



Computer based Interaction Analysis supporting Self-regulation:

Achievements of an emerging research field

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Field Purpose and emergence's reasons

The field's sources

The field's Main Concepts

IA tool generic process

IA indicator as a central concept of the field

Research dimensions and research questions



IA ⇒ Emergence's reasons

The need to support 'participants' in a metacognitive level:

➤ *In Learning environments (for standalone and social use)*

- ◆ Working in computer based LE is an activity more complex than in paper-pencil: it is difficult to be aware on «what we have done »
- ◆ Working in CSCL systems is an activity much more complex than working individually
- ◆ Students cannot create an 'image' of their own activity, or this of other students/collaborators (as individuals, group or community).
- ◆ For teachers, it is very-very hard to manage activities in collaborative environments or in stand-alone systems, due to the very complexe interactions that occur.

➤ *In working groups and scientific communities*

- ◆ Need for support of Awareness of actions and interactions, of different actors and groups with different roles and needs.

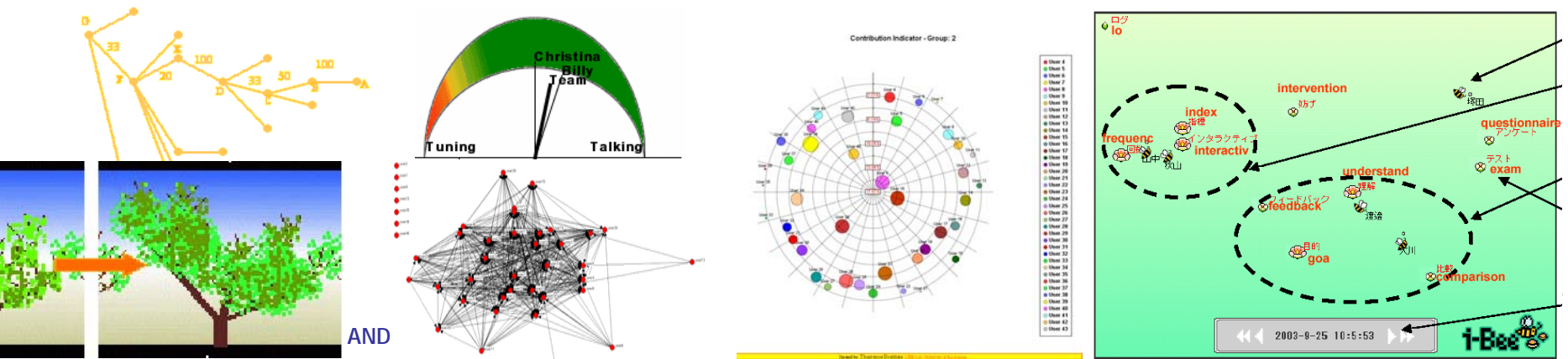


Interaction Analysis \Rightarrow Purpose

The core purpose of **computer based Interaction Analysis (IA)** is to assist technology based activities' participants (with different profiles & roles), working on standalone or social environments, **providing a cognitive or metacognitive support.**

The support is provided via Interaction Analysis [IA] tools that

- offer **directly information on interactions and activity products** (e.g. via visualised IA indicators) to the participants, so as
- to **be aware and regulate** their behaviour (either as individuals or groups)



AND



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For instance, Interaction Analysis Tools could support:

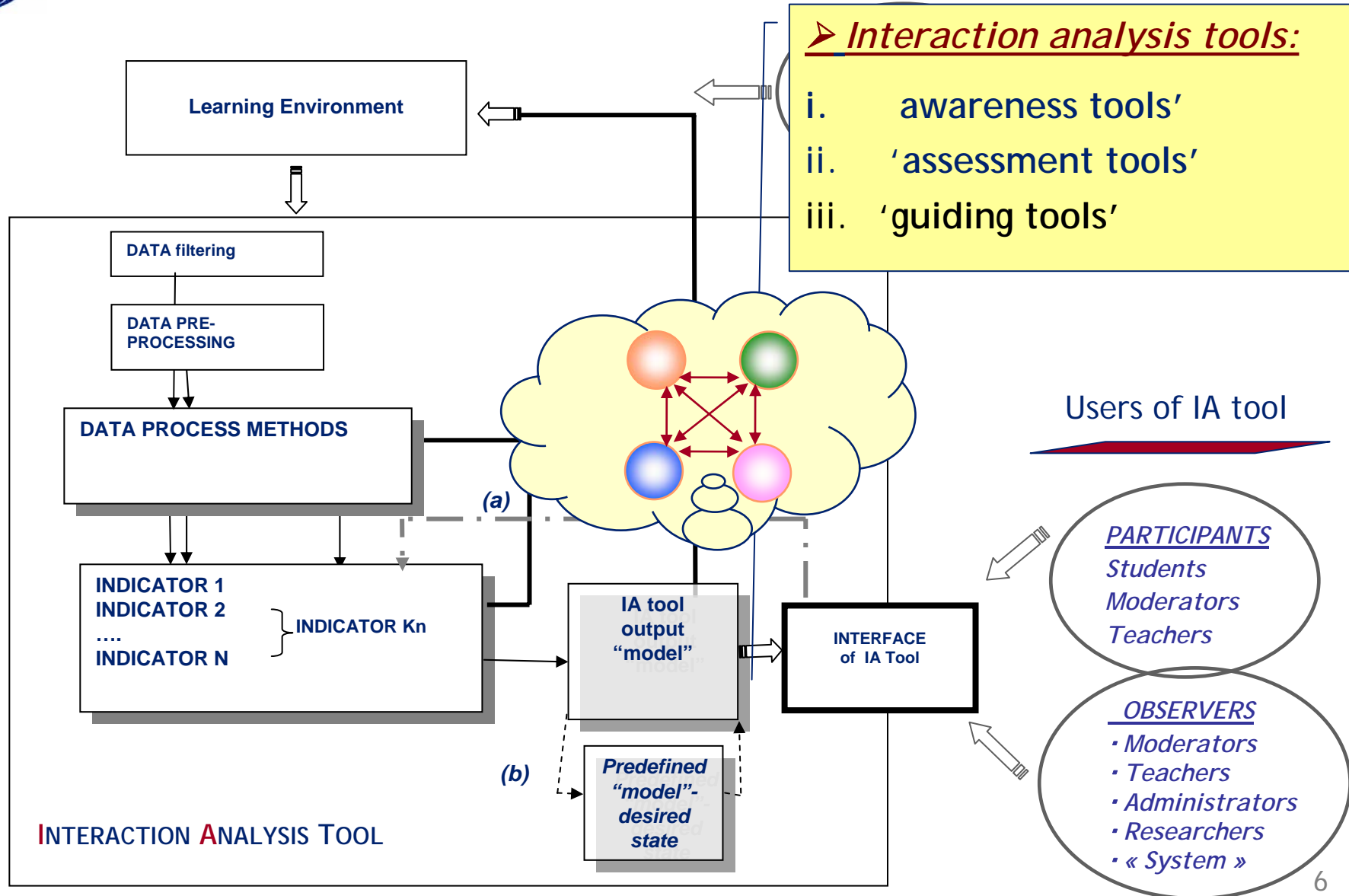
- students, groups: **awareness, self-assessment, metacognition** \Rightarrow **selfregulation** of their own activity
- teacher(s): **diagnosis, assessment** \Rightarrow **teachers' strategies adaptation**



IA tool \Rightarrow Generic Process

Interaction analysis tools:

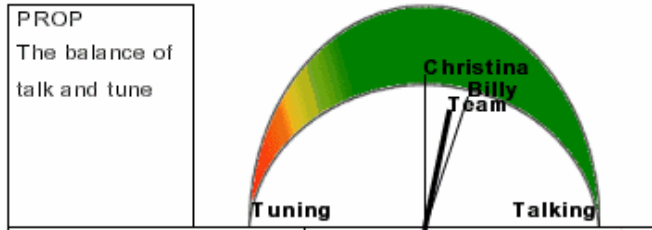
- i. awareness tools'
- ii. 'assessment tools'
- iii. 'guiding tools'





IA ⇒ IA 'tools' examples

- Addressed to students: Metacognitive- Assesment
[collaboration mode & coll. quality assessment]



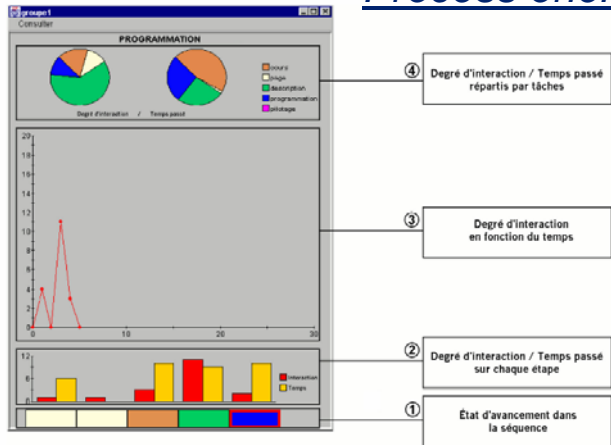
Jermann, 2001

- Addressed to teachers

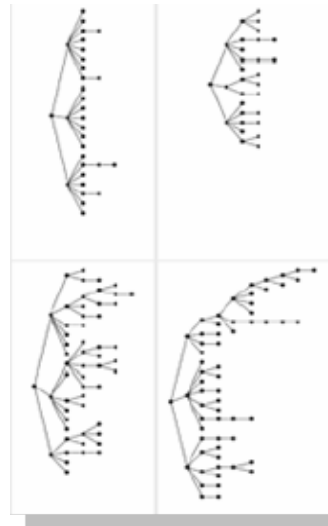
Barros, 2000

Global Analysis for experience ENTORNO2					
ATTRIBUTE	VALUES			INFERED FROM	
Argumentation	strong	low	variable	high	DepthTree Interactivity Initiative Work
Collaboration	variable	normal	good	veryGood	Argumentation Cooperation Coordination
Conformity	low	intermediate	high		
Cooperation	mid	low	intermediate	good	Argumentation Creativity Creativity
CoordinationMessages	little	enough	much		
Coordination	low	variable	good	high	Argumentation CoordinationMessages Initiative
Creativity	low	intermediate	high		
DepthTree	low	average	high		
Elaboration	low	variable	high		
Initiative	low	intermediate	high		
Interactivity	low	middle	much		
MContributionsNumber	little	appropriate	much		
MContributionsSize	short	average	long	VeryLong	
Work	little	variable	high		MContributionsNumber MContributionsSize Elaboration

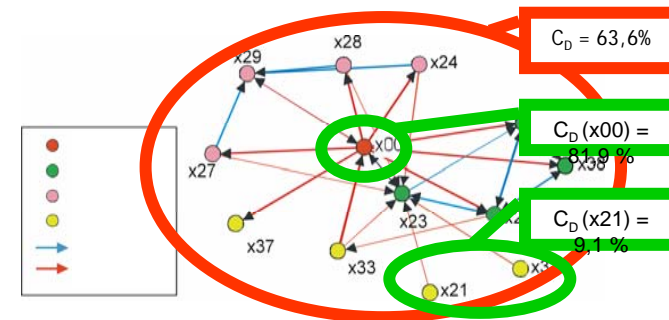
Process oriented Awareness



Despres, 2000



Collaboration mode



Gerrosa, 2005

Martinez, 2004
Hlapanis, 2005

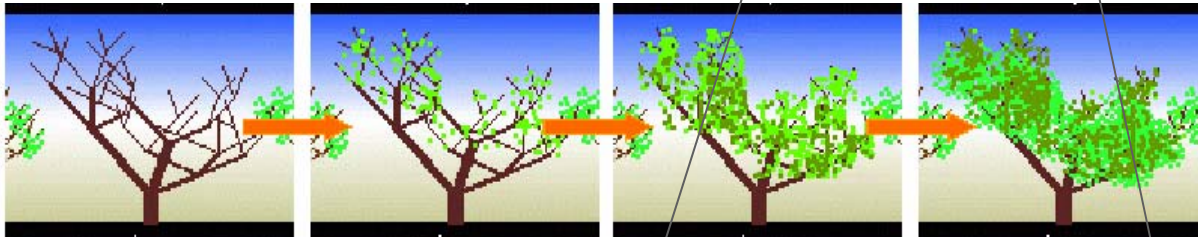


IA Indicator \Rightarrow A central Concept

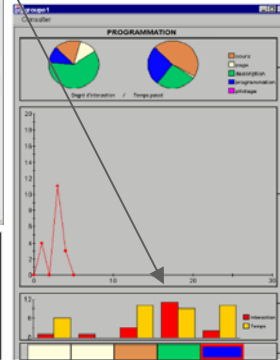
Interaction Analysis indicators constitute variables that describe 'something' related to:

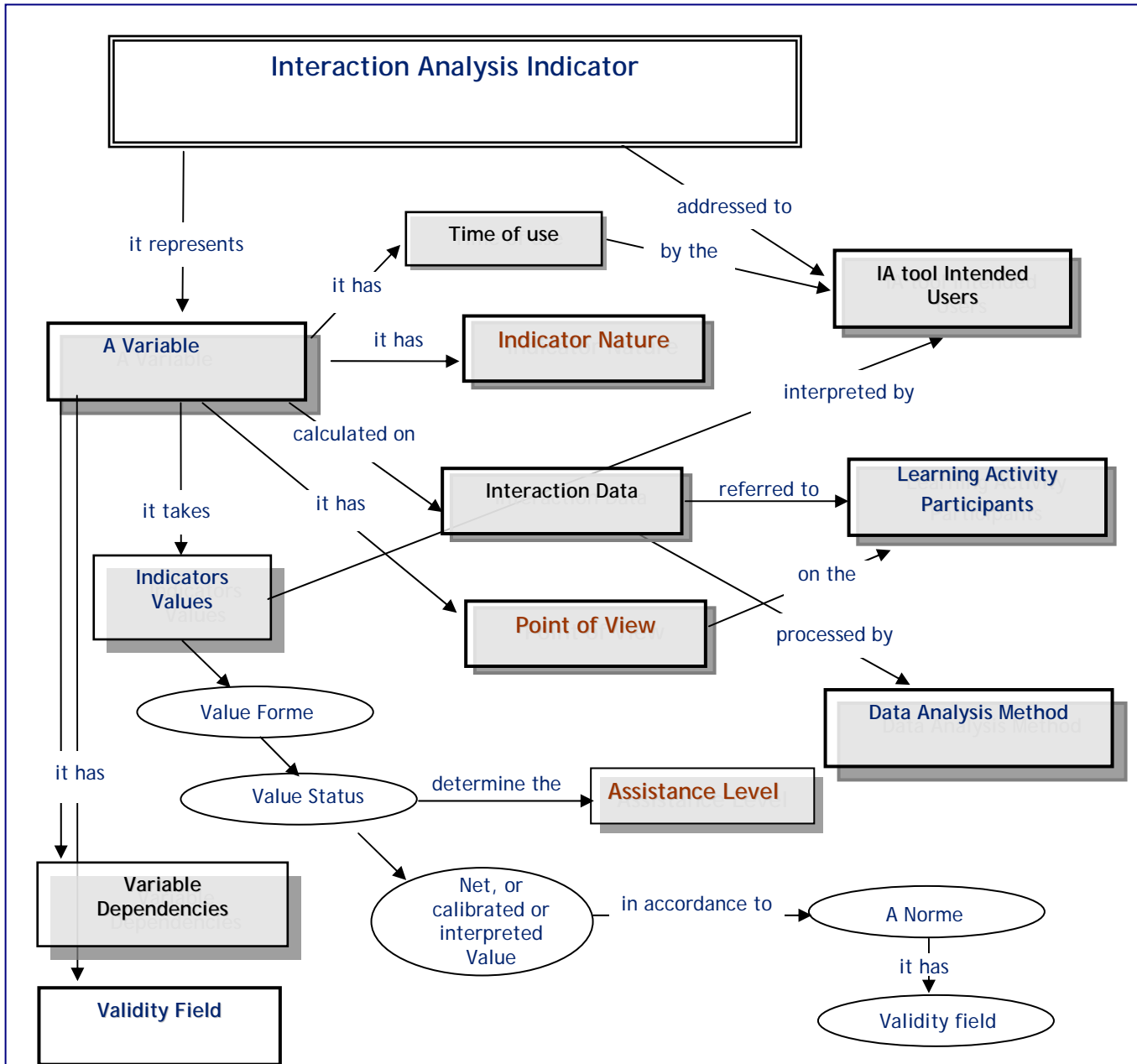
- the mode, the process of the activity of the considered 'cognitive system' (individual, group, community)
- the features or the quality of the interaction product,
- the mode or the quality of the collaboration, (when acting in the frame of a social context formed via the technology based learning environment).

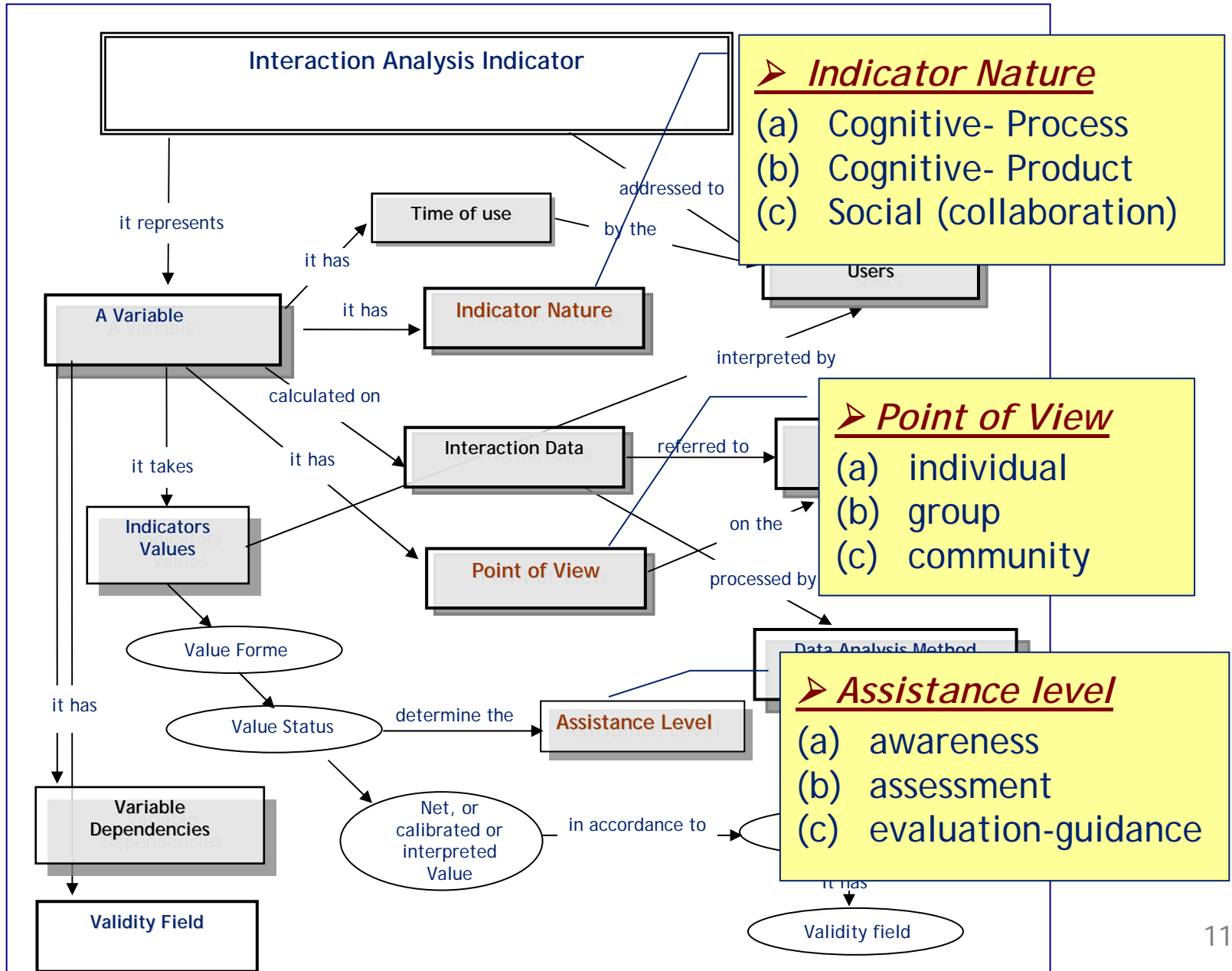
These variables have to be interpreted, taking into account, the learning activity, the profile of the participants, the context of interaction, etc.



ATTRIBUTE	VALUES	DIVERSED FROM
Argumentation	low, variable, high	Digital University Subjects Work
Collaboration	low, medium, high	Argumentation Collaborative Creativity
Confidence	low, intermediate, high	Argumentation Creativity Creativity
Cooperation	low, intermediate, high	Argumentation Creativity Creativity
Coordination/Management	low, medium, high	Argumentation Creativity Creativity
Contribution	low, variable, high	Argumentation Creativity Creativity
Creativity	low, intermediate, high	Argumentation Creativity Creativity
Depth/Time	low, average, high	Argumentation Creativity Creativity
Elaboration	low, variable, high	Argumentation Creativity Creativity









IA ⇒ Indicators attributes

Level of assistance?

Awareness

Assessment-Judgment

Evaluation

What ? (nature)

Processes // Mode

Product [content]

Social [collaboration]

Whom ? (point of view)

Individual user

The individuals of group

The group

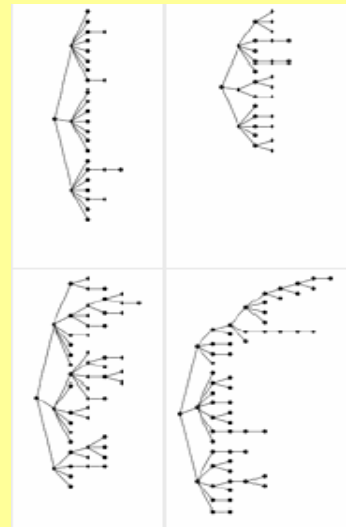
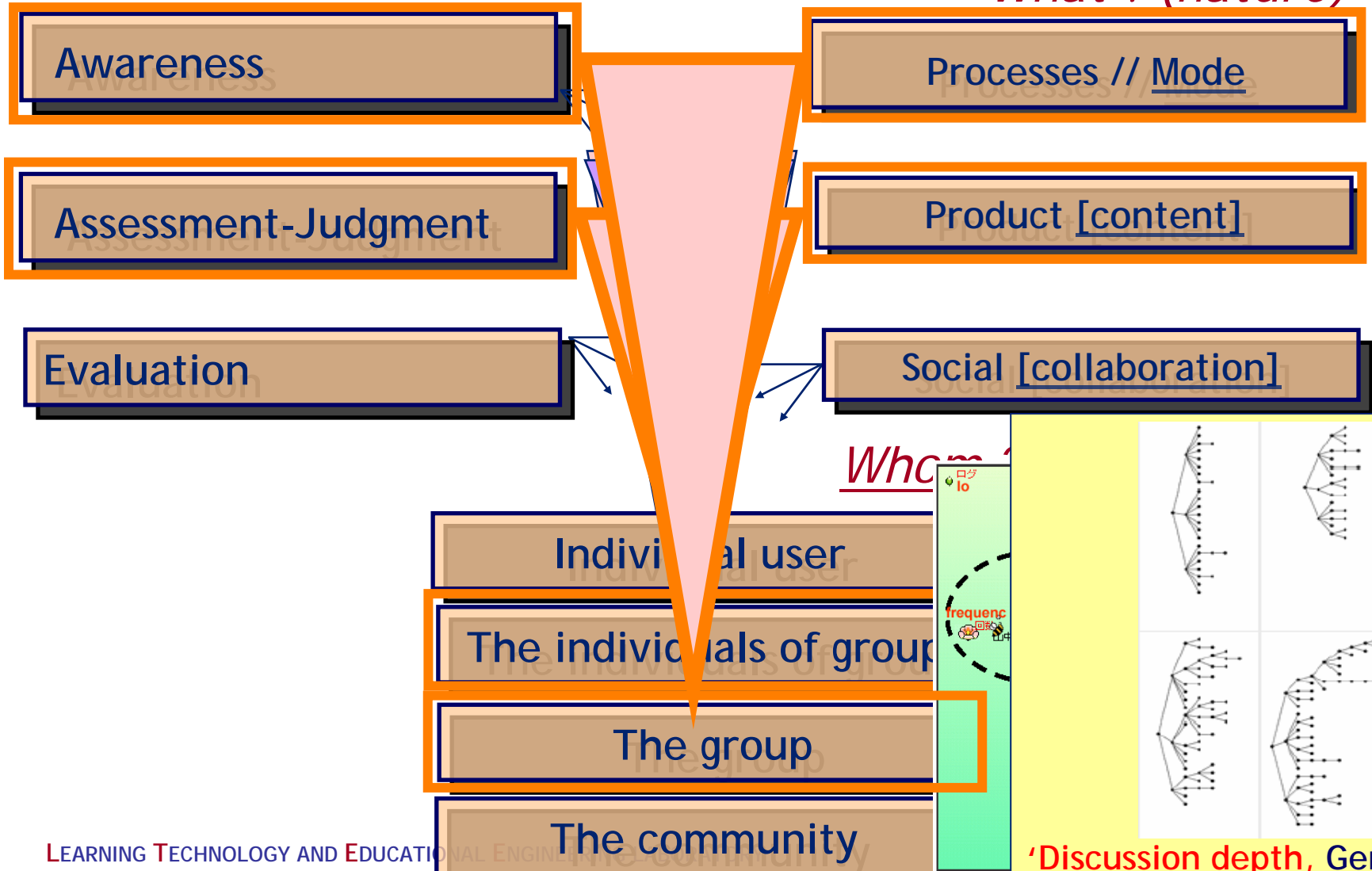
The community



IA ⇒ Indicators attributes

Level of assistance?

What ? (nature)



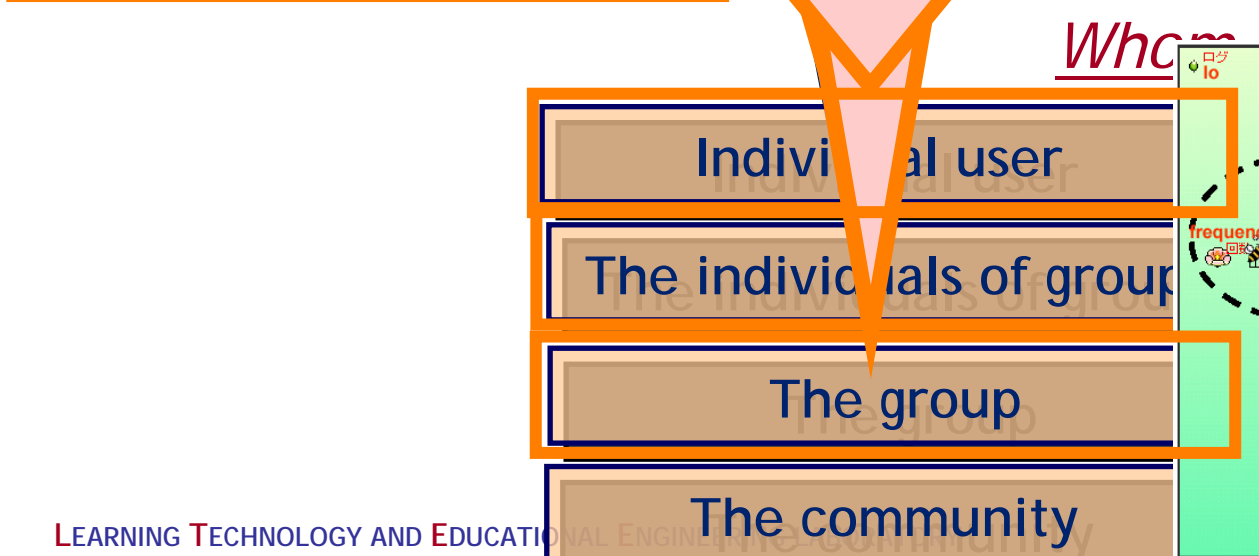
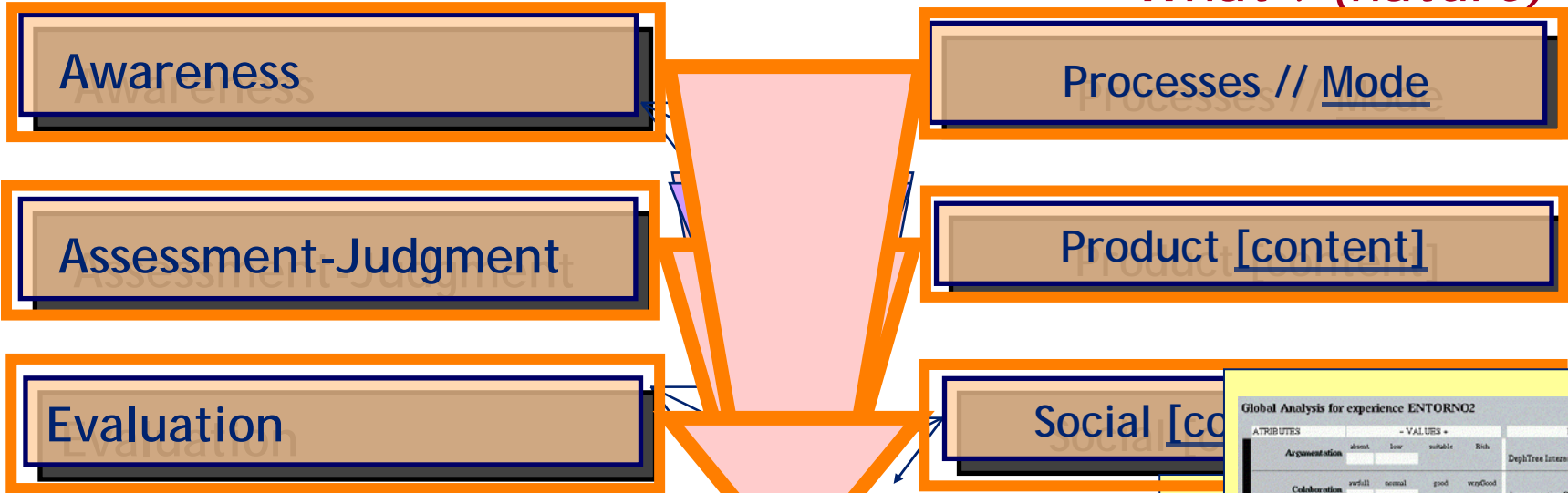
'Discussion depth, Gerrosa, 2002



IA ⇒ Indicators attributes

Level of assistance?

What? (nature)



Global Analysis for experience ENTORNO2

ATRIBUTES	- VALUES +				INFERED FROM
	absent	low	suitable	Risk	
Argumentation	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	DepthTree Interactivity Initiative Work
Collaboration	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Argumentation Cooperation Coordination
Conformity	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Cooperation	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Argumentation Coordination Creativity
Coordination/Message	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Coordination	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Argumentation Coordination/Message Initiative
Creativity	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
DepthTree	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Elaboration	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Initiative	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Interactivity	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
MContributionNumber	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
MContributionSize	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Work	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	MContributionNumber MContributionSize Elaboration



IA ⇒ Achievements IA tools

➤ State of current IA support

- ◆ Function(s) in a system
- ◆ Component in a learning environment
- ◆ Complete IA tool

➤ IA tools current developments for:

- Forums (*e.g. Aula IA support: to teachers, DIAS system: students & teachers*)
- File exchange- contribution systems (*e.g. Cordella*)
- Learning environments (*like MODELLINGSPACE, Knowledge Forum, CoolModes*)
- Web-based platforms
- Scientific communities platforms (*CCI-IA service Kaleidoscope NoE, etc.*)



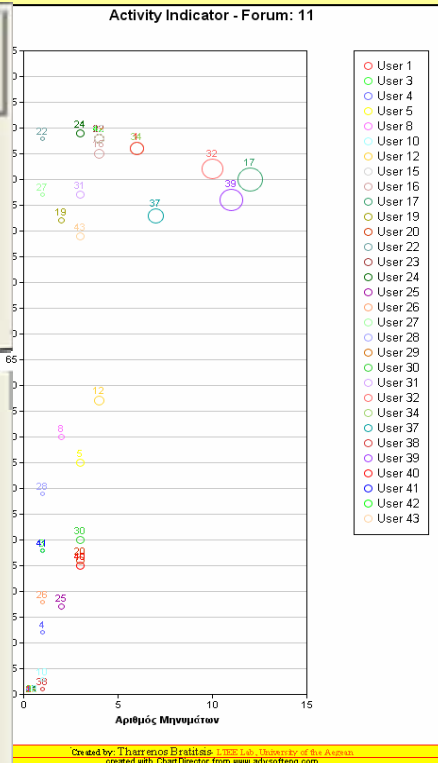
IA ⇒ Achievements IA tools

D.I.A.S.
Decision Interaction Analysis System
IIGS - University of the Aegean

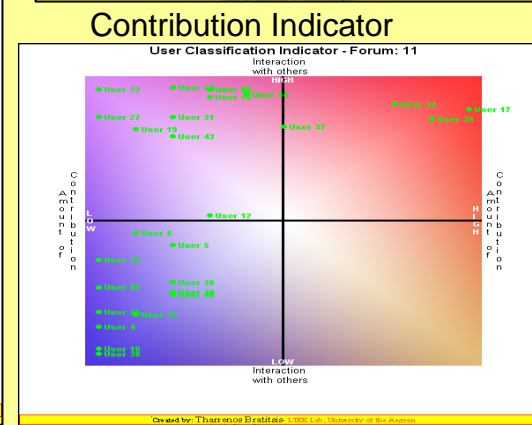
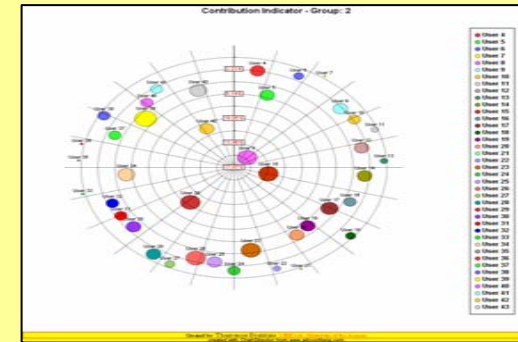
Group Indicators for Group: Group 1

Indicator	Additional Parameters
<input type="checkbox"/> Number of Posts per Time Interval	From: <input type="text"/> To: <input type="text"/> Interval: <input type="text"/> Day: <input type="text"/>
<input type="checkbox"/> Number of Posts per Time Interval for Forum: Thematic Unit 1 : Forum No 1	From: <input type="text"/> To: <input type="text"/> Interval: <input type="text"/> Day: <input type="text"/>
<input type="checkbox"/> Number of Posts per Time Interval	
<input type="checkbox"/> User Classification Indicator for Forum: Thematic Unit 1 : Forum No 1	
<input type="checkbox"/> Time Slot Relative Activity Indicator for Forum: Thematic Unit 1 : Forum No 1	From: <input type="text"/> To: <input type="text"/>
<input type="checkbox"/> Activity Indicator for Forum: Thematic Unit 1 : Forum No 1	
<input type="checkbox"/> Contribution Indicator	
<input type="checkbox"/> Group Interactivity	
<input type="checkbox"/> Group Interactivity (w/ Forum: Thematic Unit 1 : Forum No 1)	
<input type="checkbox"/> Average Contributions	
<input type="checkbox"/> Average Contributions (w/ Forum: Thematic Unit 1 : Forum No 1)	

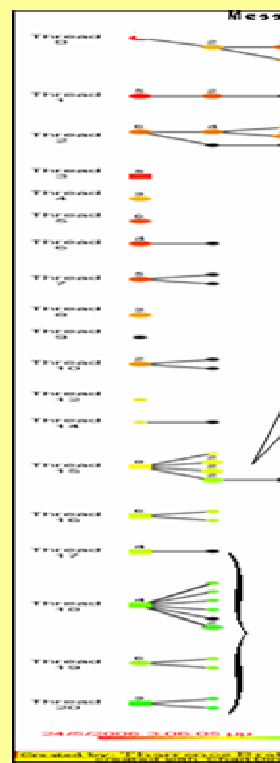
OK Cancel



Activity Indicator



Classification Indicator



DIAS IA tool user: can select set of indicators based on the available ones (more than 60 low and high level indicators):

- for individual students, groups
- for teachers



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➤ IA tools current development

- Forums (*e.g. Aula IA support*)
- File exchange- contribution
- Learning environments (*like*)
- Web-based platforms
- Scientific communities plat

Interaction Analysis for Kaleidoscope NoE CCI - Windows Internet Explorer

http://ia.noe-kaleidoscope.org/

Interaction Analysis

kaleidoscope

Interaction Analysis Indicators for Kaleidoscope NoE platform

This site includes Computer Based Interaction Analysis indicators, deriving from data regarding visitation of the Kaleidoscope NoE main web site. Select the desired IA indicators by activating the corresponding check box and providing the necessary additional information. These indicators concern the main website of kaleidoscope. Information outside the Kaleidoscope Common Infrastructure is not accessible (e.g. websites of SIGs or JEIRPs not embedded to CCI are not accessible). Take into account that the results might need some time to appear, due to the embedded database queries.

For more information related to indicators' interpretation and the current site's functionality, select *Instructions* from the menu.

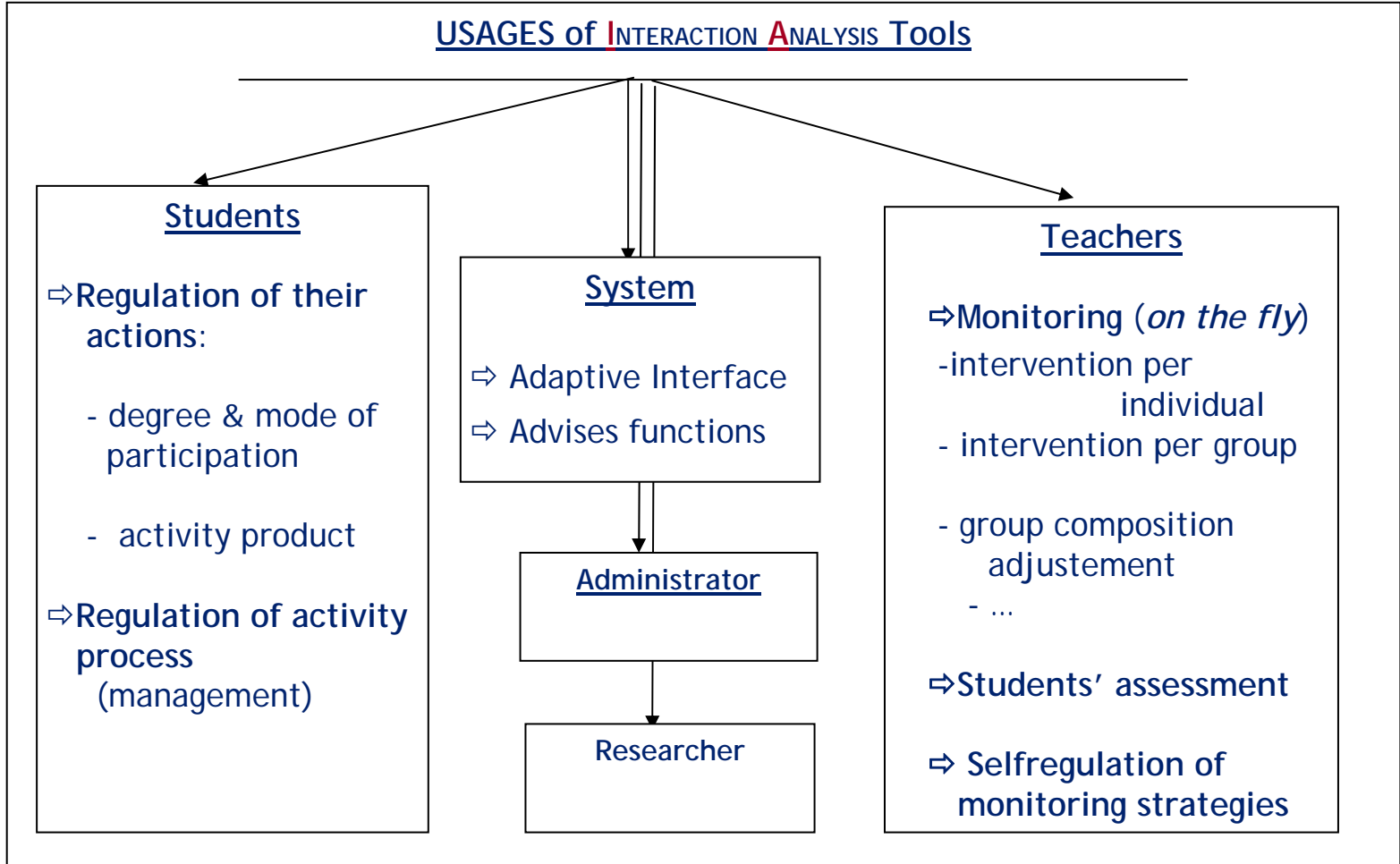
Note: --> To better review the indicators, you can open/close the indicator categories by clicking on the corresponding table title
--> Data is being recorded since the 31st of October 2006

User Behavior Indicators

Indicator	Additional Parameters
<input type="checkbox"/> Most active users	Counting Visits Avg Session Time Total Session Length Longest Session From: 2007-8-31 To: 2007-10-30 The format accepted for dates is YYYY-MM-DD
<input type="checkbox"/> Social Networks within Kaleidoscope	Related to keywords CSCL Interaction Analysis Inquiry Learning Evaluation
<input type="checkbox"/> List of relevant Users	Research Interests Select an appropriate keyword



IA ⇒ Current Usages of IA tools





IA ⇒ Research Dimensions

- ⇒ **Design of interaction Analysis tools/components & functions**
 - ⇒ Interaction Analysis Indicators (produced vs suitable)
 - ⇒ Values presentation form
 - ⇒ Calibrated values, in specific conditions/contexts
 - ⇒ Tailoring IA indicators for different users, users' roles and contexts
 - ⇒ 'Design Principles'

- ⇒ **Development**
 - ⇒ Data process methods
 - ⇒ Representation formalisms
 - ⇒ Independent interoperable tools

- ⇒ **Research on IA tools users**
 - [(i) users' requirements, (ii) tools usages,
(iii) IA I significance for the users, (iv) tools' effects]
 - ⇒ Empirical Results
 - ⇒ Methods for teachers & students' needs and requirements



IA ⇒ Research Dimensions

⇒ Design of interaction Analysis

- ⇒ Interaction Analysis Indicators
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- ⇒ Representation formalisms
- ⇒ Independent interoperable tools

⇒ Research

[(

⇒ Emp

⇒ Methods for teachers & students’ needs and requirements

- How to inter-relate collaboration features with collaborative activity content and process?
- How to go beyond simple quantitative indicators (e.g. participation rates) to more sophisticated ones?
- How to provide a rich variety of analysis output to really assist participants ?

⇒ In order to make the field progress, and cover the actual needs : develop interoperable IA tools, independent of specific learning environments



ICALTS & IA JEIRPs, CCI-IA ⇒ Identity

- ⇒ Learning Technology and Educational Engineering [LTEE] Laboratory, University of the Aegean, Greece, *Angelique Dimitracopoulou*
- ⇒ Collaborative and Learning Support Systems, [COLLIDE], University of Duisburg, Germany // *Ulrich Hoppe - Andreas Harrer*
- ⇒ Center for Research & Support for Training and its Technologies [CRAFT], /EPFL, Switzerland, *Pierre Dillenbourg - Patrick Jermann*
- ⇒ EDTE, University of Twente, Netherlands, *Ton de Jong*
- ⇒ Learning Technologies and Collaborative Systems Group, UNED, Spain, *Felisa Verdejo*
- ⇒ Cognitive Science and Educational Technology Laboratory (COSET), University of Athens, Greece, *Stella Vosniadou*
- ⇒ InterMedia, University of Oslo, Norway, *Anders Morch*
- ⇒ InterMedia, University of Bergen, Norway, *Weiqin Chen*
- ⇒ EMIC-GSIC, Univ of Valladolid, Spain, *Yannis Dimitriadis*

Biblio

⇒ <http://telearn.noe-kaleidoscope.org/> {open archive on TEL}