

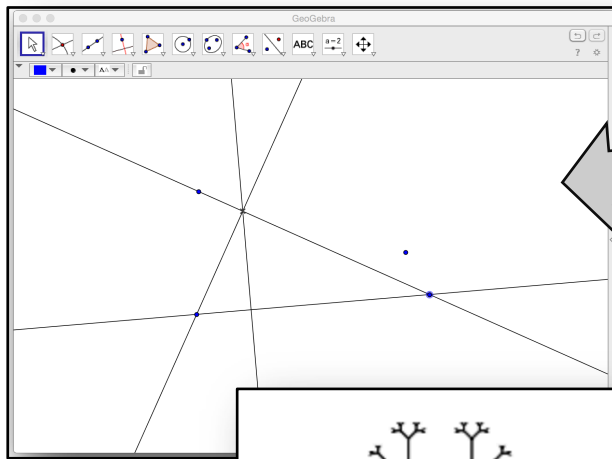
CS-411 : Digital Education & Learning Analytics

Chapter 7: Social Cognition

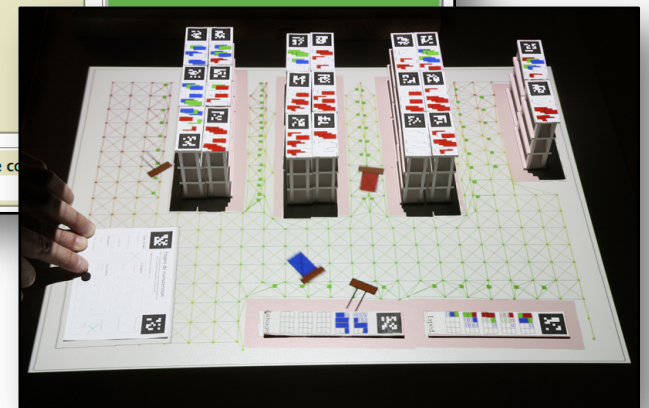
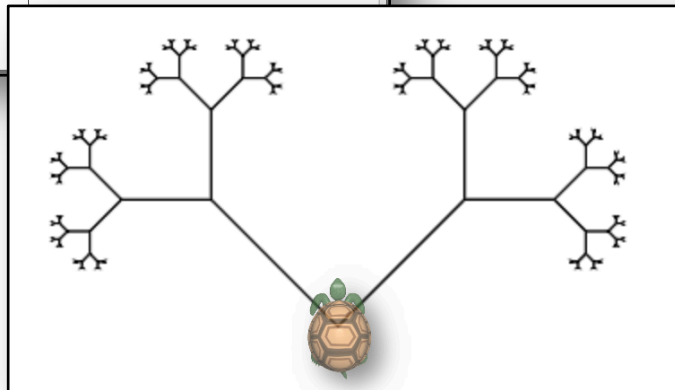
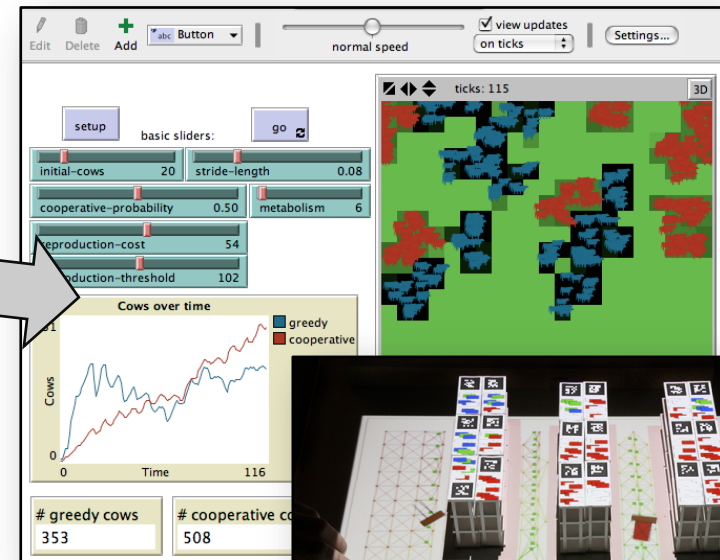
LAST WEEK

Cognitive **conflict** is the key learning mechanism
for **constructing** knowledge structures

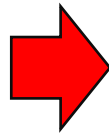
A learning environment allows the student to **learn**
by trial and error, but needs to provide guidance



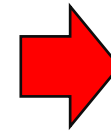
MicroMondes
Simulations



Learning
Theory



Pedagogical
Model



Learning
Technology

Skinner
Behaviorism

Mastery
Learning

eLearning
Intelligent tutoring systems

Piaget
Constructivism

Guided Discovery
Learning

Simulations, microworlds
modeling, problem solving

Vygotsky
Socio-cultural theory

?

?

1. In a group includes students with different levels of knowledge:
 - ☐ The lower students will learn from the explanations provided the better students
 - ☐ The better students will learn from explaining the task to the lower students
 - ☐ None of them will learn well because the difference of levels
 - ☐ Both will learn to work in heterogeneous teams, which is socially important

2. If a group includes students having opposite opinions or conflicting knowledge, will collaborative learning be effective?
 - ☐ No, because there will be a negative team spirit
 - ☐ No, because the student with incorrect knowledge might convince the one who had the correct knowledge
 - ☐ Yes, because this will force them to argue with each other and to elicit their knowledge
 - ☐ Yes, because they will learn to collaborate in conflict situations

3. When forming groups of students, what is the best way of combining men and women :
 - ☐ Separating them because their differences might prevent them to focus on knowledge
 - ☐ Mixing them because differences of collaboration style might increase the group effectiveness
 - ☐ Mixing them because they will have to collaborate in mixed groups in their professional life

4. What is the primary role of computers in collaborative learning ?
 - ☐ Communication tools (chat, forum,...) enable teamwork at distance
 - ☐ Collaboration software can be designed to influence collaboration
 - ☐ Internet provides students with the knowledge they don't have in the team
 - ☐ It is important that students learn to collaborate in teams distributed worldwide

Mastery
learning

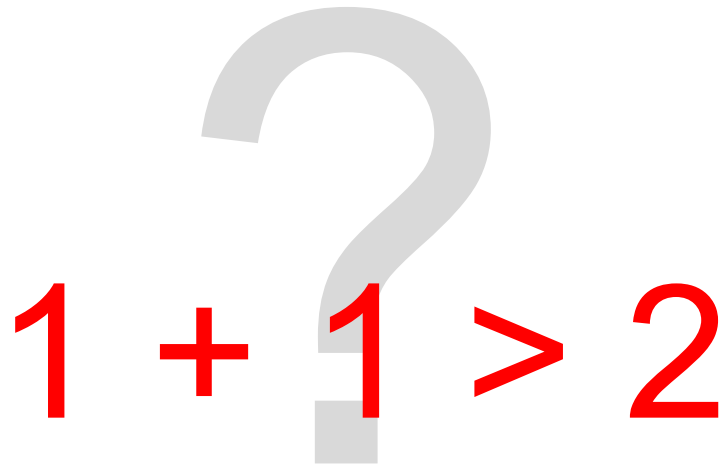
→ Individualisation

kids > # computers
(late 90')

Socio-Cultural
Theories

→ Collaboration




$$1 + 1 > 2$$

Is learning in teams
more effective
than learning alone ?

Question 1: Is Collaborative Learning Effective ?

	Learning Gains		
	>	=	<
Meta-analyses: collaborative versus individual			
Slavin, 1983.	26	14	1
Johnson & Johnson, 1989	829	645	109

Thanks to Fabrizio Butera

A decision maker could conclude that the probability that team learning is effective is high enough to use it.

A scientist would instead conclude that team learning is not effective per se, but depends on the conditions... see next slide

Question 2: **When** is collaborative learning effective ?

Independent Variables (CS411 – Chapter 9)

Factors:

- **Group** composition: number, level, gender, age, ...
- **Task** features: verbalizable, open, ...
- **Medium**: face-to-face, synchro/not, text/audio/video, ...
- Context: school/work

The effects of collaborative depends upon so many variables (plus their interaction effects) that it is impossible to predict that a given teamwork in a specific context will be effective

Question 3: Which **interactions** make collaborative learning effective ?

1. Elaborated **explanations**
2. Conflict resolution, **Argumentation** / Négociation
3. Mutual **Regulation**

Collaborative learning occurs when team members engage into the 'productive interactions' listed above.

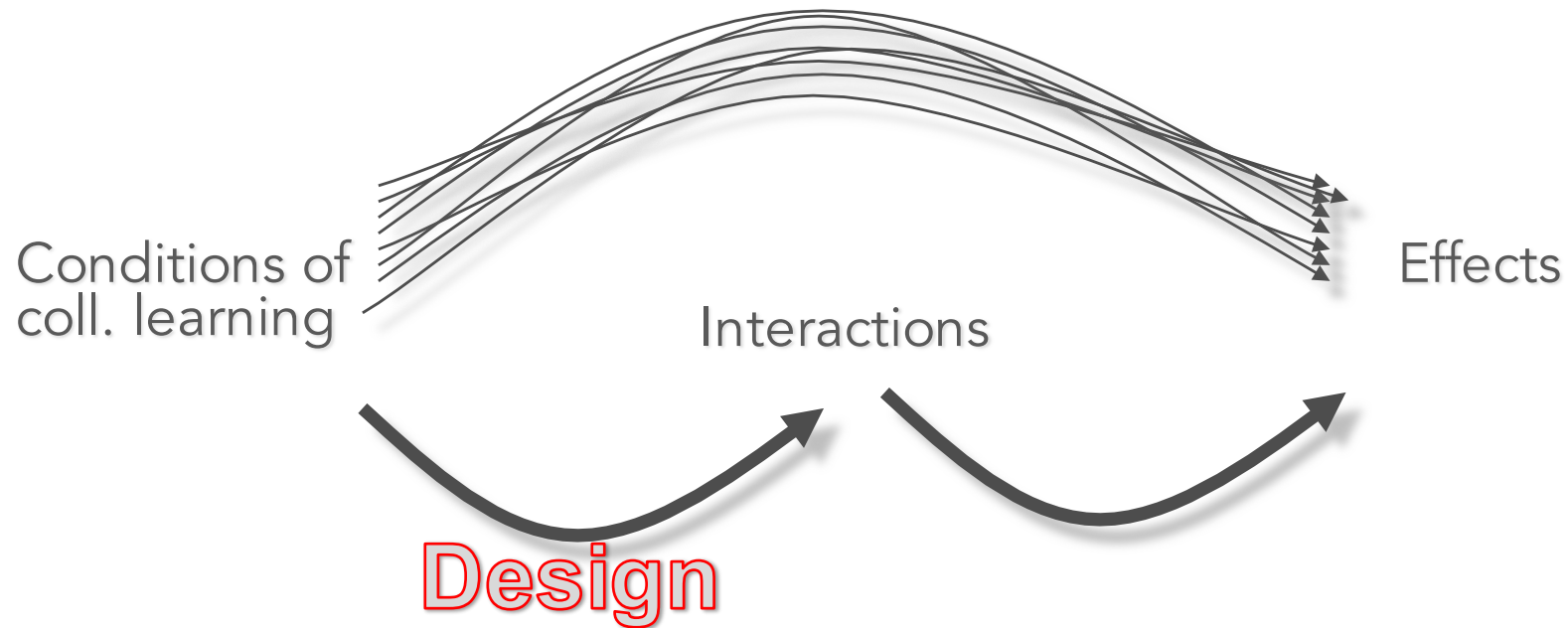
These interactions are summarized as "the effort" that team members engaged to reach and maintain a **shared understanding** of the task.

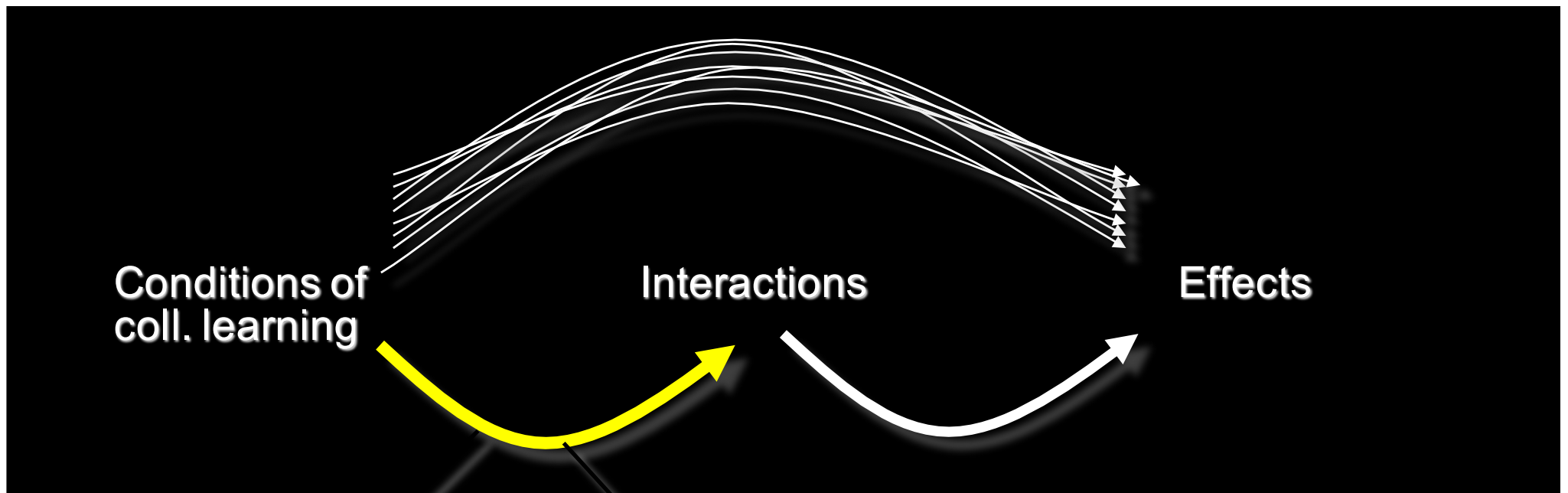
Collaborative learning occurs when team members engage into

rich verbal interactions

These interactions are summarized as “the effort” that team members engaged to reach and maintain a **shared understanding** of the task.

Question 4: Which **design** increases the probability that teams produce the **interactions** that make collaborative learning effective ?





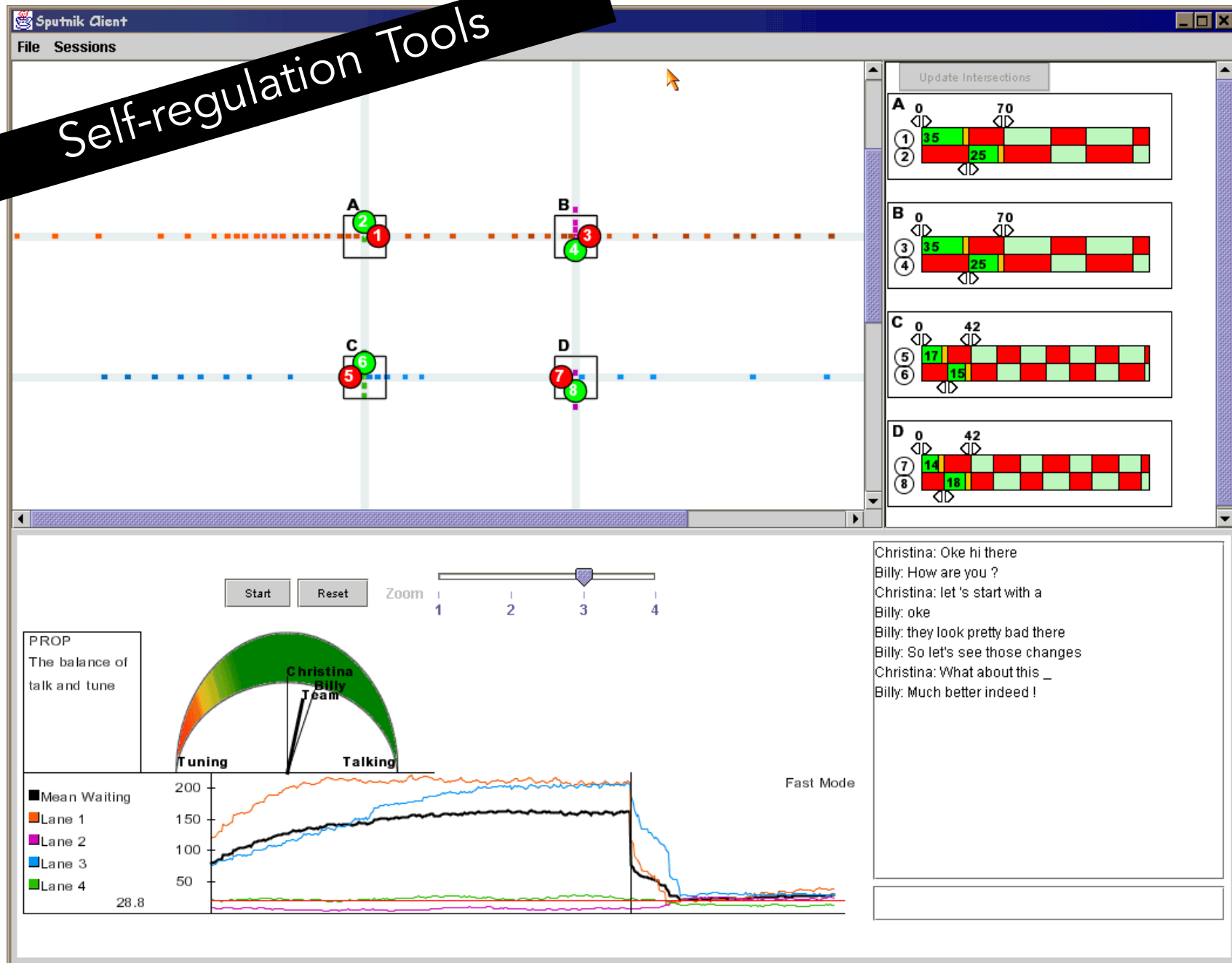
(proactive)

STRUCTURE

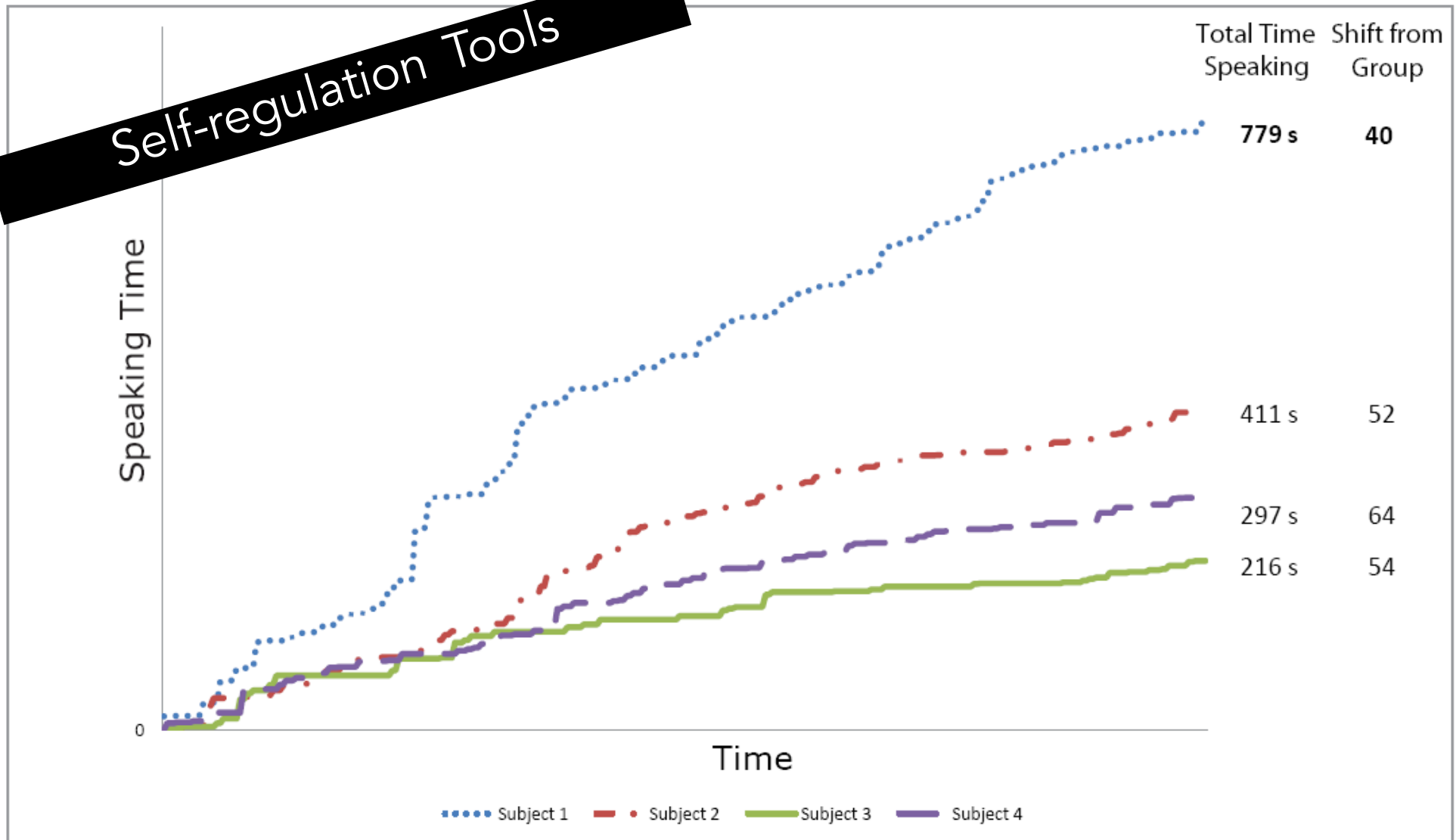
(reactive)

(self-) REGULATE

Self-regulation Tools

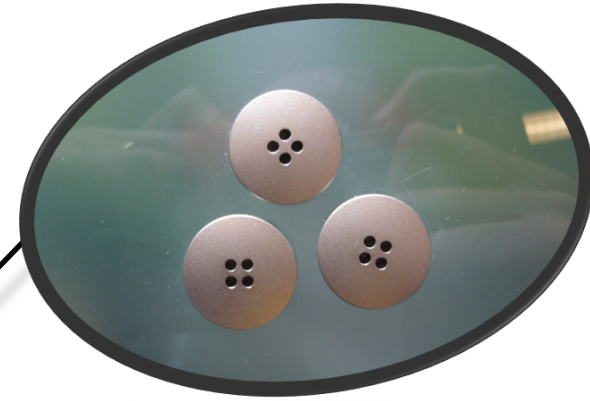


Self-regulation Tools



Example of domination in teamwork

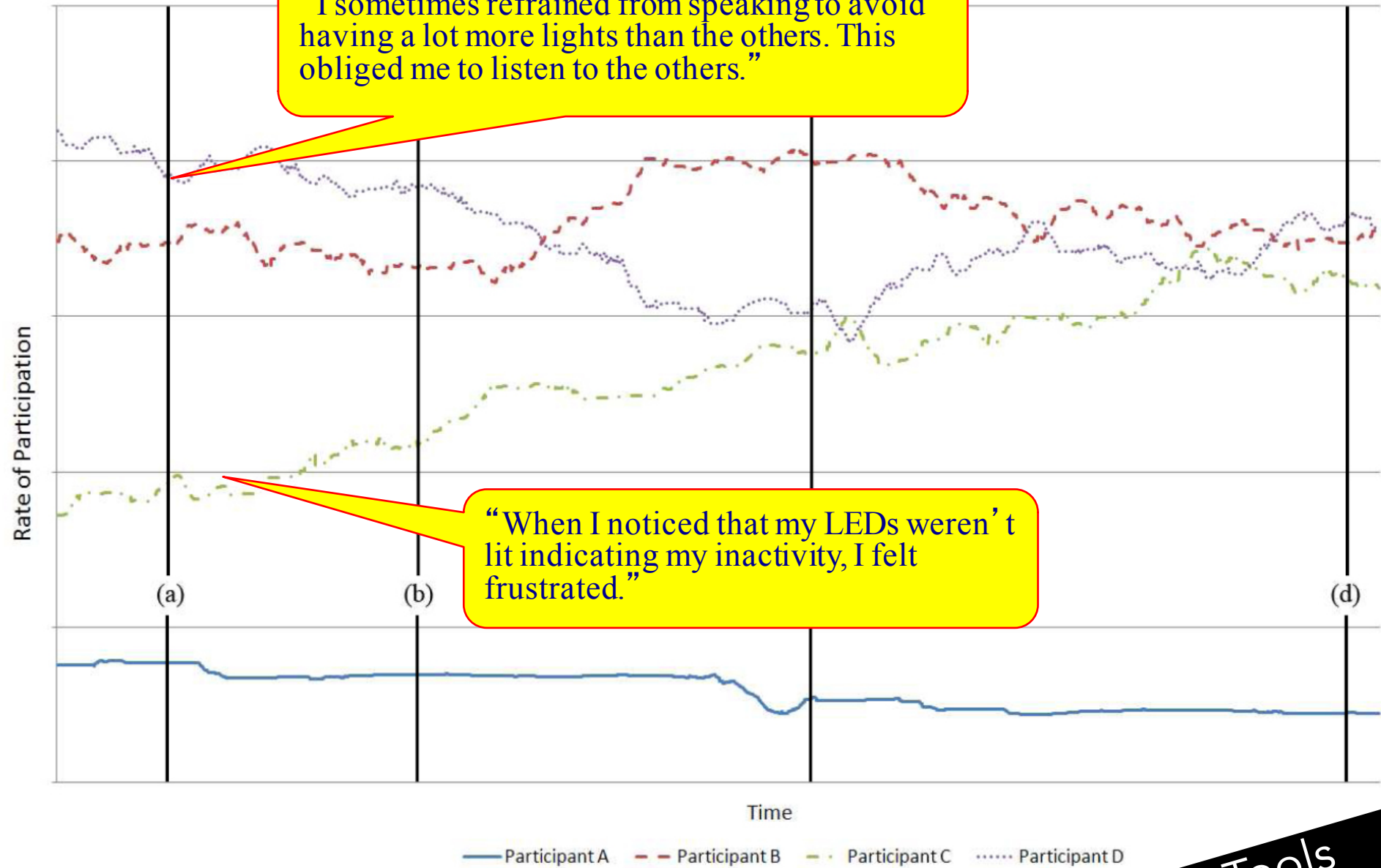
Self-regulation Tools



Reflect Table

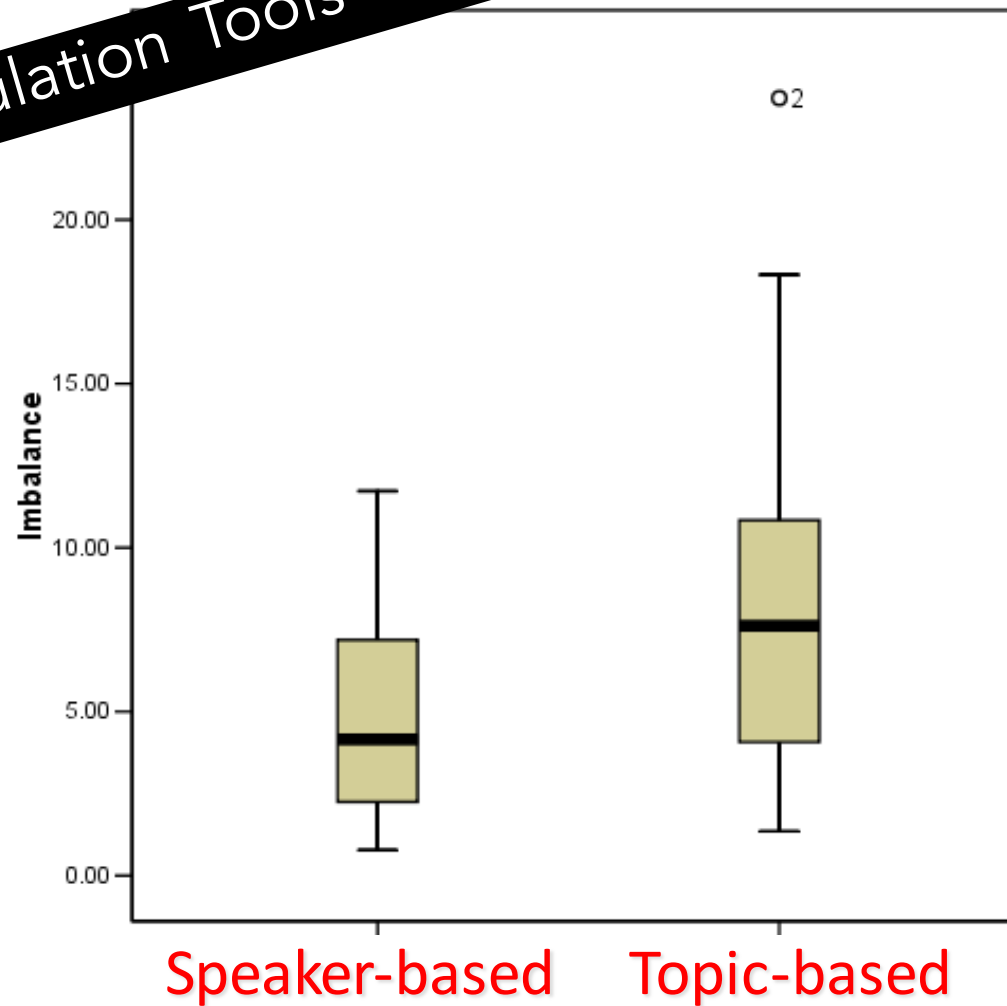
•K. Bachour, F. Kaplan, W. Hokenmeier

Reflect



Self-regulation Tools

Self-regulation Tools



T-Test: $t = 2.176$, $p = 0.036$

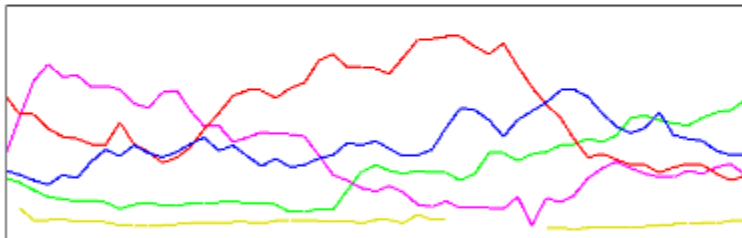
Self-regulation Tools

Session

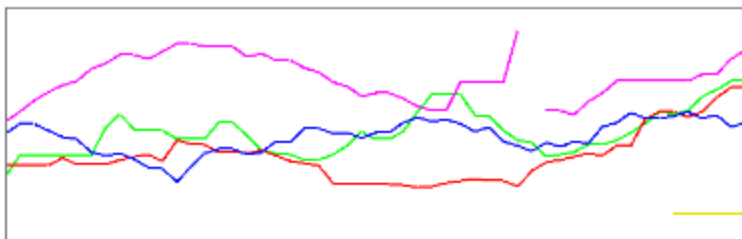


Report

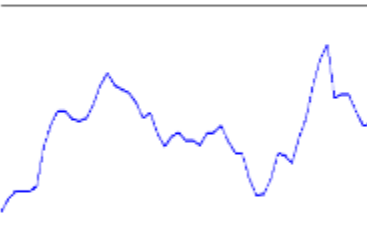
Individual Speaking Time



Individual Arousal



Group Speaking Time

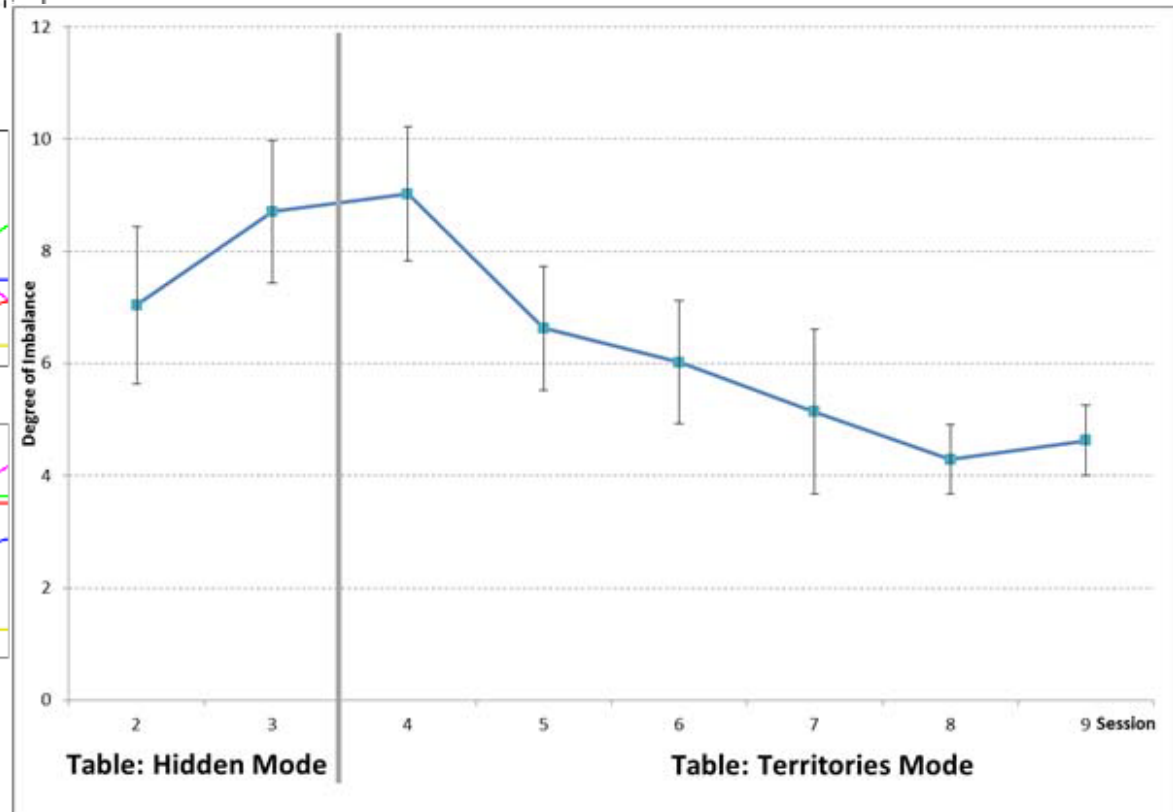


Turn Takings

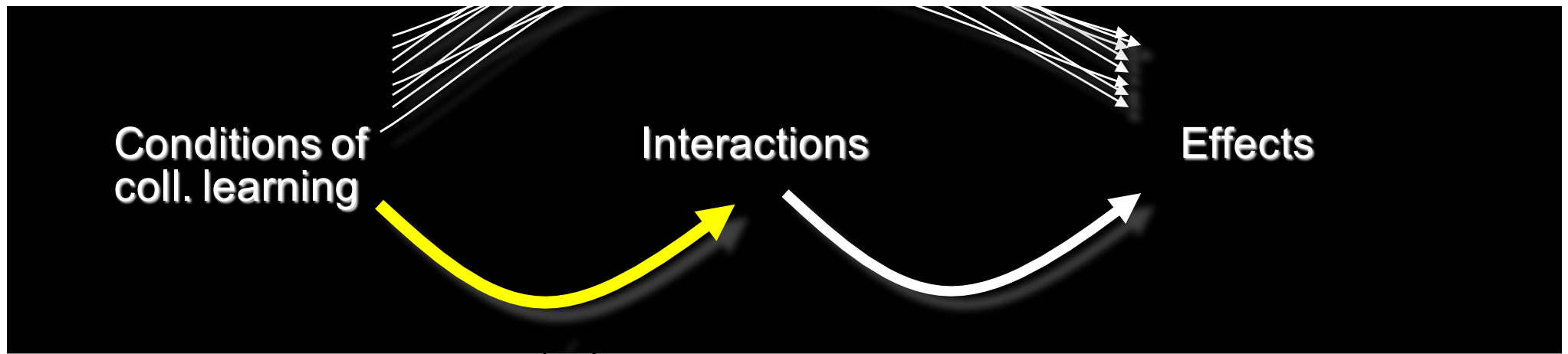


13.05.2011

09:46 - 10:38



Flaviu Roman

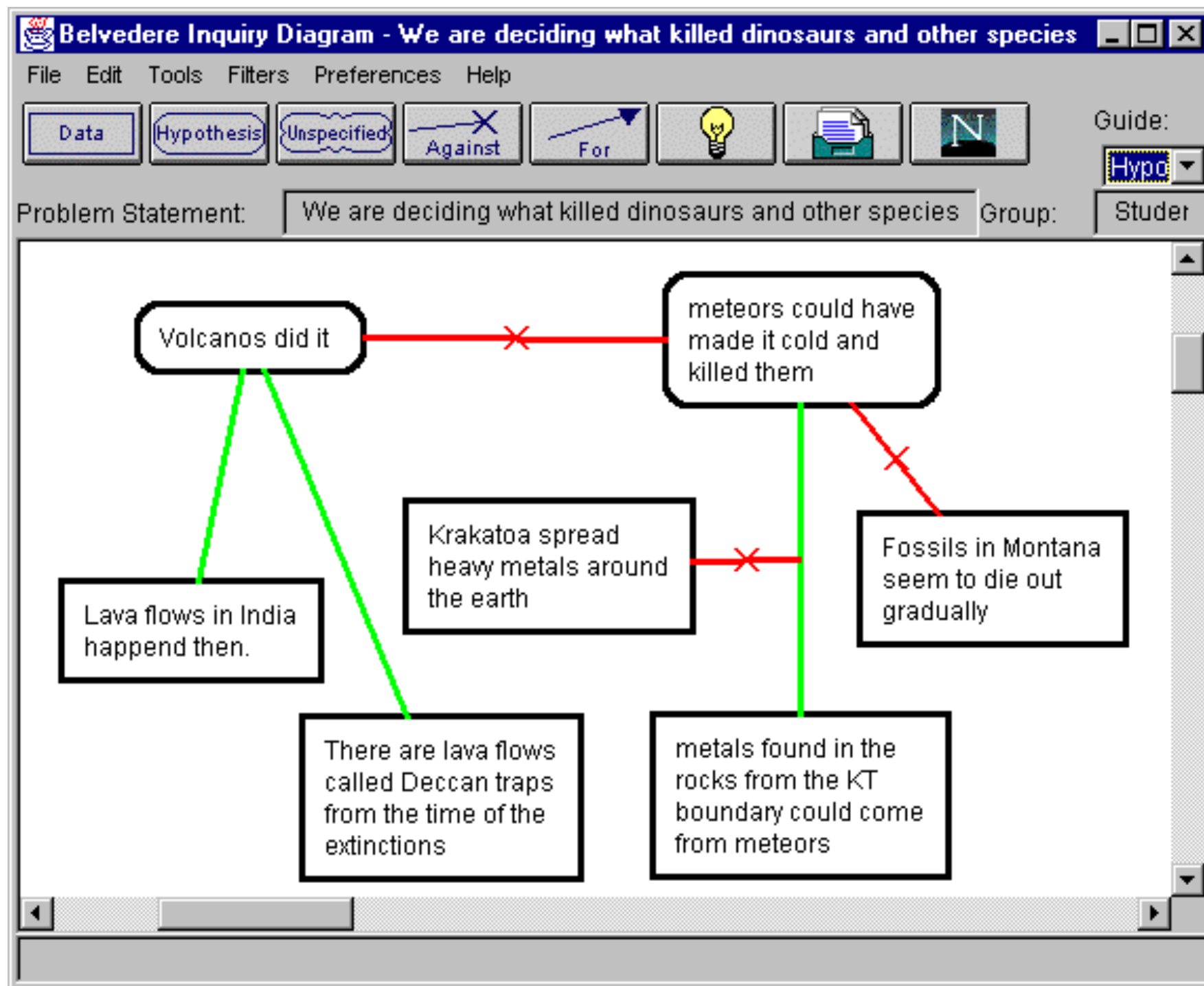


(reactive) REGULATE

(proactive) STRUCTURE

SCRIPTS

Semi-Structured Interfaces



Belvedere (Suther et al.)

Semi-Structured Interfaces

1: kris: Je propose de... créer un réservoir
2: kris: Es-tu d'accord? 1
3: erica: D'accord 1
4: kris: J'y vais! 1
5: réservoir crée

Faire la chaîne...
Je propose de...
Je pense que...
Pourquoi?
Parceque...
Quel est son nom?
Son nom est...
Lequel?
De quoi à quoi?
Faire autre chose...
Lis la feuille
Regarde l'expérience

Se mettre d'accord...
D'accord Pas d'accord
Es-tu d'accord?
Quoi? Oui, mais...
Je ne sais pas
Gérer l'interaction...
Par quoi on commence?
Attends! Coucou!
J'y vais! Vas-y, toi
Qu'est-ce qu'on fait?
Je me suis trompé
On a fini?

Faire la chaîne...
Je propose de...
Je pense que...
Pourquoi?
Parceque...
Quel est son nom?
Son nom est...
Lequel?
De quoi à quoi?
Faire autre chose...
Lis la feuille
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Se mettre d'accord...
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Par quoi on commence?
Attends! Coucou!
J'y vais! Vas-y, toi
Qu'est-ce qu'on fait?
Je me suis trompé
On a fini?

Baker & Lund

Task information and
timer

Semi-Structured Interfaces

Scripted
discourse

Ihre Aufgabe:
Diskutieren Sie die drei Fälle vor dem Hintergrund der Attributionstheorie und erstellen Sie mindestens eine abschließende Analyse zu jedem Fall!

Schreiben Sie eine erste Analyse des Falls Asien!

Zeitvorgabe: 15 Minuten

Fall Asien

In einem Seminar erfahren Sie von einer Studie, in der festgestellt wurde, dass asiatische Kinder gegenüber amerikanischen und auch europäischen Kindern wesentlich bessere mathematische Leistungen erbringen. Interessanterweise zeigte sich auch, dass sich die asiatischen Kinder hinsichtlich ihrer Begabung kaum von den amerikanischen und europäischen Kindern unterscheiden. In der Studie hat man dann sowohl die Schüler, als auch deren Eltern befragt, wie sie sich Erfolg und Misserfolg in naturwissenschaftlichen Schulfächern erklären. Dabei hat sich gezeigt, dass die asiatischen Eltern und Kinder vor allem günstigere Attributionsmuster im Hinblick auf die Dimensionen der Stabilität haben. Wie lassen sich die Leistungsunterschiede aus der Perspektive der Attributionstheorie erklären?

Fall Asien

Neue Analyse des Falls Asien - ... Ahorn, 29.1.2001 - 15:33:45

Erste Analyse des Falls Asien - ... Ahorn, 29.1.2001 - 14:29:22

Konstruktive Kritik - ... Birke, 29.1.2001 - 14:45:32

Antwort auf Kritik - ... Ahorn, 29.1.2001 - 14:51:58

Konstruktive Kritik - ... Birke, 29.1.2001 - 15:16:33

Konstruktive Kritik - ... Pinie, 29.1.2001 - 14:37:07

Antwort auf Kritik - ... Ahorn, 29.1.2001 - 15:01:02

Konstruktive Kritik - ... Pinie, 29.1.2001 - 15:09:06

Fall Asien

In einem Seminar erfahren Sie von einer Studie, in der festgestellt wurde, dass asiatische Kinder gegenüber amerikanischen und auch europäischen Kindern wesentlich bessere mathematische Leistungen erbringen. Interessanterweise zeigte sich auch, dass sich die asiatischen Kinder hinsichtlich ihrer Begabung kaum von den amerikanischen und europäischen Kindern unterscheiden. In der Studie hat man dann sowohl die Schüler, als auch deren Eltern befragt, wie sie sich Erfolg und Misserfolg in naturwissenschaftlichen Schulfächern erklären. Dabei hat sich gezeigt, dass die asiatischen Eltern und Kinder vor allem günstigere Attributionsmuster im Hinblick auf die Dimensionen der Stabilität haben. Wie lassen sich die Leistungsunterschiede aus der Perspektive der Attributionstheorie erklären?

Fischer & Weinberger

Learning environment
orientation map

Case information

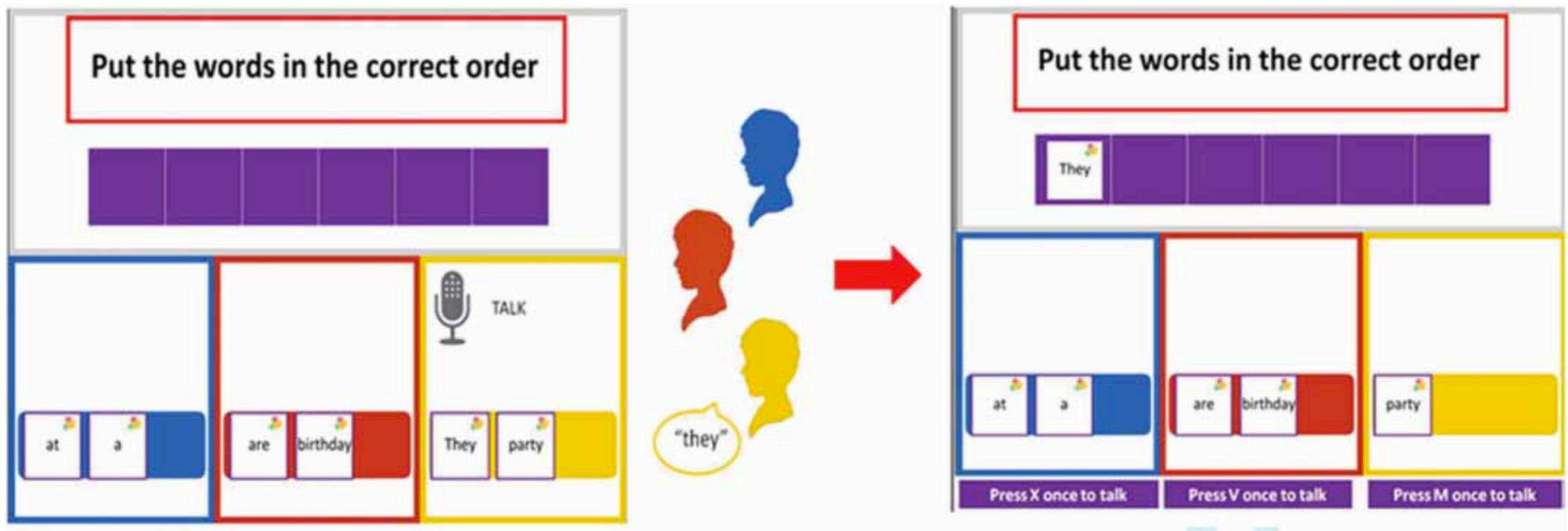
Multi Input Devices: the participation of each learner is “designed” because each mouse only access some screen functions



M. Nussbaum, UC Chile

Multi Input Devices:

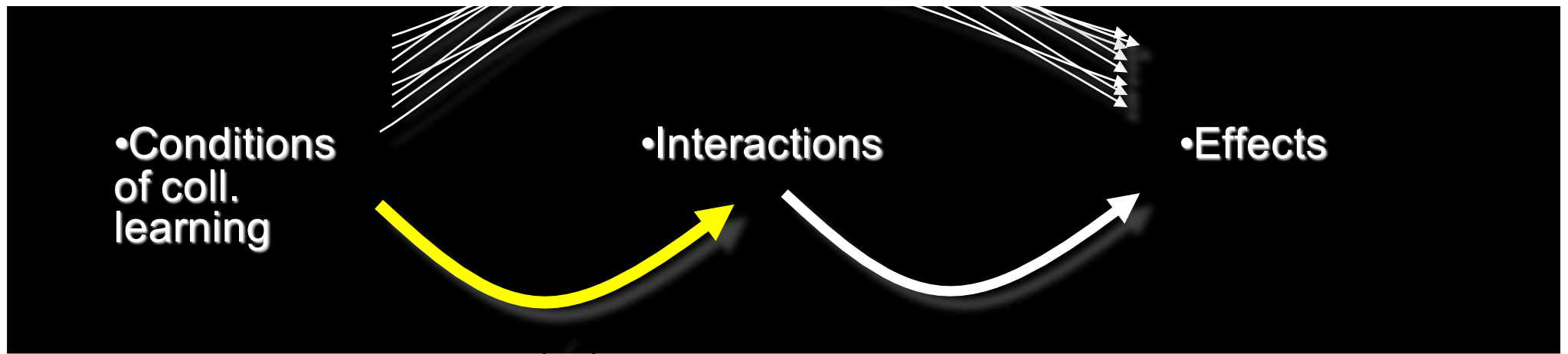
the participation of each learner is “designed” because each mouse only access some screen functions



“Computer-supported collaborative learning” (CSCL)

1990-2000: Technologies **enable** collaboration

2000-2010: Technologies **shape** collaboration (design)



(reactive) REGULATE

(proactive) STRUCTURE



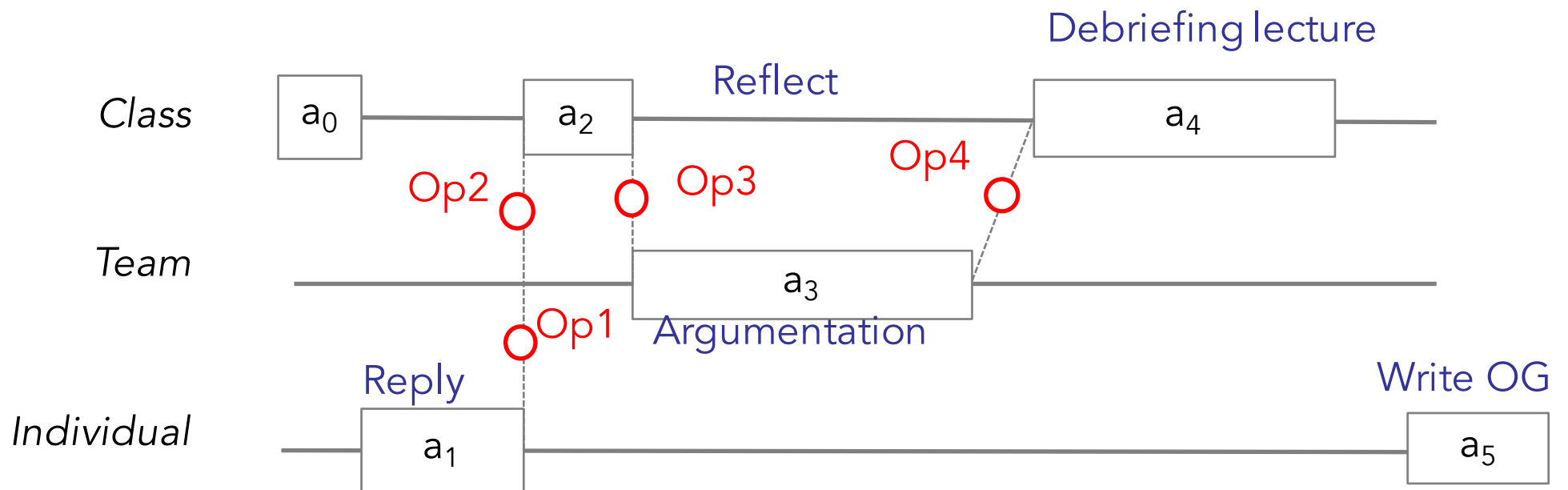
Semi-Structured Interfaces

Pedagogical scenario for increasing the probability that interactions X,Y,Z occur in teamwork.

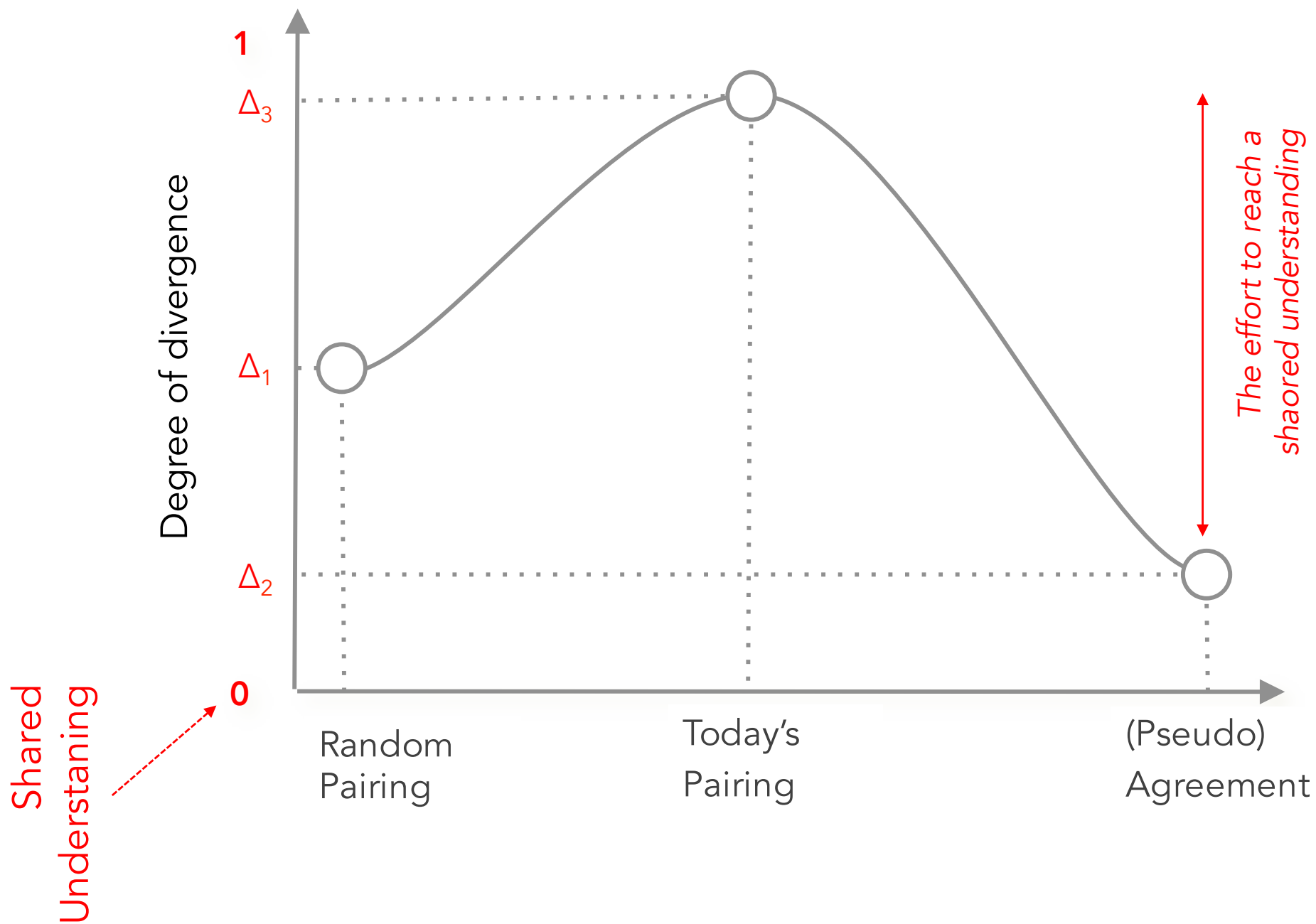
Today's lesson:

~~"Please discuss about the pros and cons of collaborative learning and the role of computers !"~~





Today's Orchestration Graph



Collaboration Script: Pedagogical scenario for increasing the probability that interactions X,Y,Z occur in teamwork.

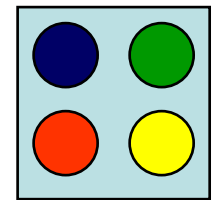
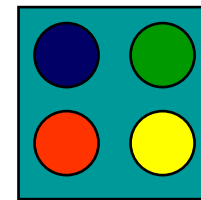
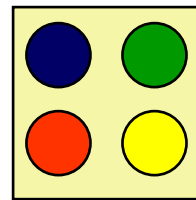
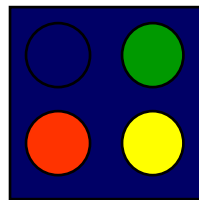
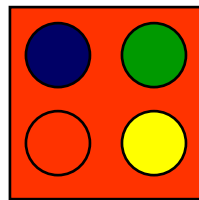
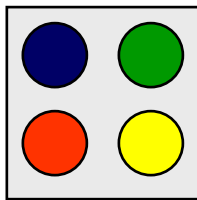


"Jigsaw"

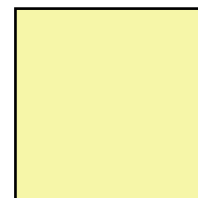
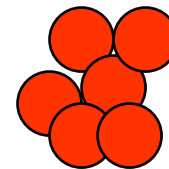
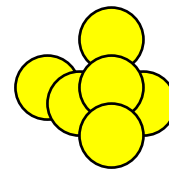
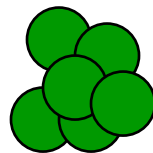
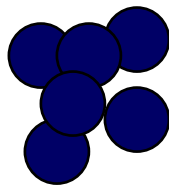
- Task: How to prevent a large earthquake ?
- Roles:
 - Maire of San Francisco 
 - Insurance agent 
 - Security officer 
 - Geologist 
- Context: Previous experiments in Denver

In the Jigsaw script, every team member receives a subset of the information necessary to solve the task. This task cannot be solved without the contribution of each individual.

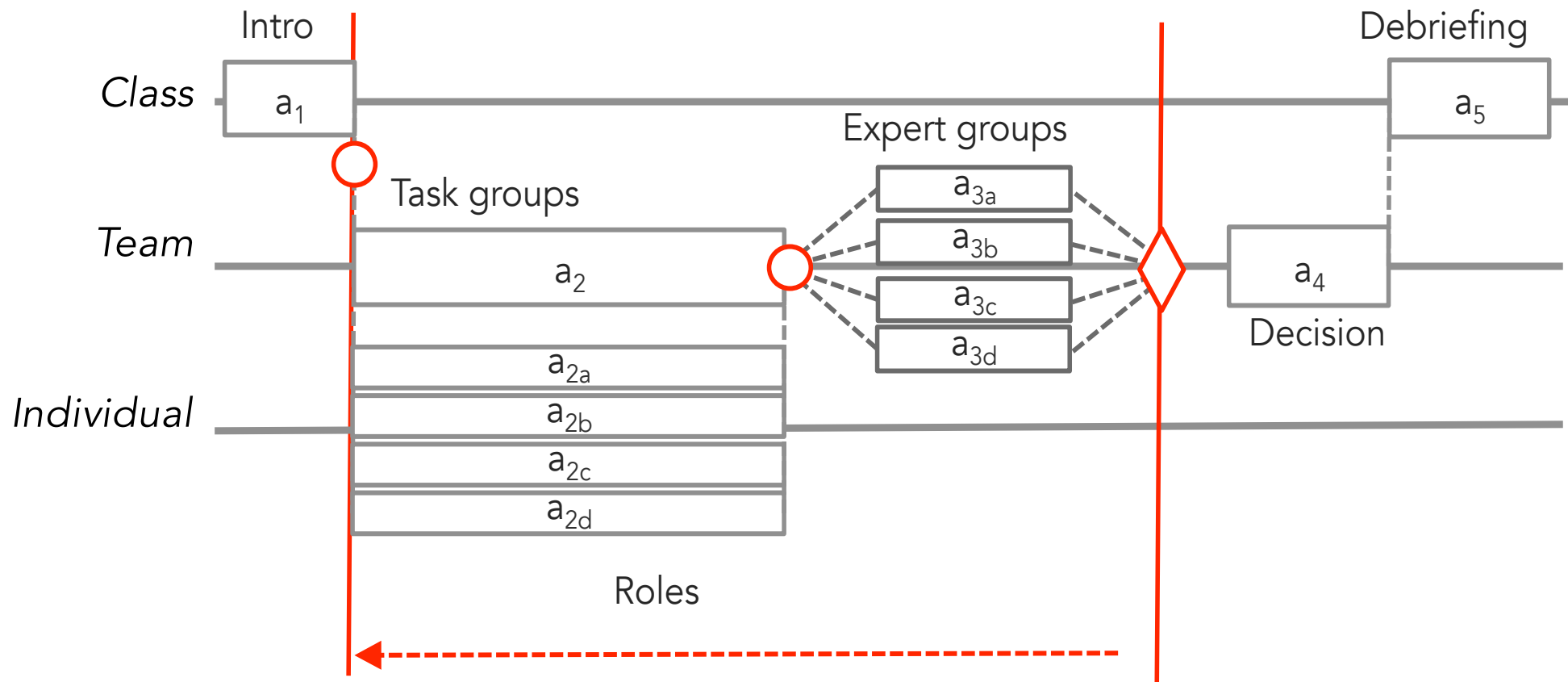
Phase “Groups”



Phase “Experts”



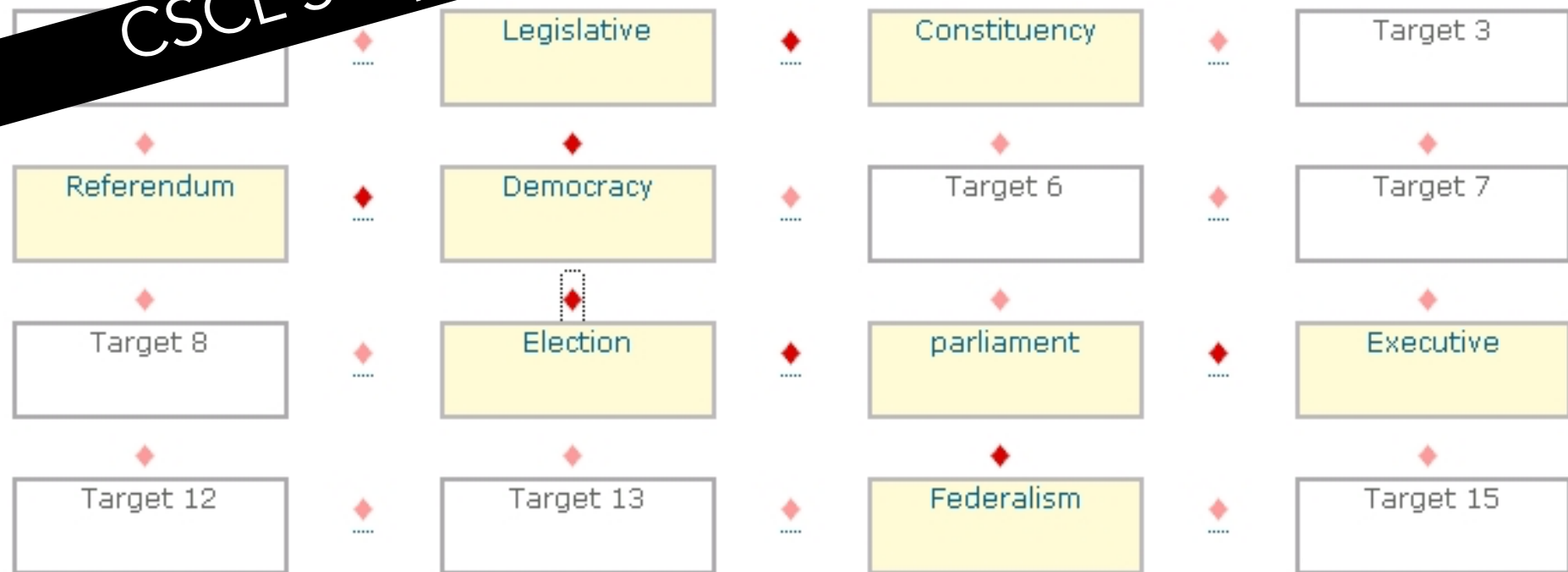
CSSL Script 2



Grid

Place the concepts below on the link between two concepts to define their similitude or difference with the help of the members. You might change the concepts place to define other relations.

CSCL Script 3



"Democracy" vs "Election"

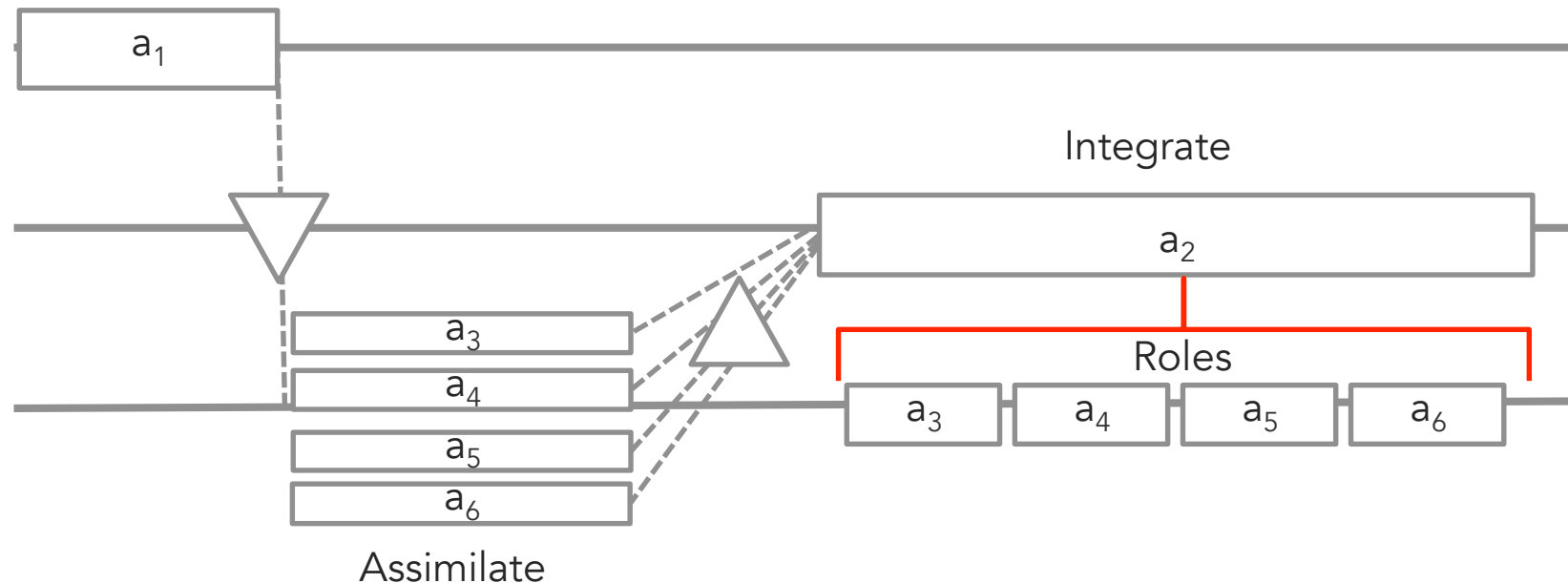
Relationship: Similar

Comments: Democracy is a form of government in which it is recognized that ultimate authority belongs to the people, who have the right to participate in the decision-making process called elections, to appoint and dismiss their rulers.

Save

Reset

CACL Script 3

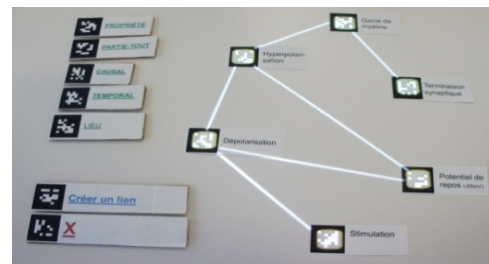


This script concerns declarative knowledge; namely, domains where students have to acquire a certain number of concepts and relate them to each other. Each team has to build a concept grid—a sort of concept map. Each team is composed of several roles (the number of roles can be determined by the teacher) and each role necessitates reading several papers (the number of papers can be determined by the teacher) that correspond to the selected role. Typically, a student will play the role “Piaget” by reading papers from Piaget. Each student selects a role that has not yet been selected by another team member, and the system simply distributes readings assigned to each role. Then, when each student has learned about a subset of concepts, the team has to build a grid in such a way that students can define (text entry) the relationship between two grid neighbor concepts. The way in which concepts are distributed among team members will determine who explains which concepts to whom in the grid construction activity.

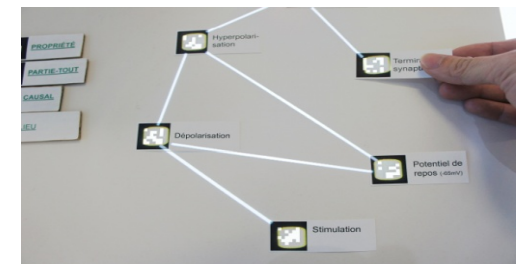
DockLamp



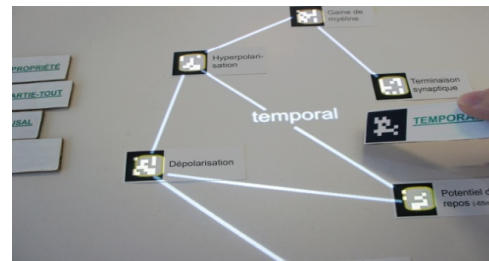
Son Do Lenh



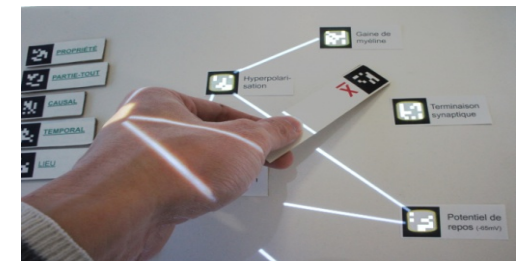
A concept map



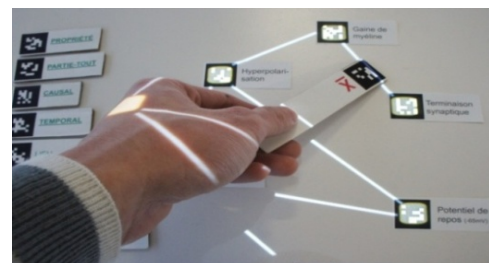
Holding a concept



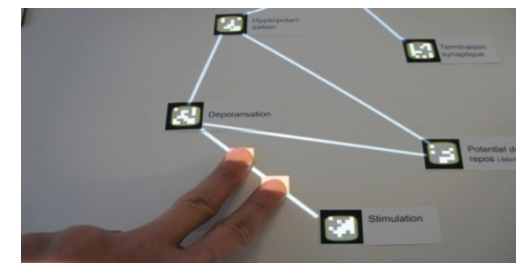
Creating a link



Deleting a link



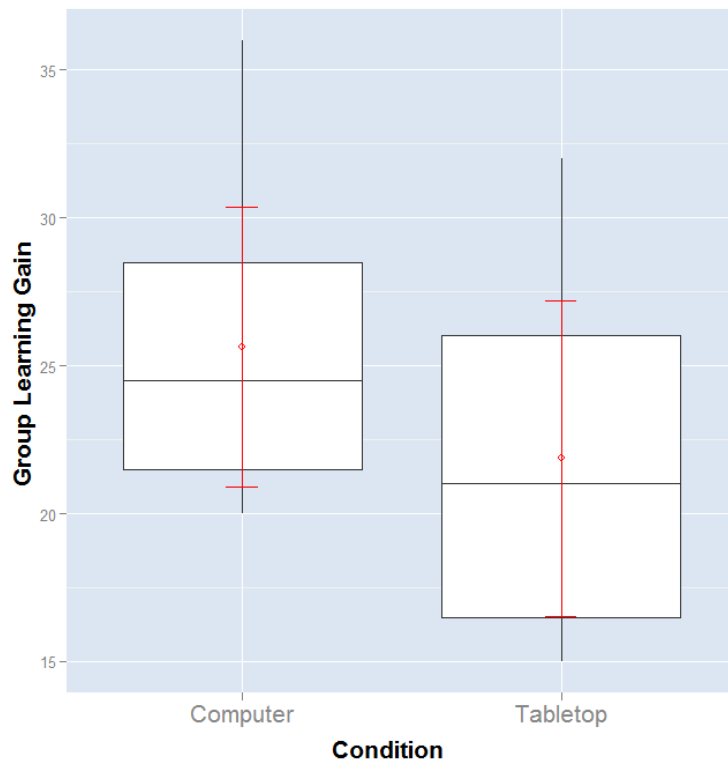
Deleting using paper



Deleting using fingers

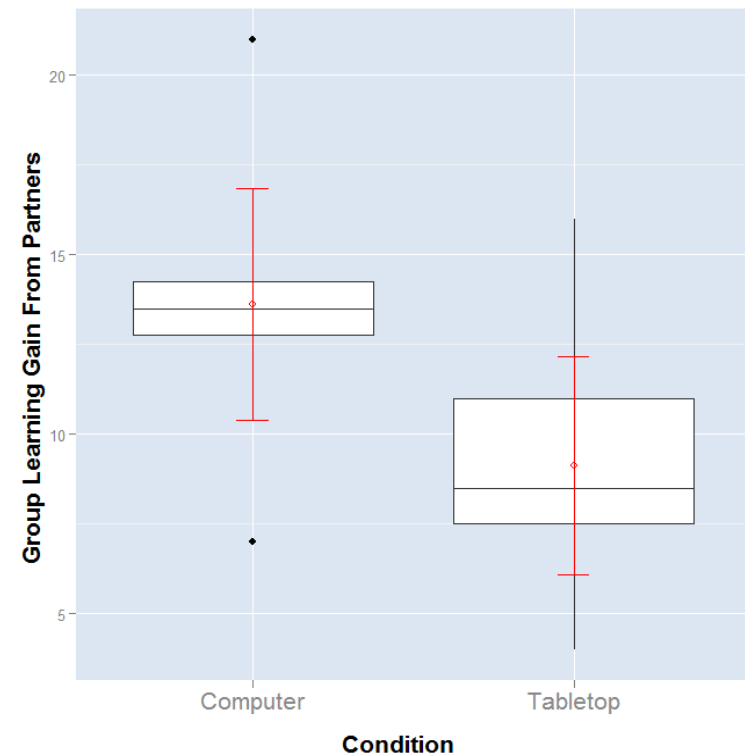
Post-test: The cool interface led to lower learning outcomes because there was no need for negotiation

No effect in **Learning Gain**

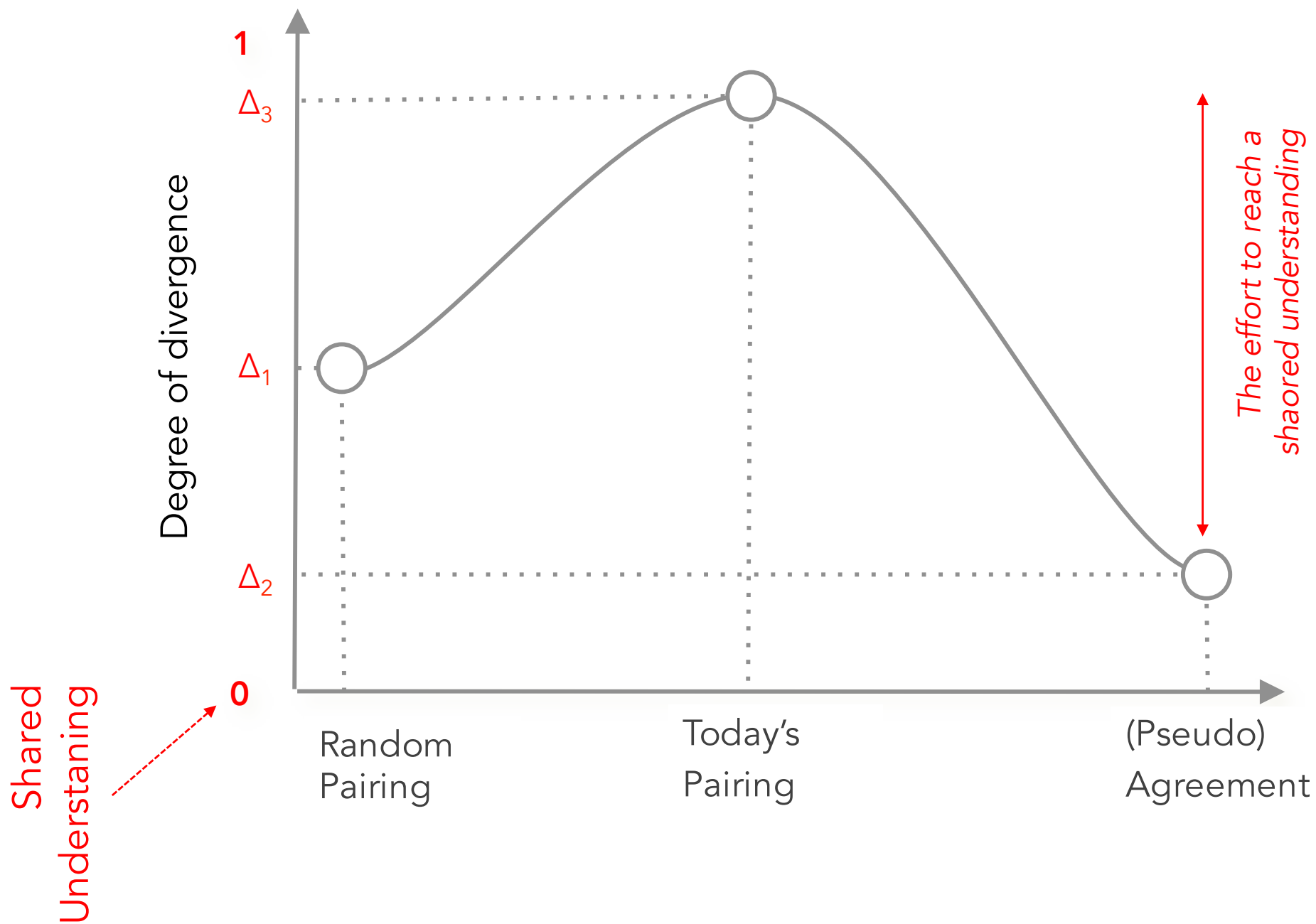


- $m_{\text{COM}} = 25.63$, $m_{\text{TAN}} = 21.88$,
- $t(14) = 1.24, p > .05$, two-tailed

More Learning From Partners
for **Computer**



- $m_{\text{COM}} = 13.63$, $m_{\text{TAN}} = 9.13$,
- $t(14) = 2.40, p < .05$, two-tailed



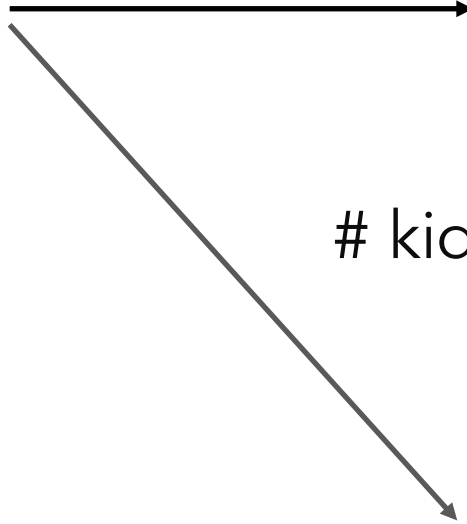
Mastery
learning

Individualisation

kids > # computers

Socio-Cultural
Theories

CSCL



Socio-Cultural Theories



Collaboration



Lev Vygotski
(1896-1934)

"Every function in the child's cultural development appears twice: first, on the social level, and later, on the individual level; first, between people (interpsychological) and then inside the child (intrapsychological). This applies equally to voluntary attention, to logical memory, and to the formation of concepts. All the higher functions originate as actual relationships between individuals.»



No

10:30

Is this North-East?

What time is it ?

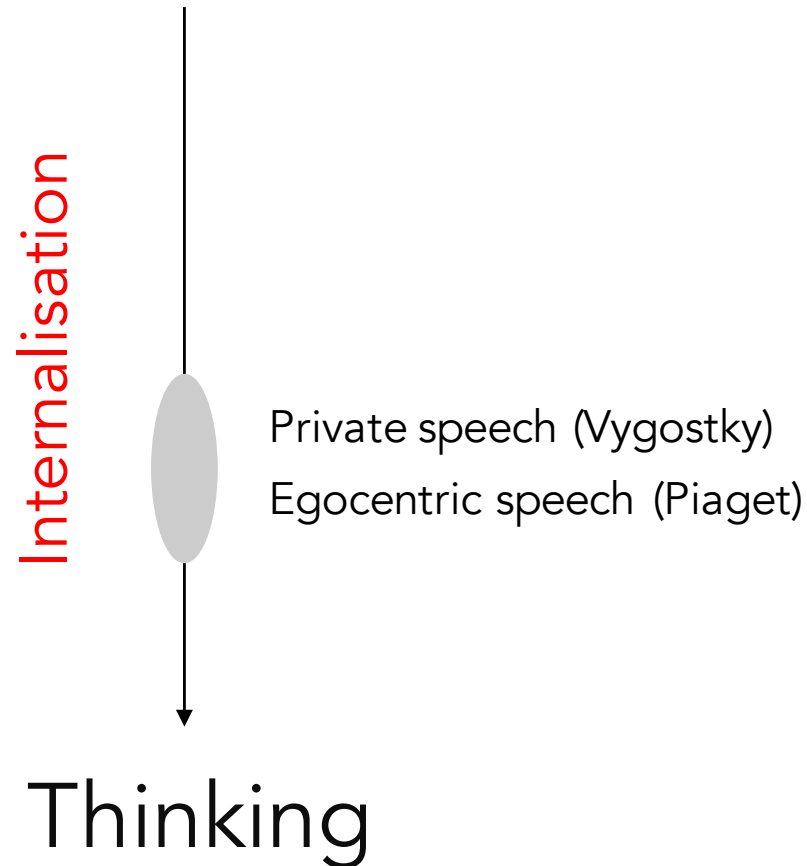
Not that way

Internalisation

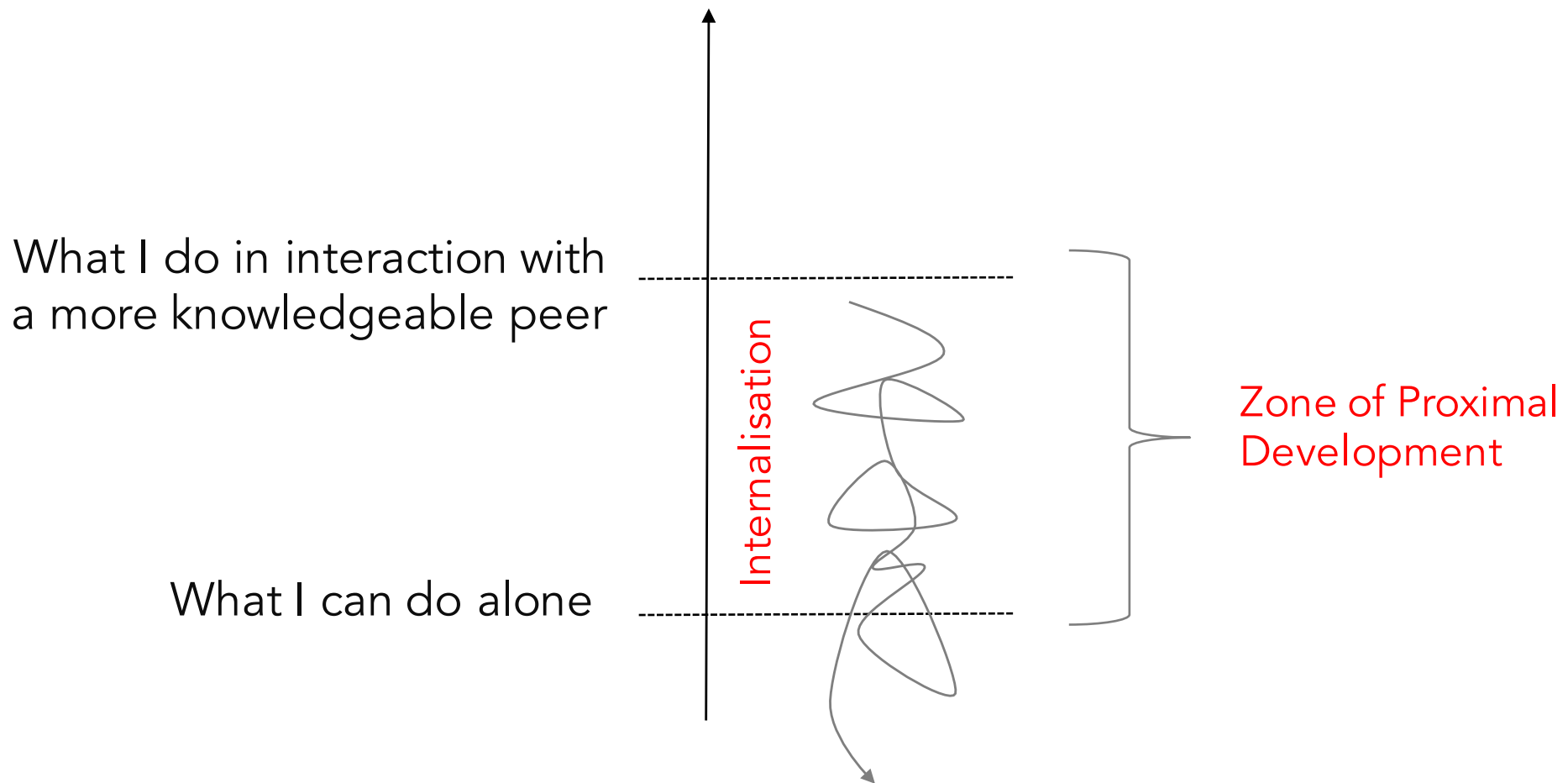


Side ? Time ? ok

Social Interaction



We internalise social interaction because
thinking is a dialogue with oneself .



The zone of proximal development (ZPD) has been defined as "the distance between the actual developmental level as determined by independent problem solving and the level of potential development as determined through problem solving under adult guidance, or in collaboration with more capable peers" (Vygotsky, 1978, p. 86).

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- Multiple Sclerosis**
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- 1-877-MS-INFO-5
- Treatment Options
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- FAQ's About MS
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- Community Support
- **Health News**

MULTIPLE SCLEROSIS

Multiple Sclerosis News

Select article from list below.

Page 1 of 6. 1 · 2 · 3 · 4 · 5 · 6

Emotional response to music can reduce pain, suggests Montreal study	Jan. 13, 2005
BioMS Medical receives approval for key multiple sclerosis trial in Britain	Dec. 10, 2004

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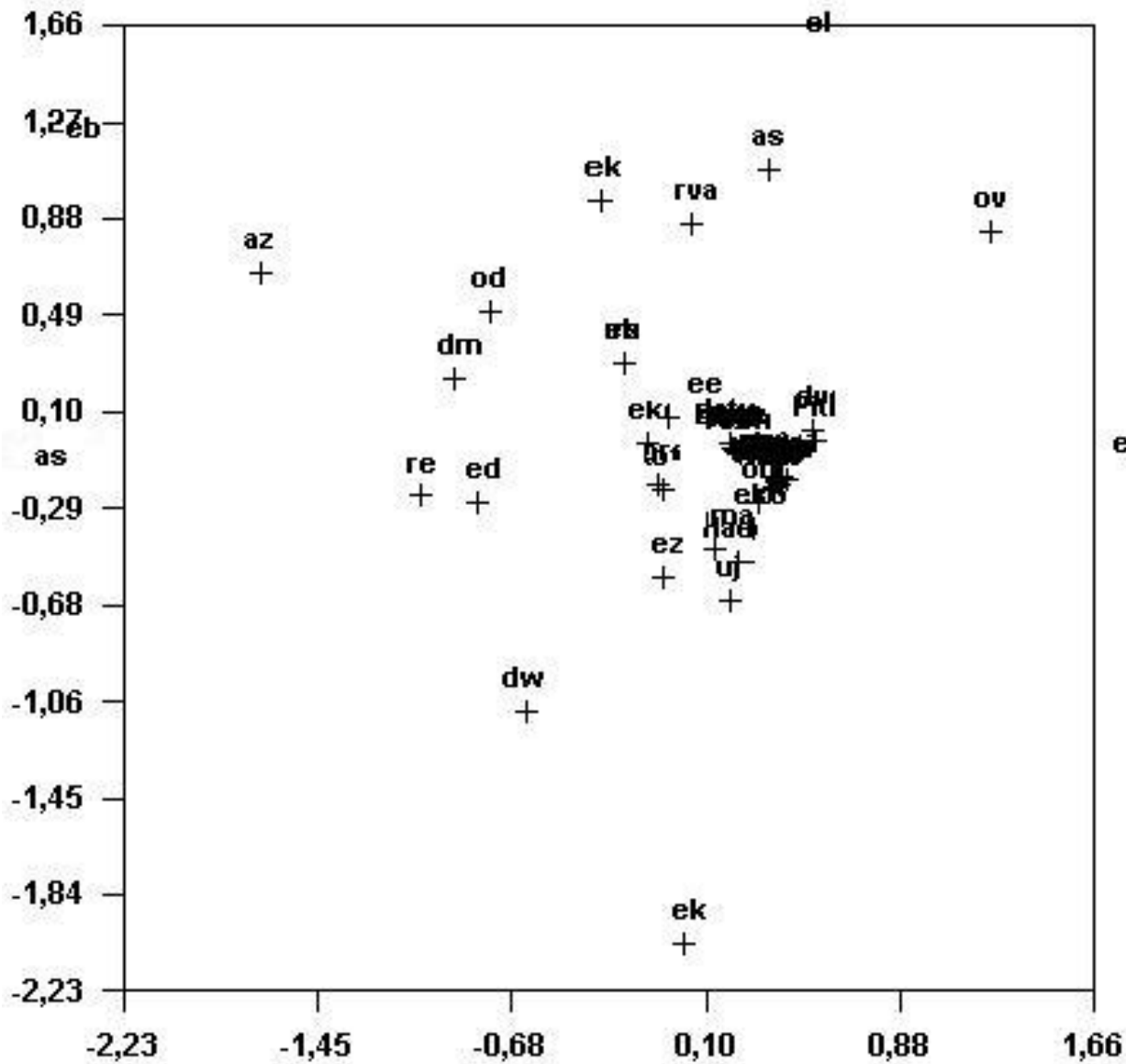
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FDA approves new drug to treat multiple sclerosis	Nov. 24, 2004
Popular MS drug may lack evidence	Nov. 22, 2004
Jury begins deliberations in three-week assisted suicide trial	Nov. 3, 2004
Medical users spurning new batch of 'stronger' Health Canada marijuana	Jul. 12, 2004
U.S. Medicare lottery favours some, others must wait until 2006	Jun. 25, 2004
Bayer bids to market marijuana-based multiple sclerosis treatment in Canada	May. 11, 2004
Alberta Tories, families, question adequacy of \$855 monthly disabled income	May. 9, 2004
Researchers set out to identify triggers for multiple sclerosis	May. 5, 2004
Nearly a third of legal marijuana users reject government pot	Apr. 29, 2004
Sick Kids researchers show strong association between MS,	Apr. 20, 2004

Online Learning Communities



The social structure of a knowledge community is not flat

(Dutch policemen in charge of drugs)

Social Network Analysis

Online Learning Communities



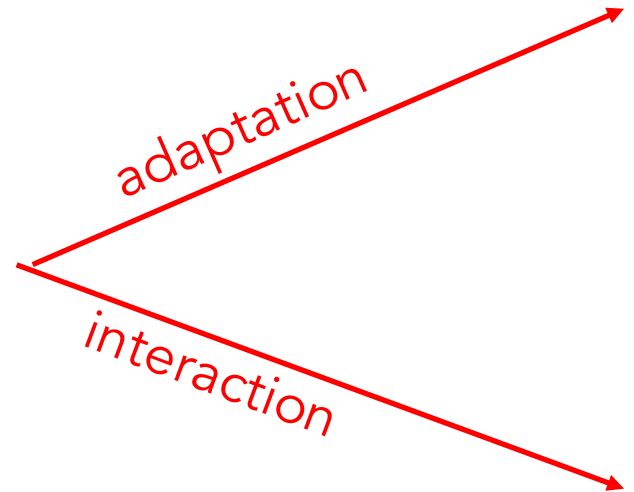
Learning a culture by participation

Mastery learning



Individualisation

MOOCs



Adapating speed;
selecting exercices,....

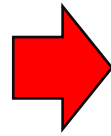
Socio-Cultural
Theories



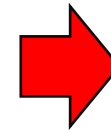
Collaboration

Forums, concept
maps,...

Learning
Theory



Pedagogical
Model



Learning
Technology

Skinner
Behaviorism

Mastery
Learning

eLearning
Intelligent tutoring systems

Piaget
Constructivism

Guided Discovery
Learning

Simulations, microworlds
modeling, problem solving

Vygotsky
Socio-cultural theory

Collaborative
Learning

CSCL

Class

Team

Individual

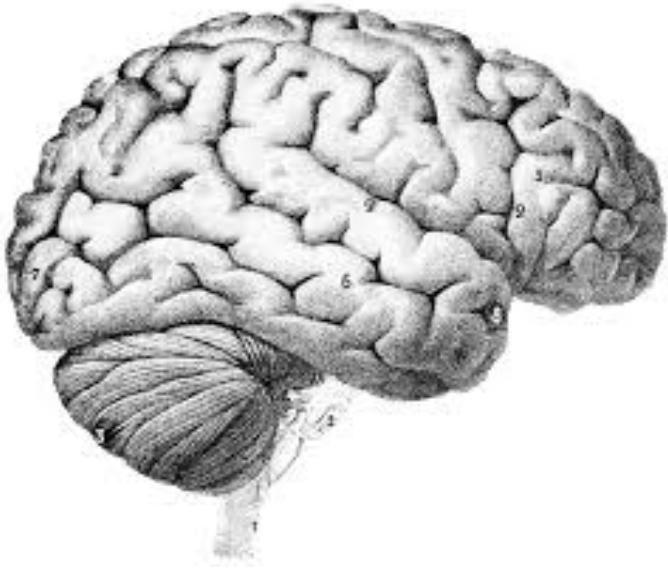
Beware

A plane describes the social structure of activities

it does not describe the cognitive processes:

- Π_3 : individual brains are active during class-wide lectures
- Π_1 : individual reasoning is shaped by (social) language.

Chapter 7: Social Cognition



The hardware is individual
But the software is social

Summary of chapter 7

1. Collaborative learning is often effective, but not systematically.
2. It is effective when rich interactions occur such as explanation, argumentation, mutual regulation
3. To make it more effective, the technology or the script increases the necessity for students to produce these interactions
4. The theory behind emphasizes that cognition is inherently social because thinking mostly relies on language.