

Modelling Classroom Orchestration (practical, conceptual, computational)



P. Dillenbourg, EPFL

Username Password Remember me Forgot Password? LOGIN	 Username Password Remember me Forgot Password? 	Username Password Remember me Forgot Password? LOGIN				
Password Remember me Forgot Password? LOGIN	Password Remember me Forgot Password?	Password Remember me LOGIN	1	Username		
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					LOGIN	



EPFL CAMPUS



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orchestration: 3rd usability circle

P. Dillenbourg, EPFL, CHILI Lab





Concept Map: paper concepts, augmented links



2 X 8 teams

No effect in Learning Gain

More Learning From Partners

for **Computer**







Collaboration is defined as the process of constructing a shared understanding of the task at hand.

Collaborative learning results from the effort towards a shared understanding of the task at hand.







Vocational education : Dual system : Logistics assistants (warehouse)





The TinkerLamp

Guillaume Zufferey, Patrick Jermann







Bertrand Schneider. Aurelien Lucchi





No sign. effect in understanding





No sign. effect in problem-solving





"Manipulation temptation"!









Son DoLenh, Patrick Jermann

Post-test



Measures	Warehouse s	tudy's conditions	Evaluation of TinkerLamp 2.0 conditions		
	Paper/pen	TinkerLamp 1.0	TinkerLamp 2.0 WithTinkerBoard	TinkerLamp 2.0 NoTinkerBoard	
Understanding score	7.84(2.85)	7.43(2.82)	9.38(2.03)	10.31(1.70)	
Problem-solving score	5.16(1.70)	5.15(1.78)	6.44(1.65)	6.59(1.53)	









		Orchestration Graphs
class	5	
Team	L	
Indívídua	L a ₁ Questionr	aire
	Question 1	
	Question:	In large city marathons, should drug testing be applied to participants that finish two hours after the winner?
	Answer:	 Yes, because cheating should always be punished Yes, because any runner taking drugs damages her health No, because they run for themselves, not for rankings No, because people have also the right to smoke and to drink alcohol
	Enter you arguments:	I believe in individual freedom



Orchestration Graphs















Orchestration Graph

Analytics







Eye tracking experiment on MOOC Video

Following teacher's references

Gaze of students' watching Scala course by Prof. Martin Odersky (EPFL, Switzerland)



K. Sharma, P. Jermann, P. Dillenbourg @ CHILI – <u>http://chili.epfl.ch</u> Supported by the Swiss National Science Foundation (Grants CR1211_132996 and PZ00P2_126611)

Dual Eye Tracking



DUET - Dual Eye-Tracking Pair programming experiment

Low gaze recurrence



P. Jermann, M.-A. Nüssli & P. Dillenbourg © CRAFT – <u>http://craft.epfl.ch/</u>

Supported by the Swiss National Science Foundation (grants #K-12K1-117909 and #PZ00P_126611)

DUET - Dual Eye-Tracking Pair programming experiment

High gaze recurrence



P. Jermann, M.-A. Nüssli & P. Dillenbourg © CRAFT – <u>http://craft.epfl.ch/</u>

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« withmeness »



Time [msec] to visit the referred sites, first time

First Fixation Duration [msec] the referred site

Kshitij Sharma, Patrick Jermann, Pierre Dillenbourg





"...they look like a bunch of little grains arranged together...typically a group of very small elements"

Sarah d'Angelo, Kshitij Sharma, Darren Gergle, Pierre Dillenbourg (2016)

Do finger-based or gaze-based deictics enhance learning ?



Sarah d'Angelo, Kshitij Sharma, Darren Gergle, Pierre Dillenbourg (2016)

Orchestration load







Computational Modelling of Education

Lesson plan

Modeling in the wild ?

Kt



	Kernel	Features	Score	Cohen's kappa
	RBF(c=1.31, g=0.0211)	Distance, Head travel norm., Num. still periods	61.86%	0.30
	BF(c=1.21, g=0.11)	Period, Row, Head travel norm., Mean duration still	61.72%	0.32
R.	F(c=1.11, g=0.061)	Head travel norm., Mean duration still	60.42%	0.28
Dt	$\beta F(c=1.4, g=0.04)$	Period, Distance, Row, Mean duration still	59.23%	0.30

Raca, Tormey & Dillenbourg

Spatial Entropy of Gazes





Extreme Value Theory

Intra-pair difference of gaze spatial entropy



Means

5% highest values for episodes of 10 seconds



Computational Models

Education Research

Pierre Dillenbourg, EPFL



Classroom Orchestration: The 3rd circle of usability





Ayberk Ozgur, W. Johal, S. Lemaignan, P. Dillenbourg, F. Mondada



Ayberk Ozgur, W. Johal, S. Lemaignan, P. Dillenbourg, F. Mondada



Swarm Cellulo (Ayberk Ozgur, Wafa Johal)





EPFL Digital Education Ecosystem