

Learning lab day

INRIA PARIS, 11 / 16 / 2016



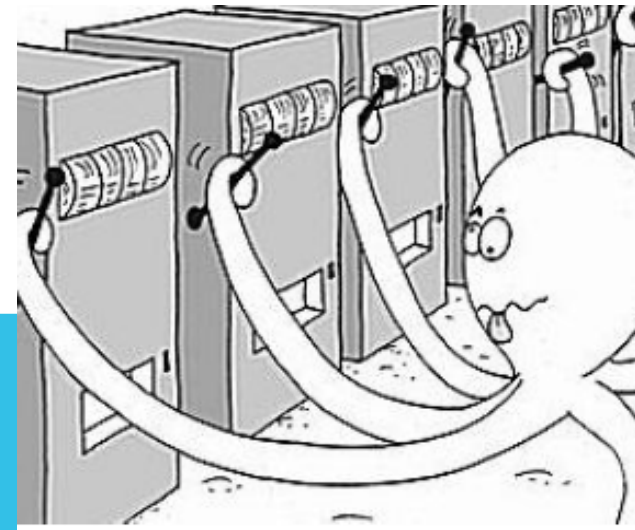
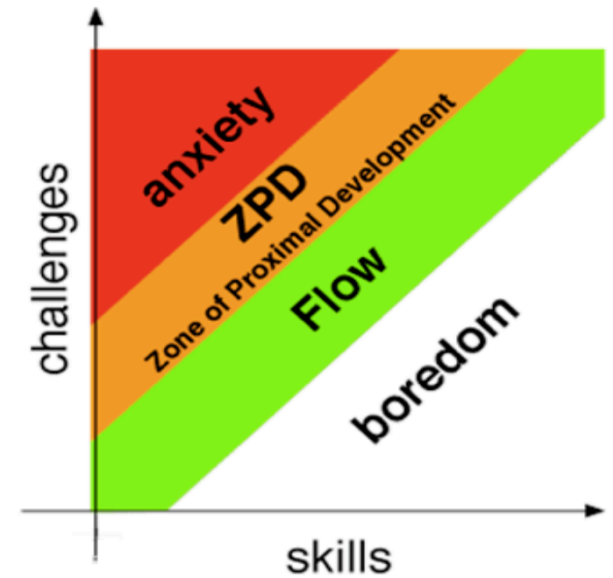
Benjamin Clement
Alexandra Delmas
PhD Students INRIA Flowers

Kidlearn Project Objectives

- **Personalize of teaching sequences in Intelligent tutoring systems**
- **Identify the current level of students**
- **Choose online the activity that better addresses the challenges for each student**
- **Improve motivation and engagement**

Methods

- **Flow theory and Zone of proximal development**
- **Use of multi-armed bandit algorithms to manage pedagogical sequences.**
- **Activities proposed based on the evaluation of the progress of the learner**



Zone of Proximal Development and Empirical Success

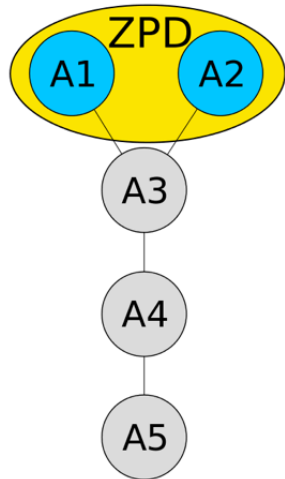
● Active activity

● Deactivated activity

● Activity not explored

● Zone of Proximal Development

δ_{ZPD} : ZPD success rate
 δ_{A_x} : A_x success rate
 λ_{ZPD} : threshold to expand
 λ_a : threshold to deactivate



Inside the zone of proximal development choose exercises stochastically according to the learning progress



A1



A2

Time

ZPDES

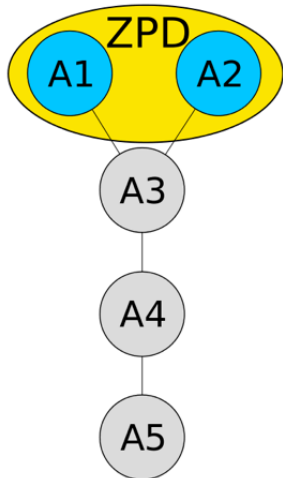
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Inside the zone of proximal development choose exercises stochastically according to the learning progress



A1



A2



A3

Time

ZPDES

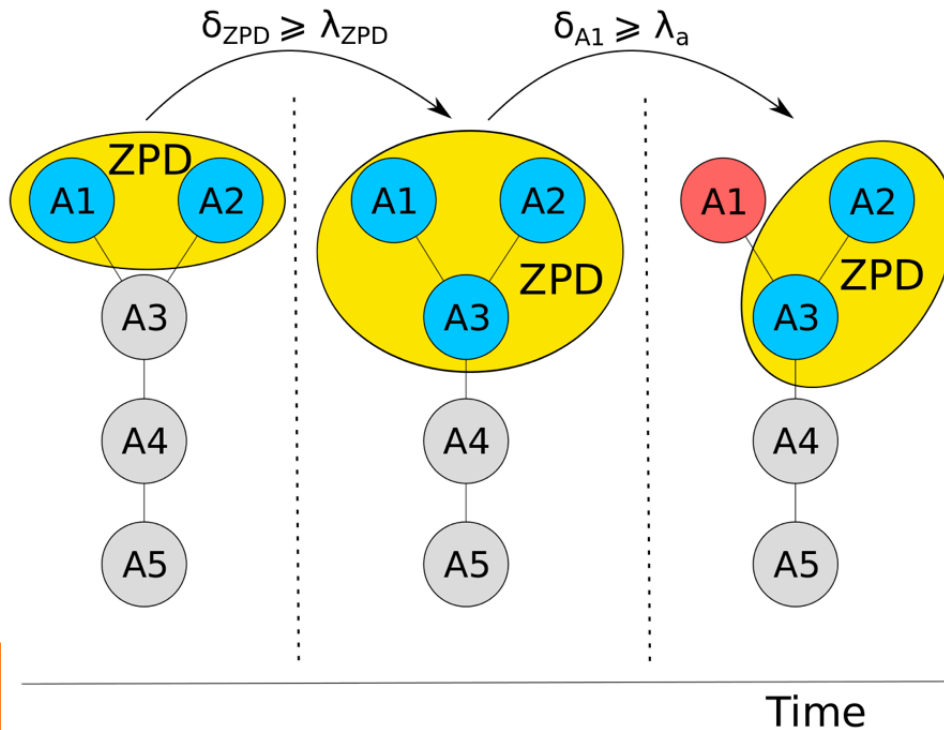
● Active activity

● Deactivated activity

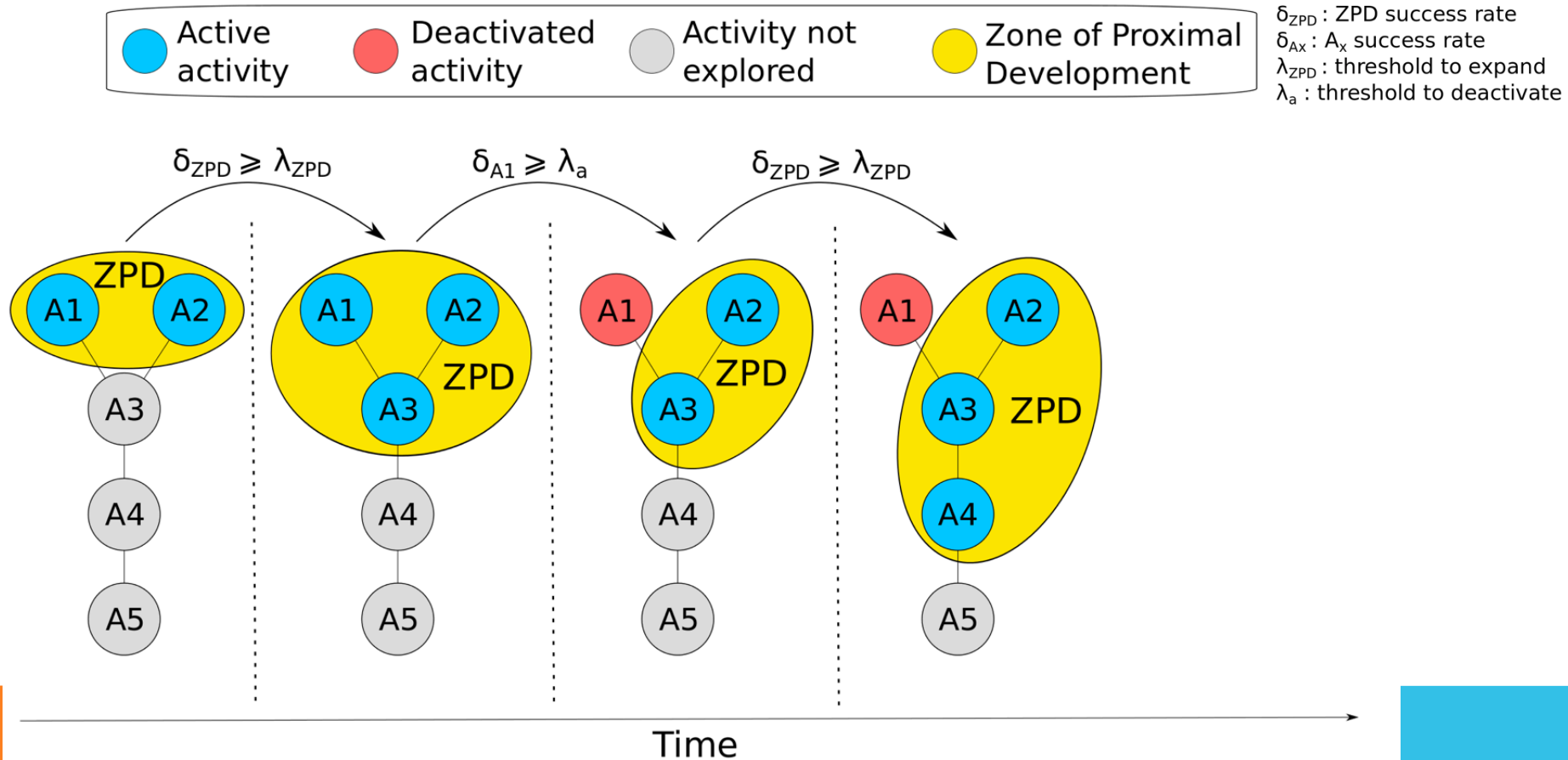
● Activity not explored

● Zone of Proximal Development

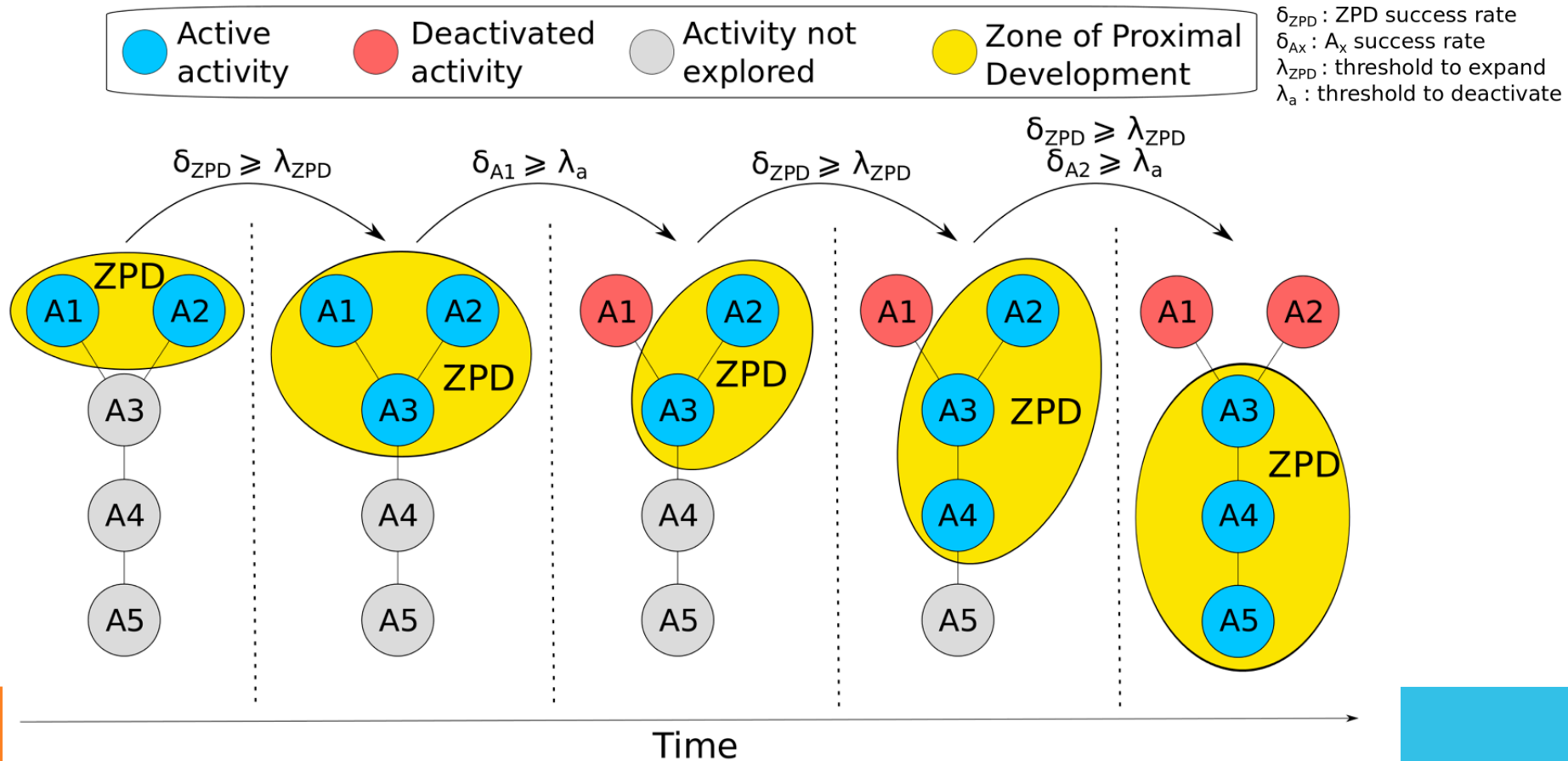
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ZPDES



ZPDES



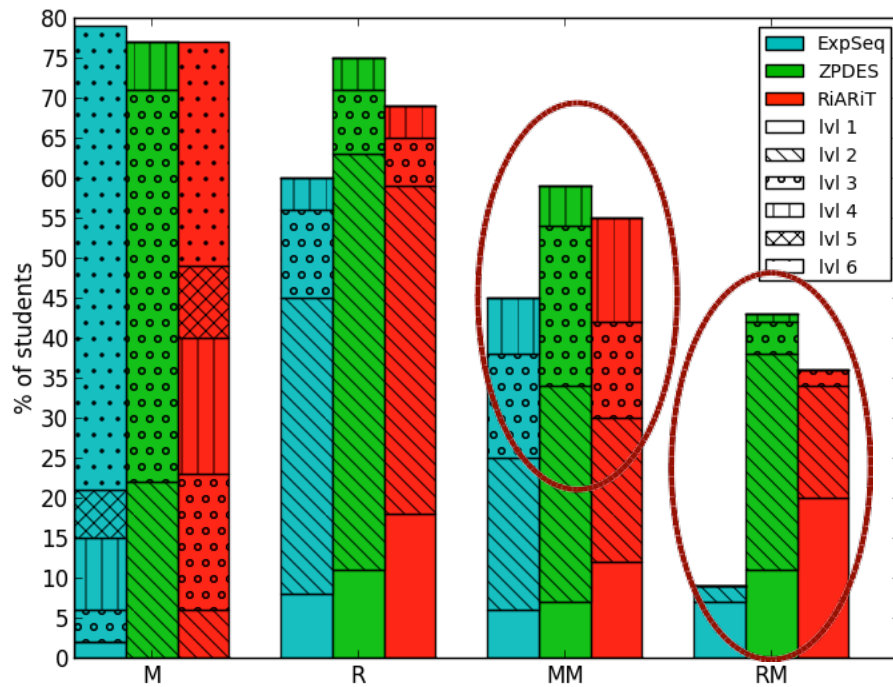
Application tested in Aquitaine



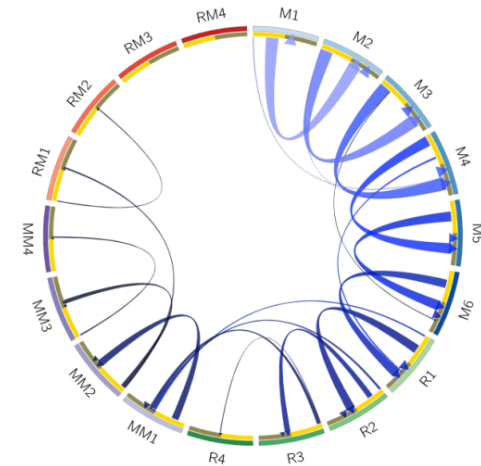
- 11 schools
 - 18 classrooms
 - 400 students
 - 4 activities
 - 45 minutes per student
-
- 3 types of sequence manager:
 - Predefined sequence
 - ZPDES
 - RiARiT



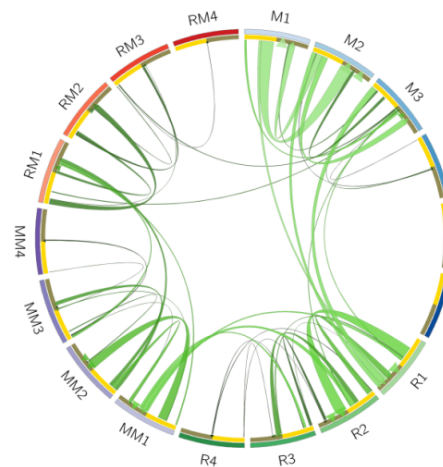
Some results



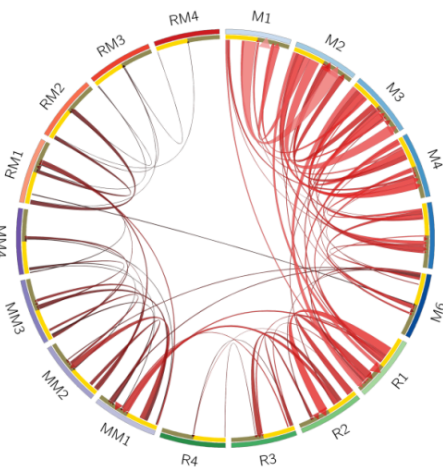
Predefined sequences



ZPDES



RiARiT



Current developments

- **Using of the algorithms in Kidbreath**
- **Development of a project with Harvard to test new algorithms which use features and context about the activities and the learner**

KidBreath Context

- Asthma: 1st chronic disease in children → 10%
- Only 50% are adherent
- Factors influencing disease behavior
 - **Disease knowledge** → personalized
 - Self efficacy → illness perception & coping
 - Motivation

KidBreath Project

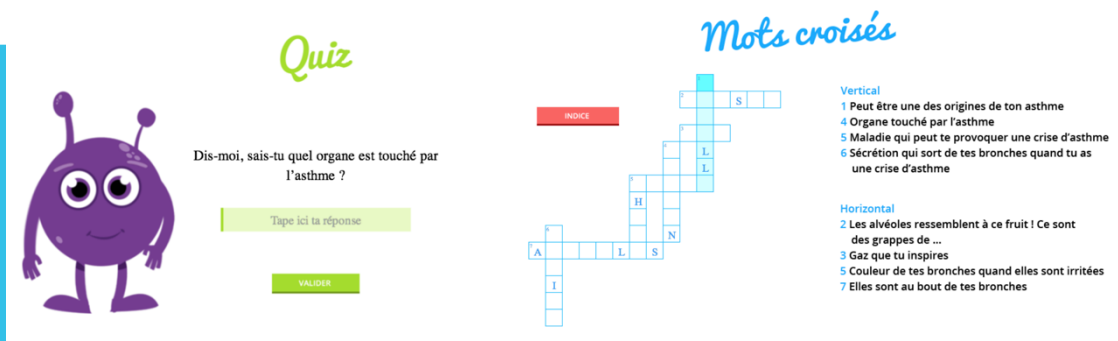


Web application with learning activities linked to asthma

- Transfer of learning optimization algorithm in chronic disease context
- Parameters ?

Use of Therapeutic Education Programs criterias established by High Authority of Health

Gamification, participative design & user tests to validate contents



Contents

Type / Theme	Biomédical (1)	Symptômes (2)	Conn. Gales (3)	Traitements (4)
Quiz (a) - N1	5	2	10	2
Quiz (a) - N2	7	2	11	9
Quiz (a) - N3	3	1	7	3
Qcm (b) - N1	11	3	19	6
Qcm (b) - N2	4	2	8	6
Qcm (b) - N3	0	0	1	2
Jeux (c) - N1	0	0	0	0
Jeux (c) - N2	3	3	2	2
Jeux (c) - N3	0	0	0	0
Vidéo d'inf (d)	1	2	12	3
Vidéo technique (e) - N3	/	/	/	14

TOTAL : 166

Preliminary Study

- 1 class of 20 pupils aged 8
- 3 asthma kids
- Use of KidBreath during 3x20min on a week
- 2 conditions: choice VS no choice condition
- Results:
 - Strong usability rate
 - +50% increase of disease knowledge
 - Strong motivation to continue, especially for asthma kids



Further Study

- **At home - daily life usage**
- **Learning asthma in autonomy more efficient ? (VS without algorithm VS TEP)**
- **Motivation ?**
- **Illness perception?**
- **Adherence ? (treatments, accidents, avoiding factors ...)**



In Progress

- **Methodology in participative design**
- **In global learning context:**
 - **Which others parameters taking account to integrate it in algorithms ?**
 - **Transdisciplinary approach to improve learning paths in ITS (evaluation of frustration, cognitive load) ?**

Thanks for your attention !

