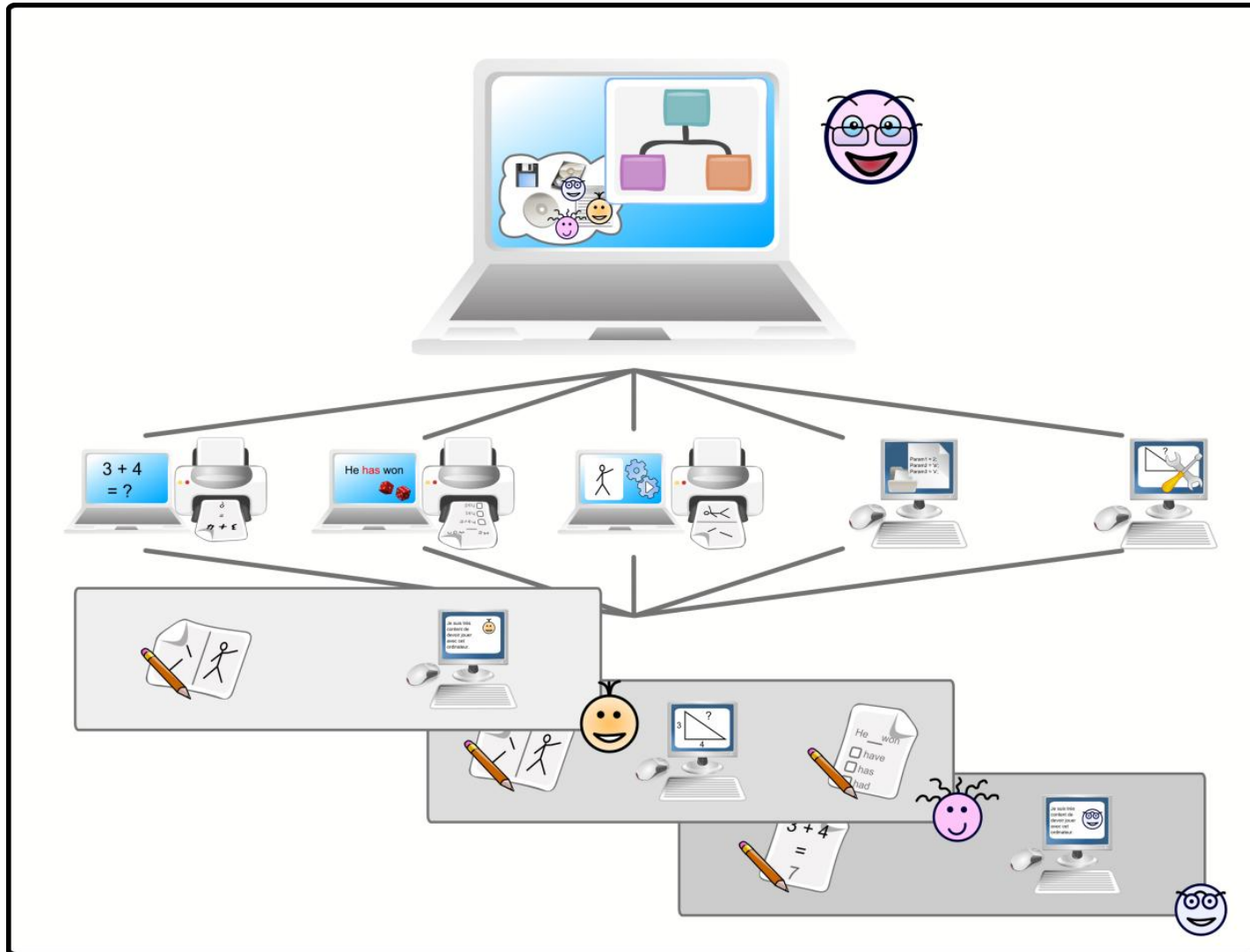
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Our Approach



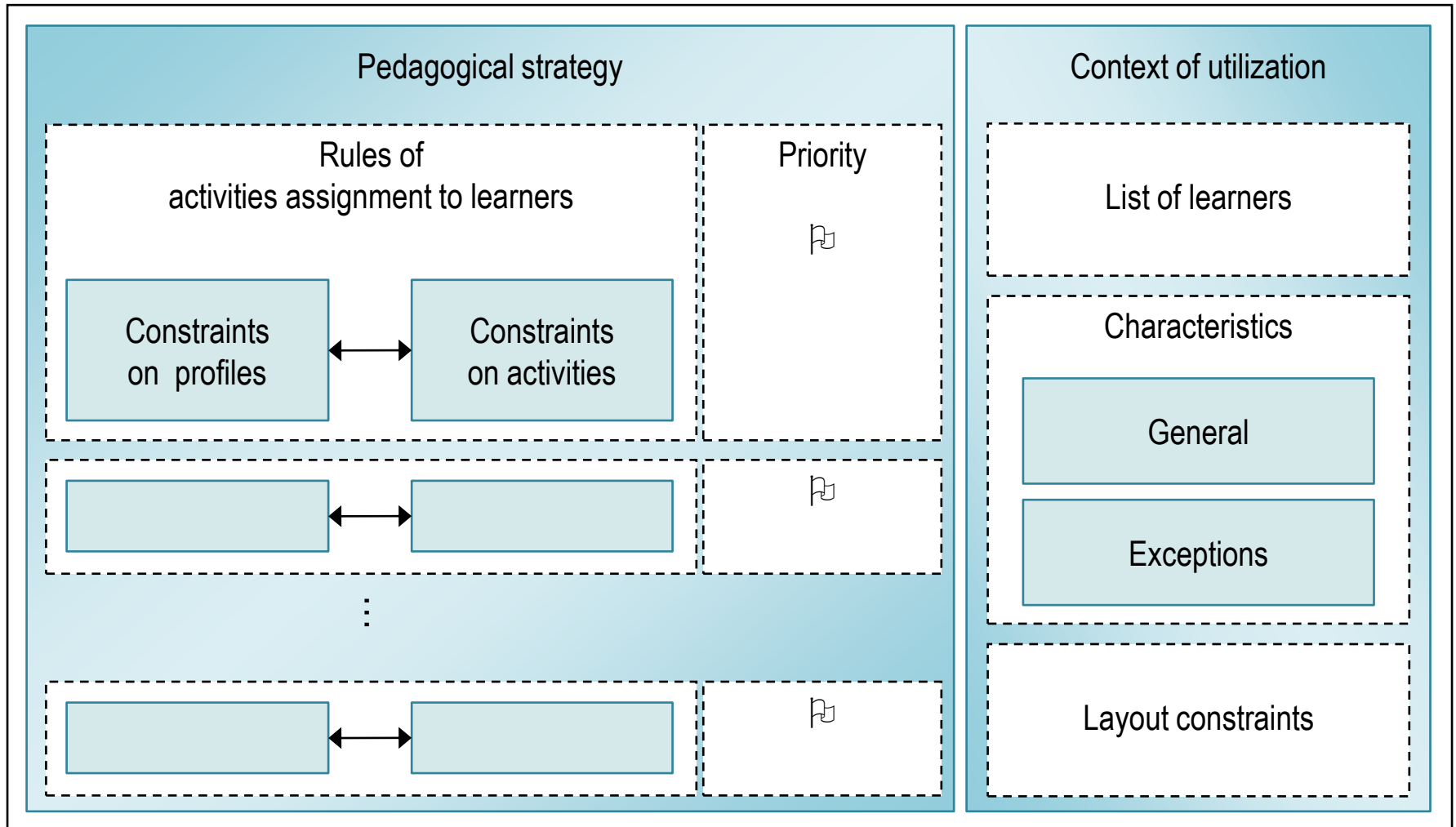
Our Approach



Outline

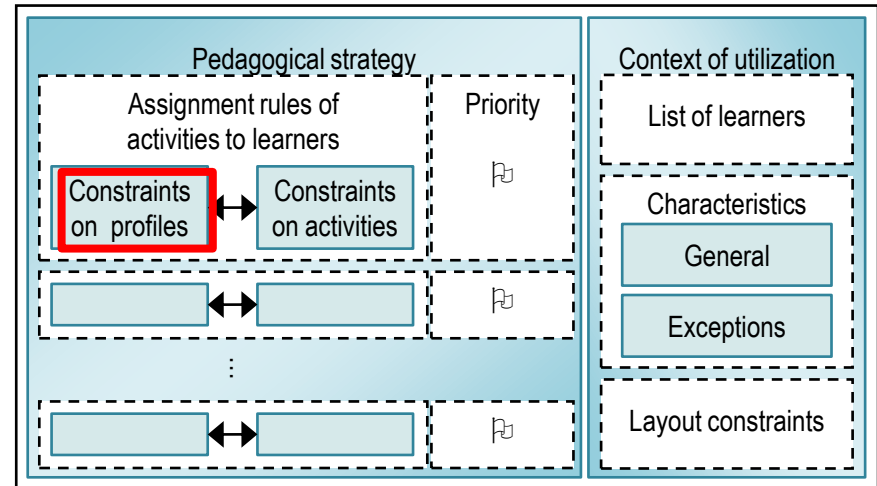
- Use Case
- State of the Art
- **PERSUA2 Model**
- Exploitation Process
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A Model for a Unified Personalization of Activities



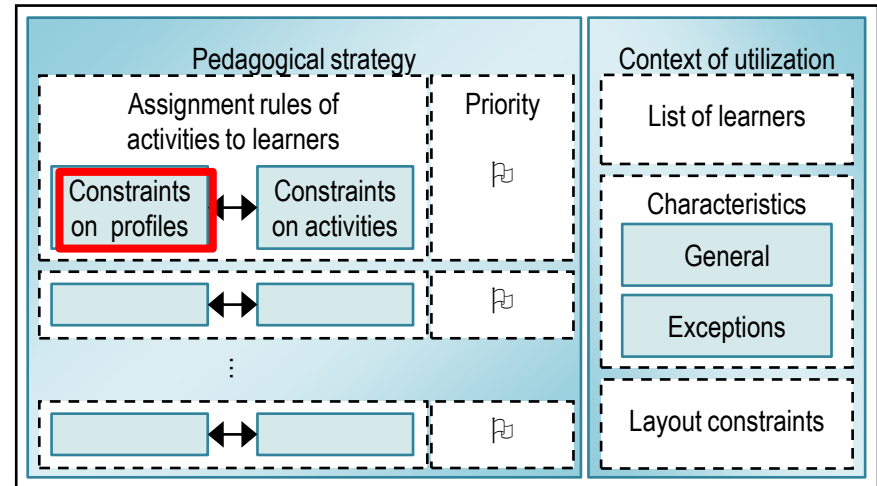
Constraint on profiles

- Goal: To select learners with specific characteristics
- Selection of one or more values of learner's profile
- Definition of constraints on these values
- Formalized in the cPMDL model



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Constraints on profiles « C1 – No mastered of French cities »

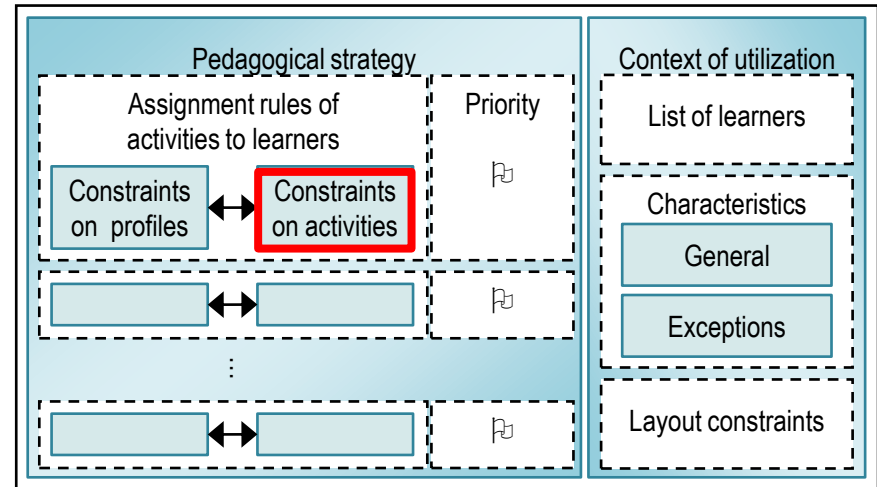
- **Knowledge:** Geography – Cities of France
- **Values :** X between 0% and 30%

Constraints on profiles « C2 – Partially mastered of French cities »

- **Knowledge:** Geography – Cities of France
- **Values :** X between 30% and 70%

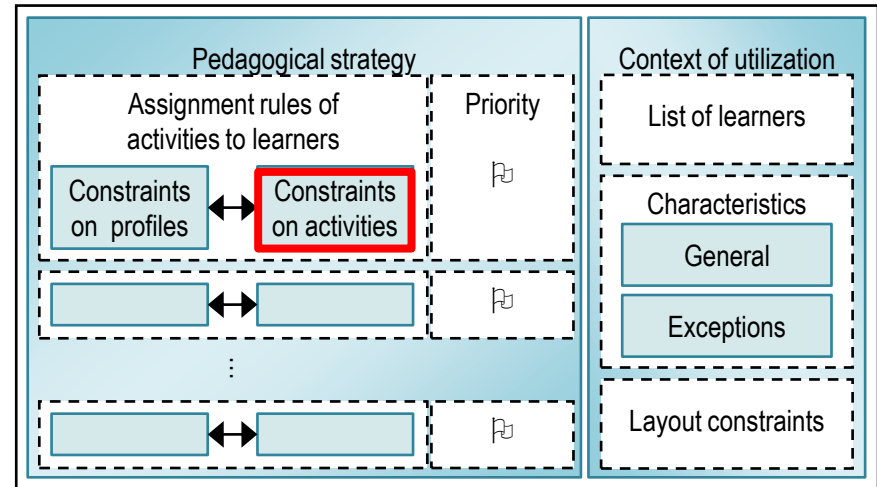
Constraints on activities

- Goal: To create of activities corresponding to the work habits of each teachers
- Paper and pencil activities
 - Selection of exercise pattern
 - Definition of generation constraints
- Pedagogical software
 - If generator exists, definition of generation constraints
 - Else, definition of constraints of exercises selection in database
- Formalized in GEPPETO approach



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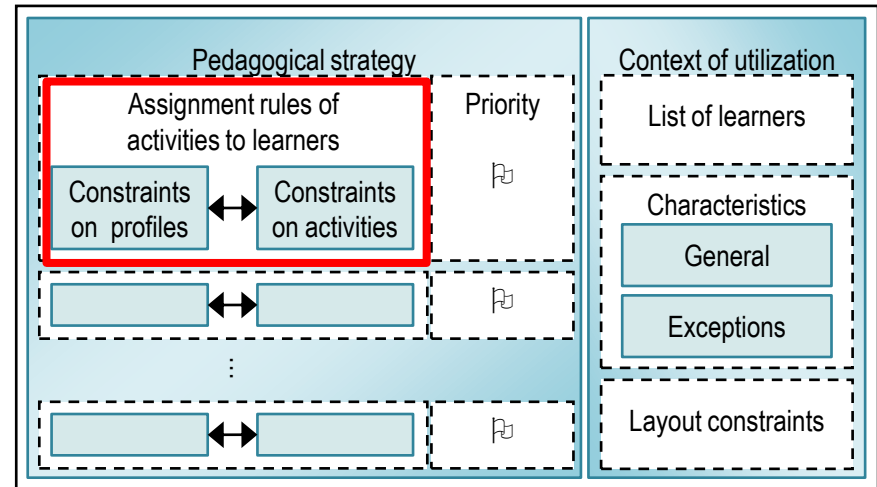


Constraints of activities
"D14 – To place cities in France"

- **Exercise pattern** Work on illustration
- **Constraints** =
 - **Illustration** = map of France
 - **Fields** =
 - Content = cities of France
 - Quantity = 10
 - Required = Paris, Lyon, Marseille
 - **Action** = to complete

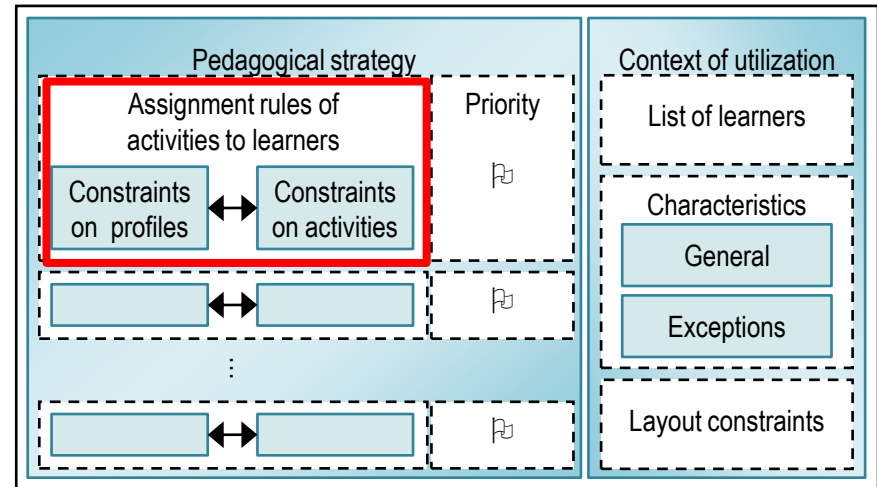
Assignment rules of activities to learners

- Goal: To link parts of learners profiles and constraints of generation / selection of activities



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Rule 1

No mastered of French cities

- **Constraints on profiles:** C1 – No mastered of French cities
- **Constraints on activities:** D10 – To place French metropolis

Rule 2

Partially mastered of French cities

- **Constraints on profiles:** C2 – Partially mastered of French cities
- **Constraints on activities:** D14 – To place French cities

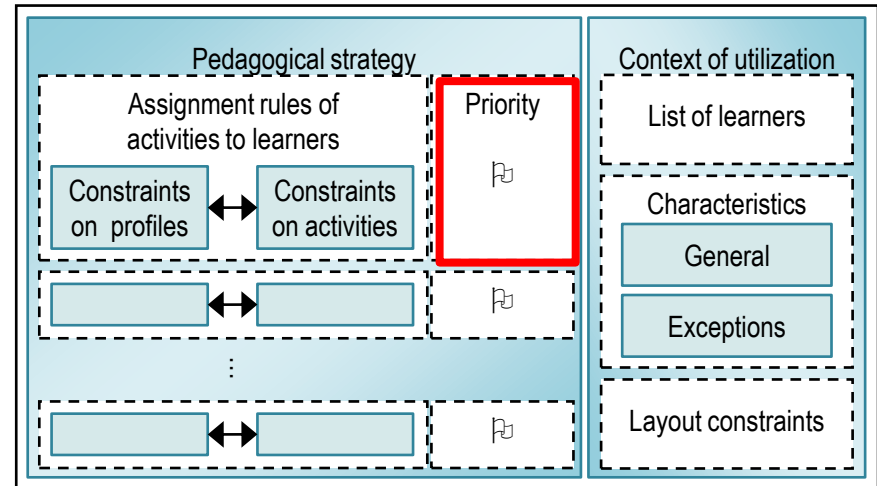
Rule 3

No mastered of additive problems

- **Constraints on profiles:** C5 and C7
- **Constraints on activities:** E7, E8 and A7

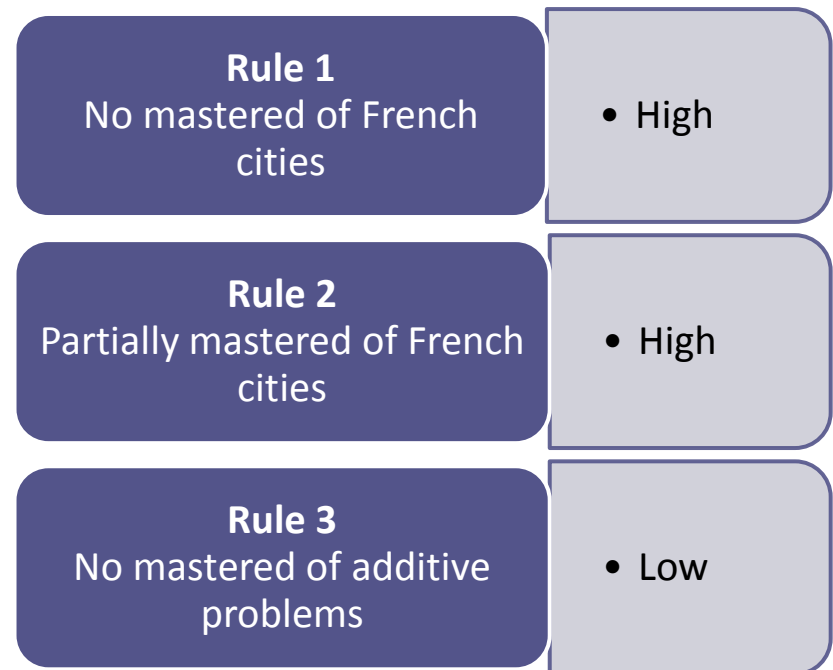
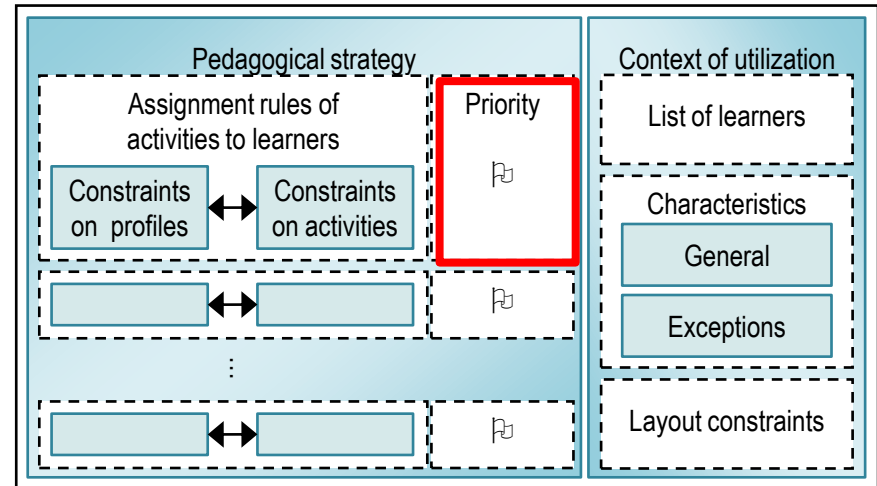
Priority

- Goal: To prioritize rules according to pedagogical goals of teacher
- Used in cases of the system « hesitates » between two activities to provide to learner
- The system will provide, at the first, activities associated with the rules with a high level of priority



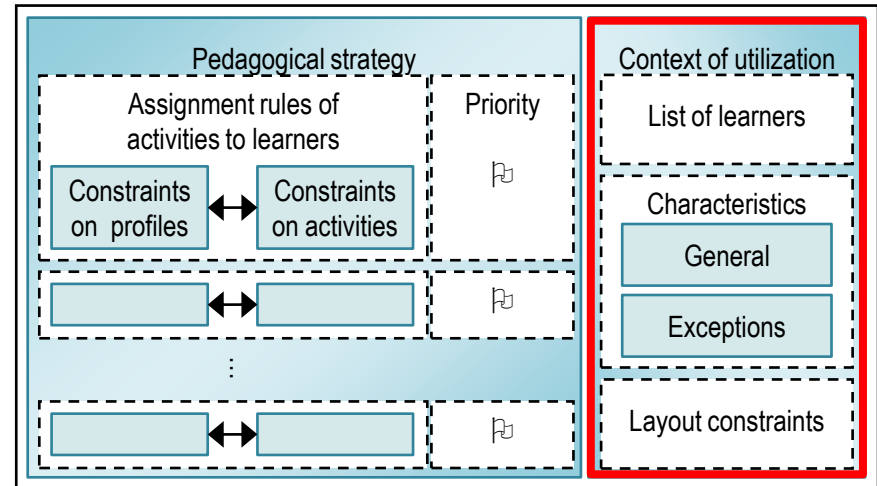
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Context of utilization

- Goal: To describe the context of the concrete pedagogical situation
- List of learners
- Constraints of creation
 - Number of activities required
 - Duration of work sequence
 - Exceptions for some learners
- Layout constraints



Outline

- Scénario d'usage
- État de l'art
- Le modèle PERSUA2
- **Exploitation Process**
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Principle of exploitation process of PERSUA2 model

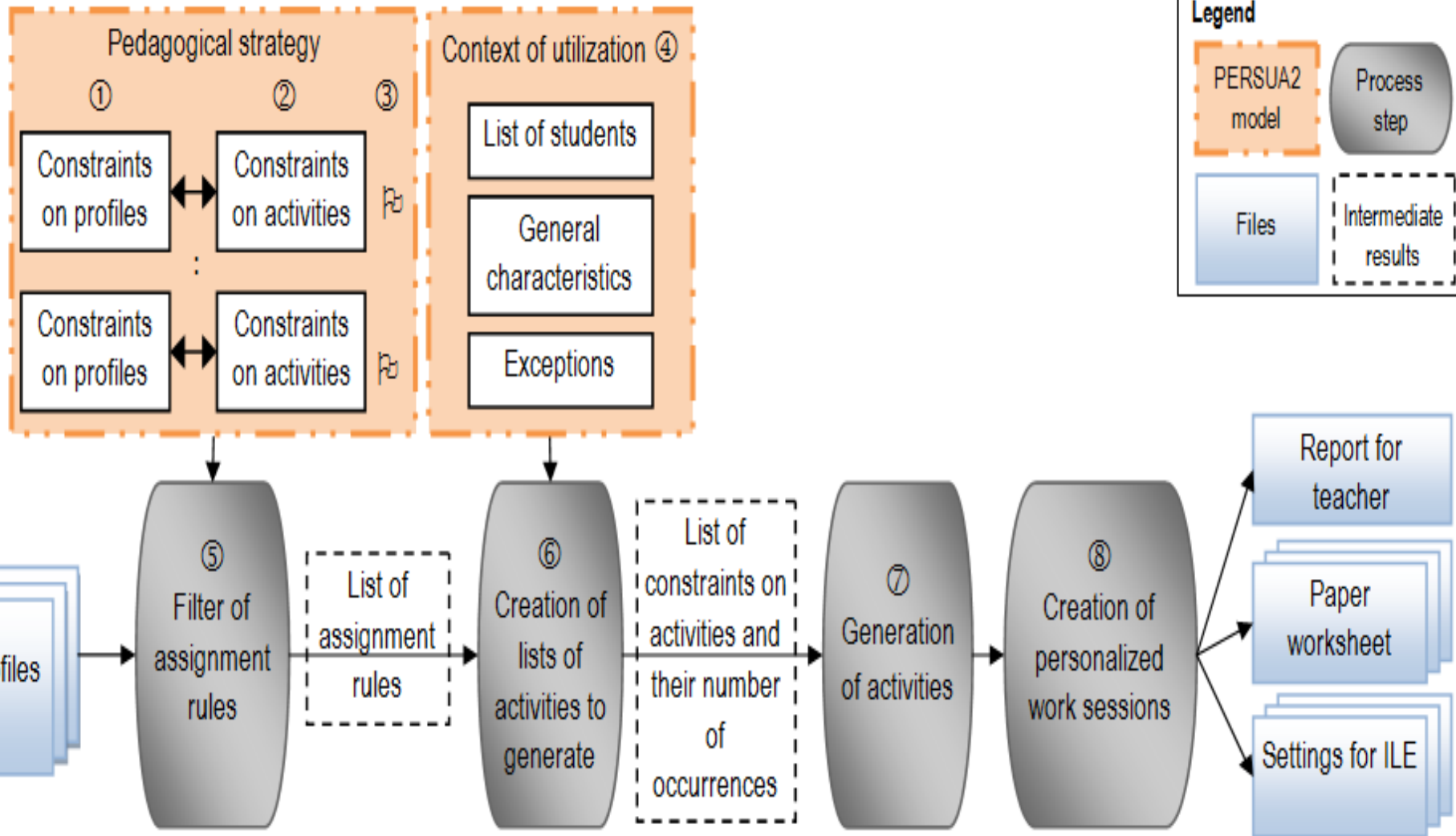


Illustration of use of PERSUA2 model

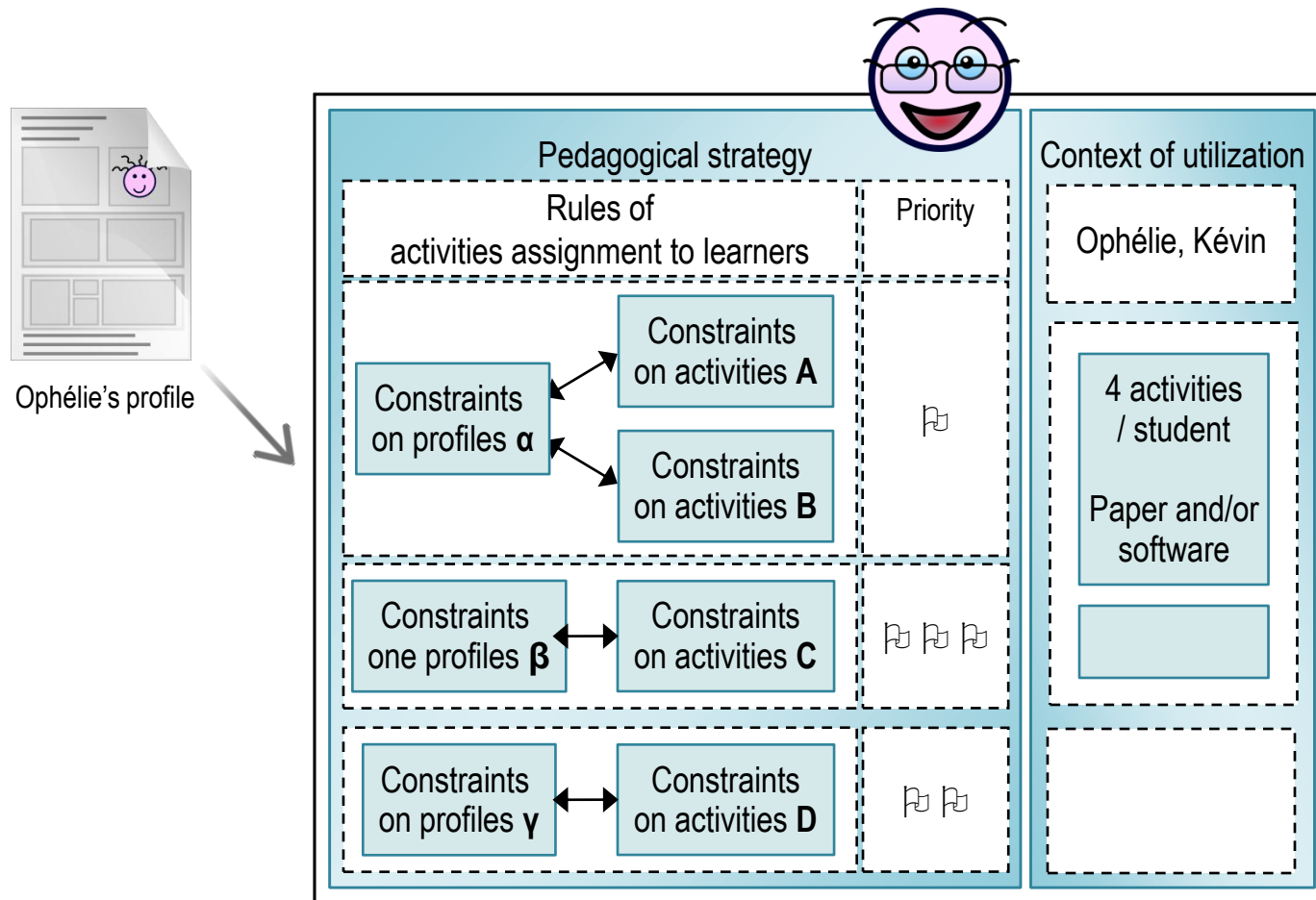


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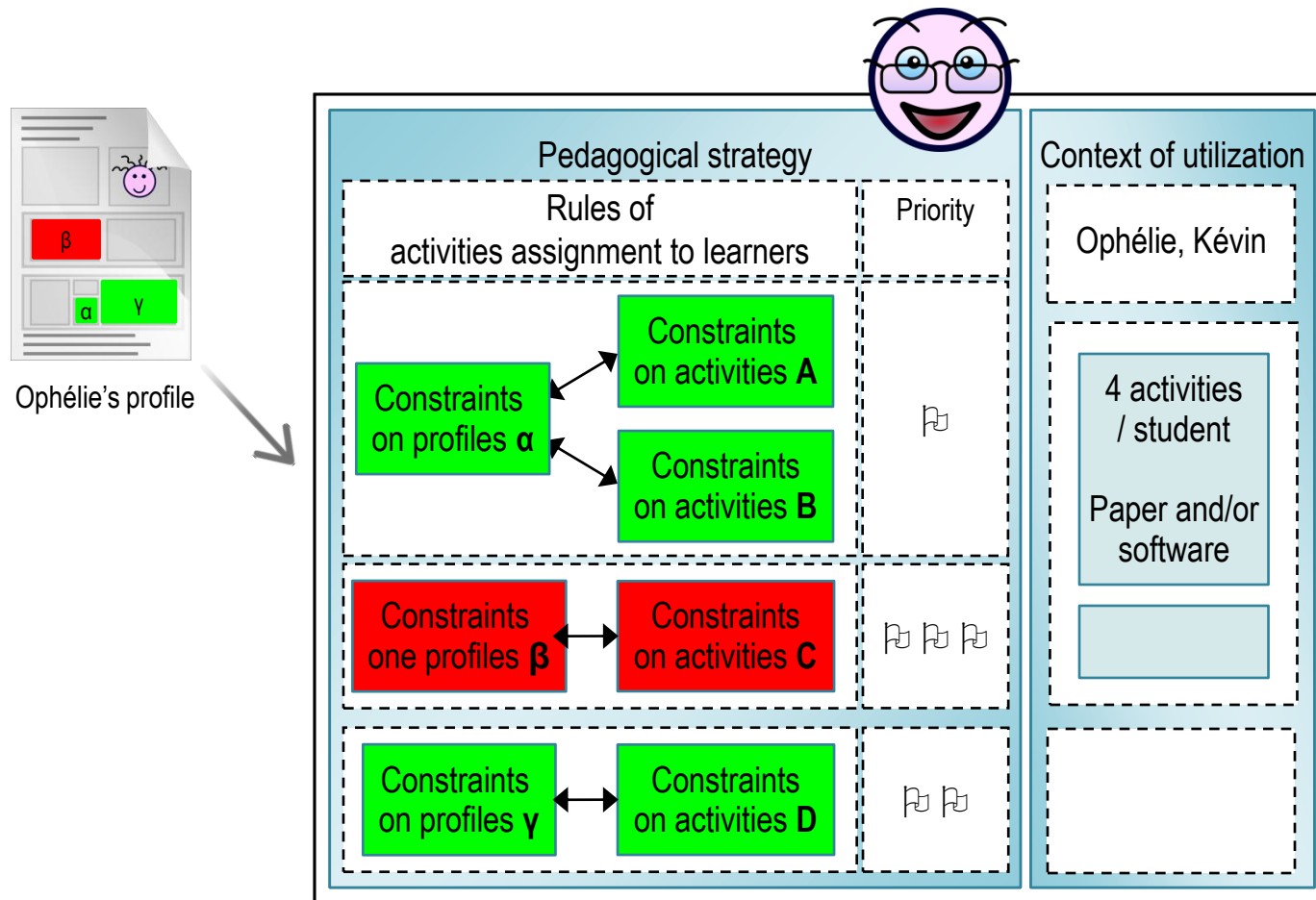


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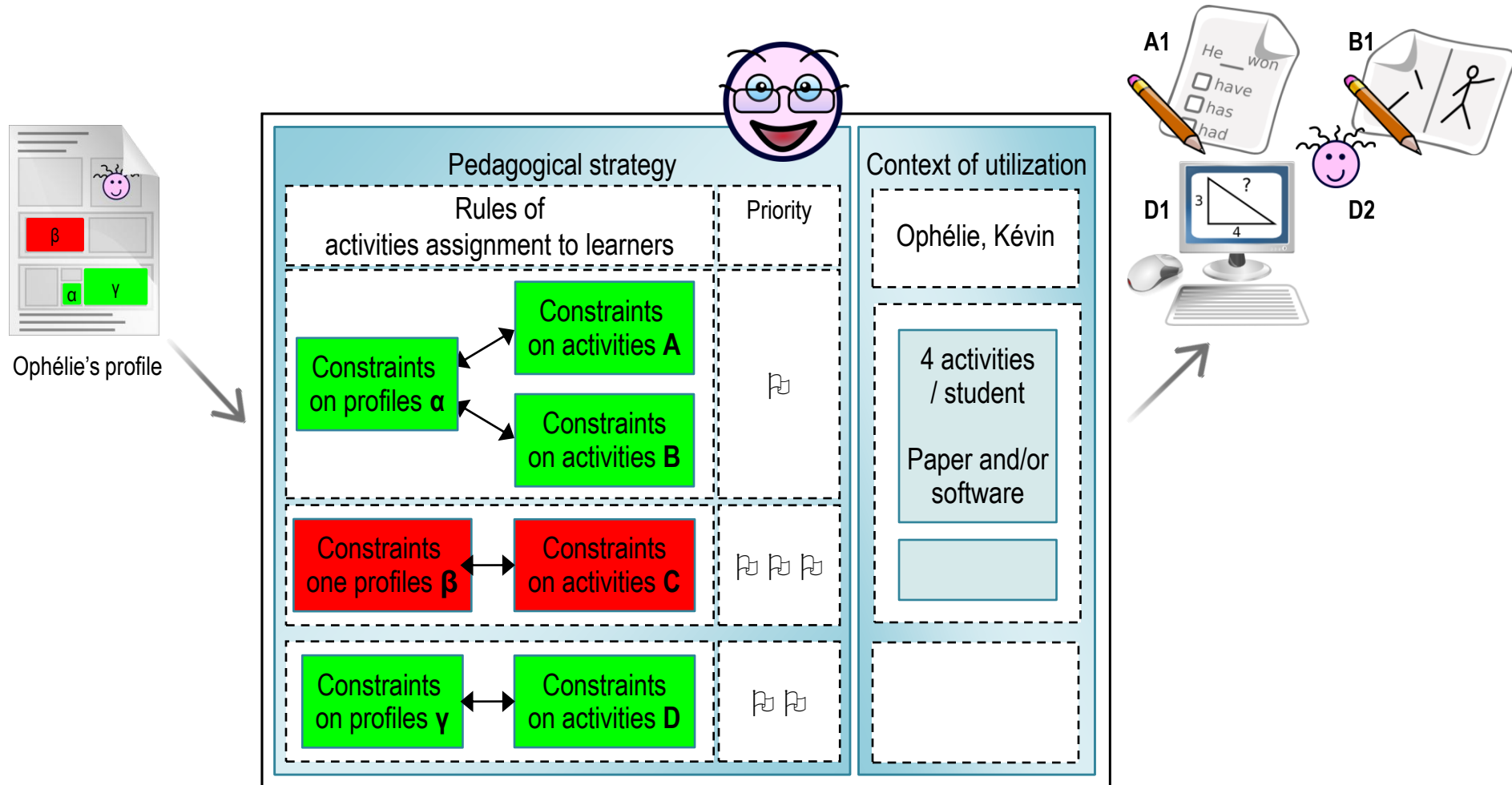


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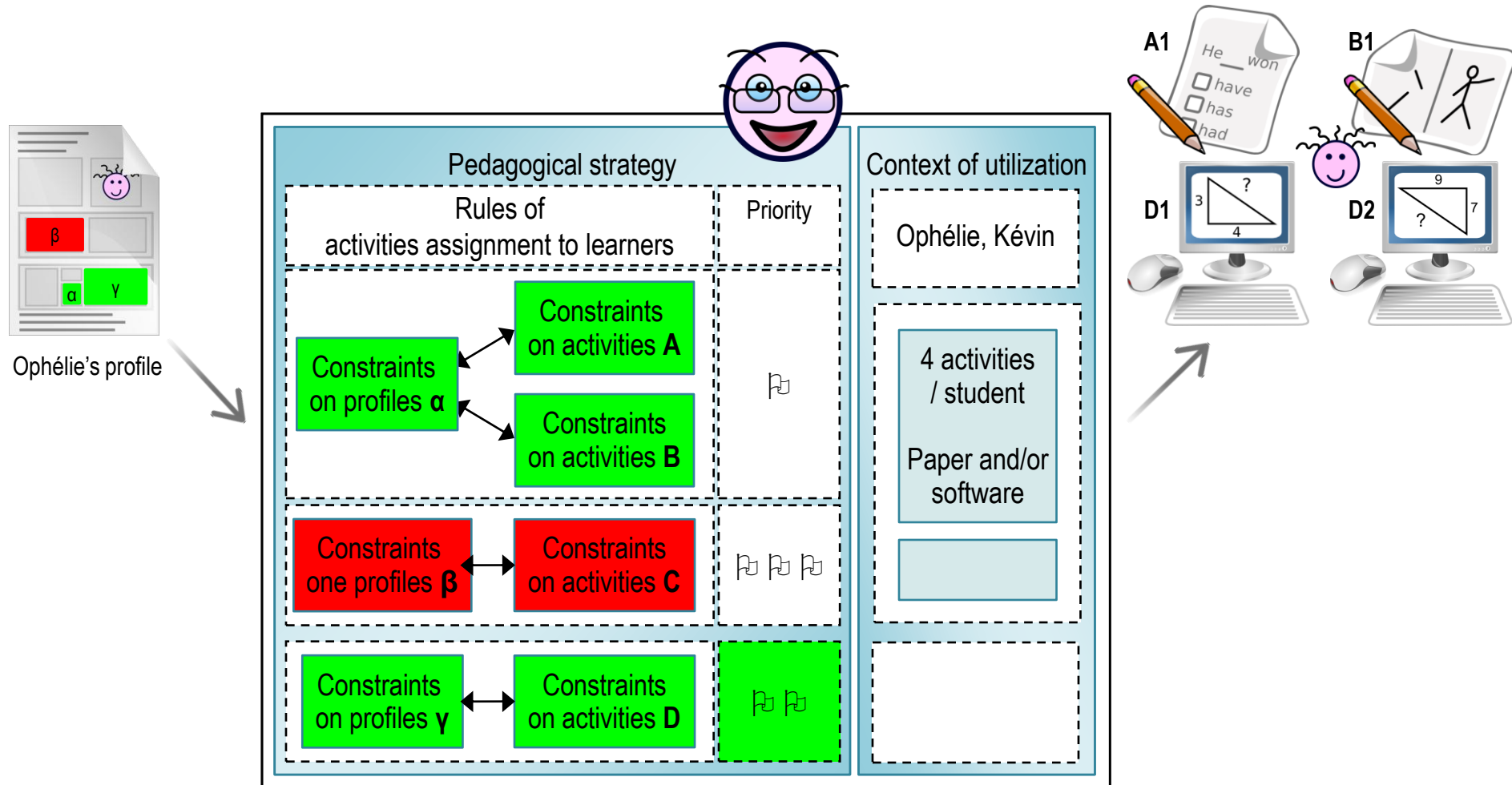


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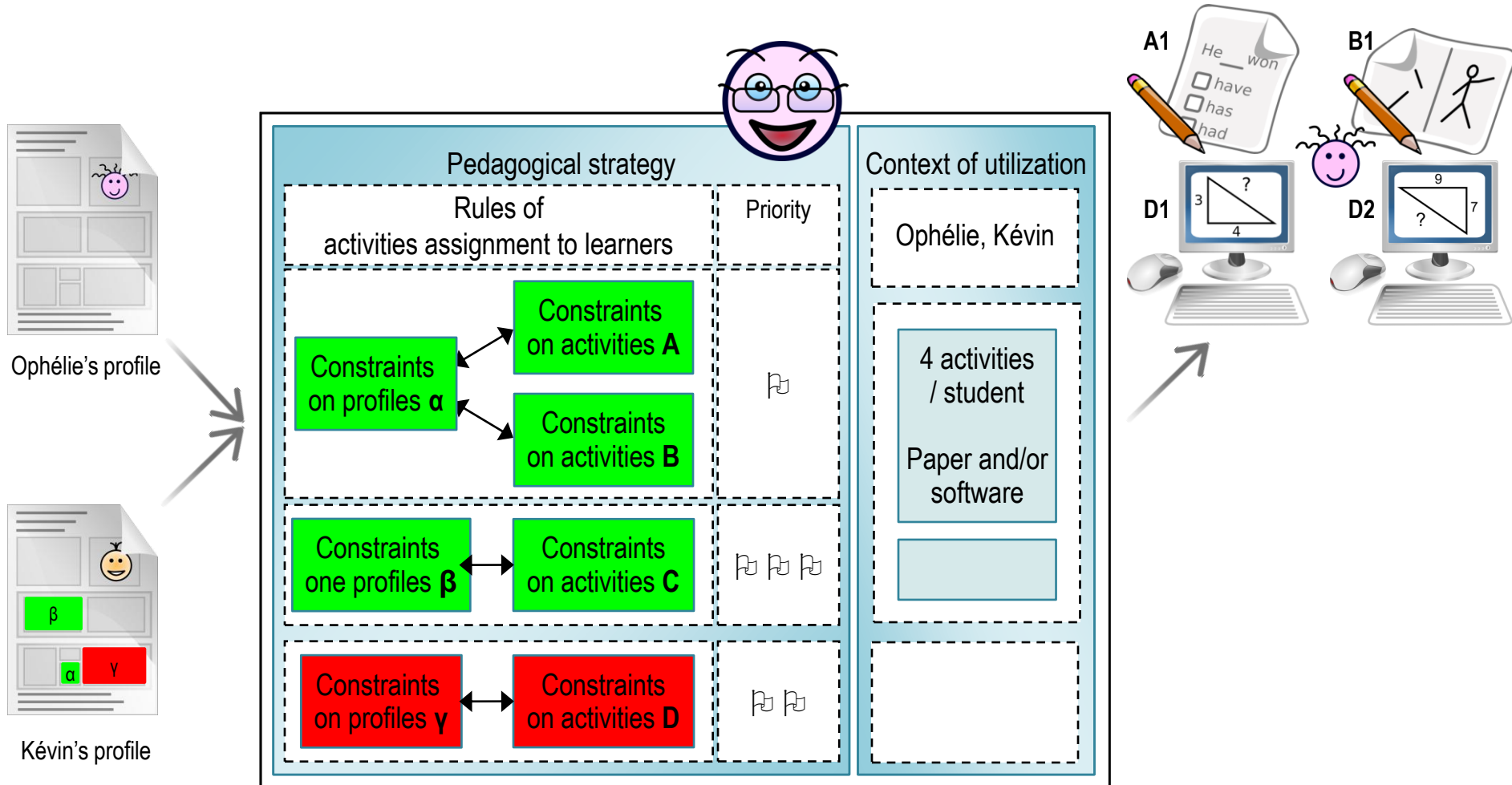
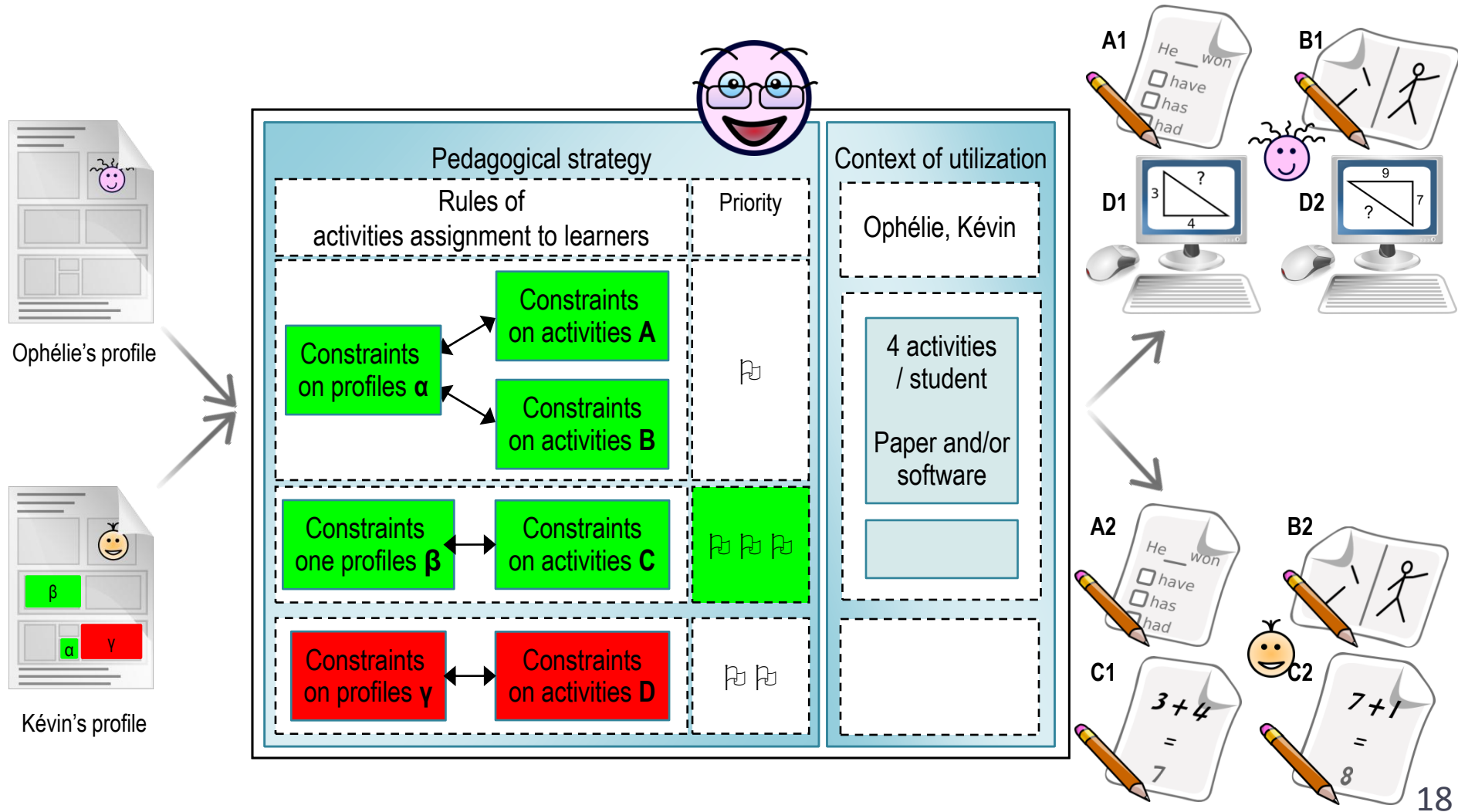


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PERSUA2 in Adapte

Définition de la stratégie pédagogique

Fichier Edition Outils Langue Paramètres Aide

Structure de profils "Récit subjectif" se trouvant : ".\Fichiers utilisateur\Strategie pedagogique\Récit subjectif.str"

Détail de la brique Liste : "Conjugaison"

- [-] passé simple de l'indicatif
 - [+] 1er groupe
 - [+] 2ème groupe
 - [+] 3ème groupe

Mur de briques de la structure

Liste des contraintes

Id	Élément du profil	Opération	Valeurs concernées
C1	Orthographe > Accords des participes pas		[0.. 5]
C2	Orthographe > Accords des participes pas		[5.. 7]
C3	Plan du texte > Les changements de tem		[maîtrisé]
C4	Plan du texte > Les changements de tem		[maîtrisé, partielleme
C5	Plan du texte > Les changements de tem		[non maîtrisé]
C6	Conjugaison > passé simple de l'indicatif	moyenne	[non maîtrisé]
C7	Conjugaison > passé simple de l'indicatif	moyenne	[maîtrisé]

Définir une nouvelle contrainte...

Nouvelle règle

Nom: Priorité: ()

SI: Pour tous les élèves)

ALORS: et

ou

SINON:

? Aide << Étape précédente Étape suivante >>

PERSUA2 in Adapte

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Mur de briques de la structure

Ecriture récit subjectif

Orthographe

Conjugaison

les valeurs des présents

les différents "je"

? Aide X Retour

Définition des critères globaux et personnels

Stratégie pédagogique : Versification 2.SP Structure de profils : LE GN.str

Profils concernés : Profil(s) d'élève(s)... Profil de groupe...

Contexte d'utilisation, contraintes globales pour l'ensemble des élèves :

Nombre d'exercices de la séance d'activité : min 3 max 4

Durée de la séance d'activité : min 0 en minutes max 0 en minutes

Nombre de pages: min 1 max 3

Mise en page des feuilles à imprimer : aAbBcC Modifier...

Variation des énoncés des activités : différent pour chaque élève

Format de sortie : html

Les contraintes globales sont modifiables pour chaque élève :

Prenom	Nom	Fichier	Nombre min.	Nombre max.	Durée min.	Durée max.	Pages min.	Pages max.	Mise en forme
Amaury		77_Amaury_CISSE_2009_04_06.xml							
Angele		77_Angele_BILLON_2009_04_06.xml		3					
Anthony		77_Anthony_BOSSUET_2009_04_06.xml							
Axel		77_Axel_DELINE_2009_04_06.xml	2	2					
Baptiste		77_Baptiste_POTTIER_2009_04_06.xml							
Cyril		77_Cyril_DEZECOT_2009_04_06.xml				30			
Elodie		77_Elodie_SEVIN_2009_04_06.xml							aAbBcC
Enzo		77_Enzo_SOURGENS_2009_04_06.xml							
Gwenegant		77_Gwenegant_DAUBAIRE_2009_04_06.xml				30			
Joss		77_Joss_HAYES_2009_04_06.xml							
Justine		77_Justine_BASTARD_2009_04_06.xml							

? Aide X Retour au menu principal << Étape précédente Étape suivante >>

Proposition of personalized activities

Génération des feuilles d'exercices personnalisées

Fichier Edition Outils Langue Paramètres Aide

< [icônes] >

Ophelie

Feuille d'exercices personnalisée pour Ophelie : 4 exercices, 57 minutes environ.

F119_conjug_ML.TAB
(durée prévue :10 minutes)
description...

<p>Énoncé :</p> <p>Conjugez les verbes suivants au conditionnel present et pour la 3è mepersonne du singulier :</p> <p>Verbes :finir.</p>	<p>Solution :</p> <p>finir : il finirait</p>
---	--

H124_additions_billes.PB
(durée prévue :12 minutes)
description...

<p>Ce matin, Romain avait des jonquilles. Il en a donné 14 à midi. Il en a 11 maintenant. Quel était le nombre de jonquilles de Romain au début ?</p>	<p>Solution :</p> <p>Romain avait 25 jonquilles</p>
---	---

F121_maths_ML.TAB
(durée prévue :15 minutes)
tables entre 2 et 25

<p>Énoncé :</p> <p>Donner la table de multiplication des nombres suivants: 11,17,8.</p>	<p>Solution :</p> <p>11 : 0, 11, 22, 33, 44, 55, 66, 77, 88, 99, 110 17 : 0, 17, 34, 51, 68, 85, 102, 119, 136, 153, 170 8 : 0, 8, 16, 24, 32, 40, 48, 56, 64, 72, 80</p>
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H92_calcul_fleurs.PB
(durée prévue :15 minutes)
problemes...

Vous pouvez trier les exercices par : pour cet élève pour tous les élèves

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Evaluations

- Utility *via* a questionnaire
- Feasibility *via* Adapte
- Usability with 2 teachers (external to the project)
 - Utilization of their learner models
 - Personalization of pedagogical activity sessions via Adapte

Future work

- Analysis of more feedback
 - More teachers
 - Do the totality of process
- Provide an « intelligent » help
 - Recommendations when creating a pedagogical strategy

