Assessment
of collaborative learning

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Assessment of learning

Summative

Assessment

Formative

Assessment for learning

Cooperative learning

versus

Collaborative learning

Positive interdependence

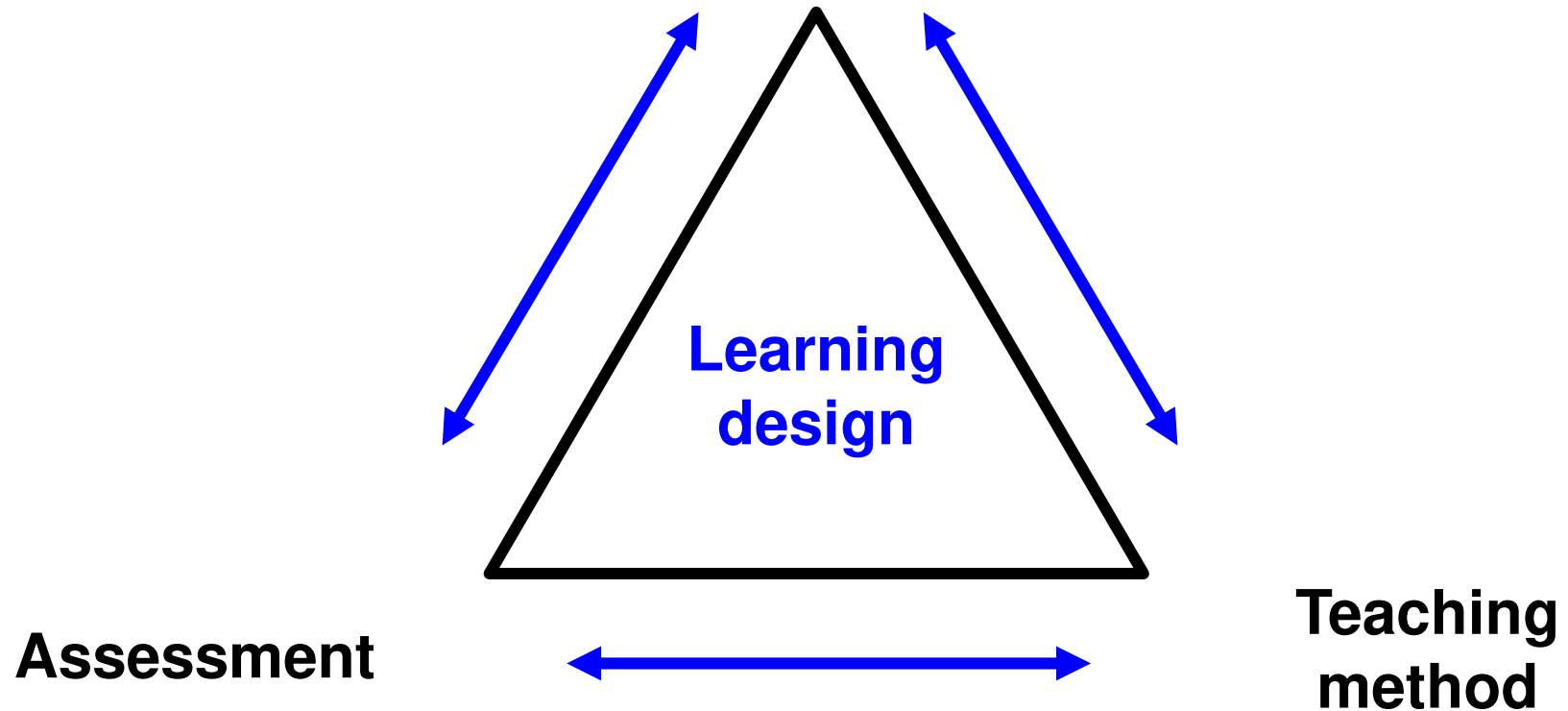# Interaction

Individual accountability

Core issues

1: **What to assess?**

2: **Who assesses?**

3: **How to assess?**

1: What to assess?

Learning outcome

Learning design

Assessment

Teaching method

Constructive alignment (Biggs, 1996)

Acquisition (Sfard, 1998)

Participation (Sfard, 1998)

Four metaphors ...

Knowledge creation (Paavola et al., 2004)

Group cognition (Stahl, 2006)

Experiential learning (Kolb, 1984)

Competency (Hall & Jones, 1976)

Group Experience Metaphor

Distributed cognition (Salomon, 1993)
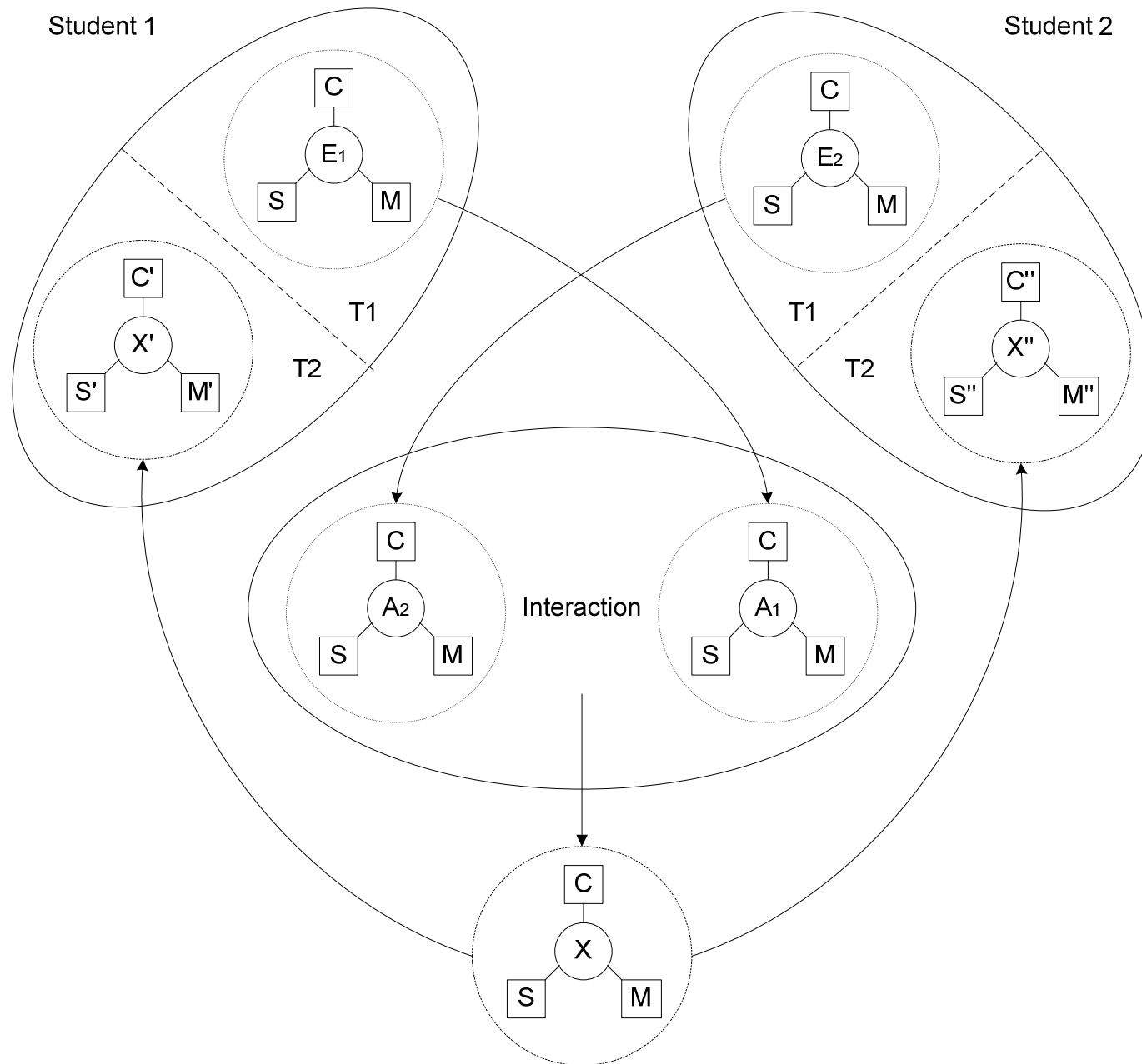
Human ecology (Bronfenbrenner, 1979)

Cognitive

Motivation/Emotion

Social

Not just cognitive!

Individual level <u>AND</u> Group level

Student 1

C

E₁

S   M

C'

X'

S'   M'

T1

T2

Student 2

C

E₂

S   M

C"

X"

S"   M"

T1

T2

C

A₂

S   M

Interaction

C

A₁

S   M

C

X

S   M

Strijbos (2011)

Distributed emergent experience

Paul´s **previous**
Experience
Cognitions
Social skills
Motivations

Paul´s **internalized**
Experience
Cognitions
Social kills
Motivations

T1

T2

Lisa´s **previous**
Experience
Cognitions
Social skills
Motivations

Lisa´s **internalized**
Experience
Cognitions
Social skills
Motivations

T1

T2

Experience
Cognitions
Social skills
Motivations

Experience
Cognitions
Social skills
Motivations

Interaction

Distributed
Experience
Cognitions
Social skills
Motivations

Anne & Miriam

Processes & Outcomes

Social

Cognitive

Motivation/Emotion

Assessing CL ...

1: Individual and group

2: Degree of similarity

3: Multiple concurrent processes
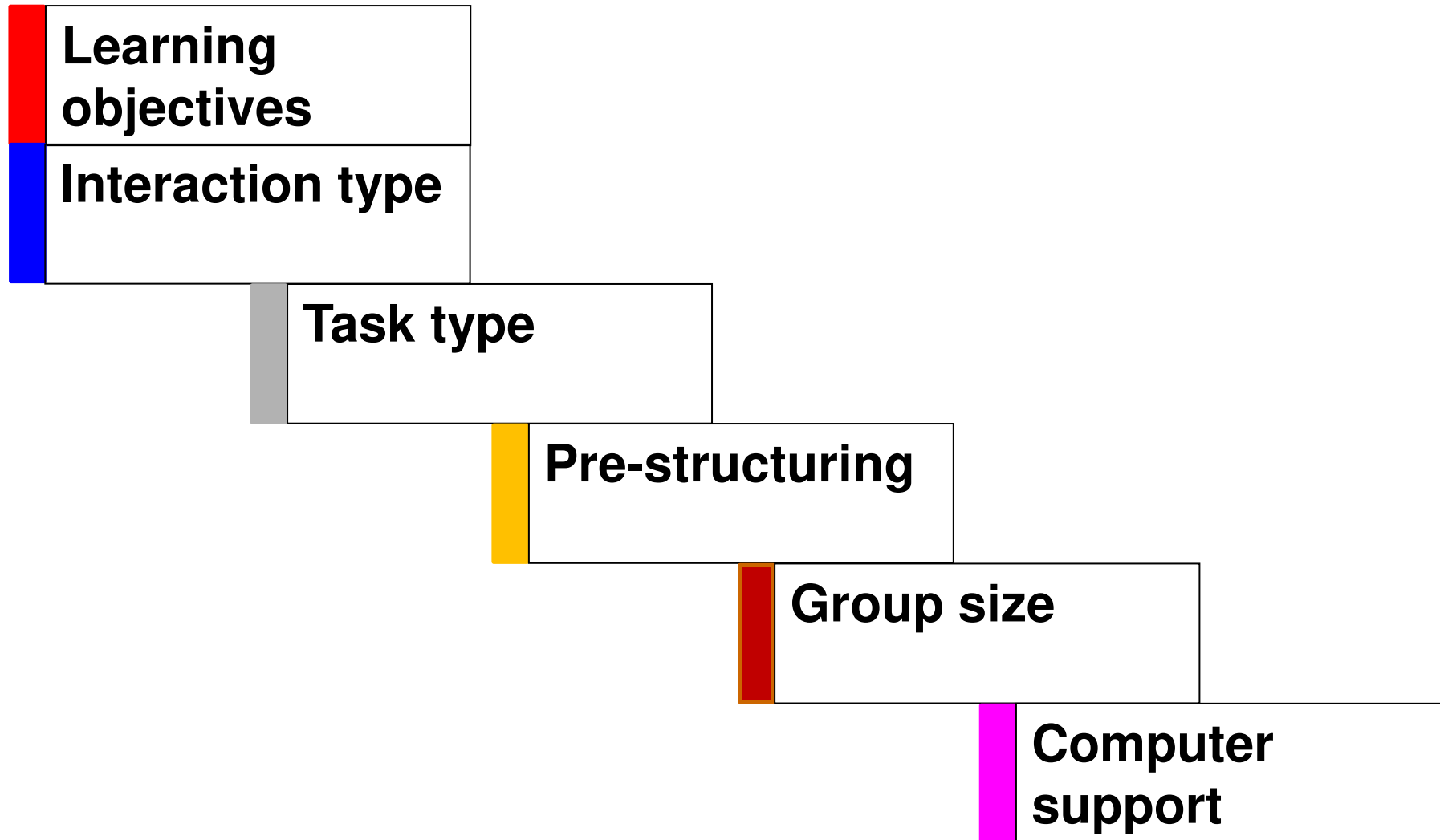
2: Who assesses?

Constrain

Scaffold

Instruct

Role of the teacher

Designs the learning environment …

… which includes the assessment!

Design of CL

Learning objectives

Interaction type

Task type

Pre-structuring

Group size

Computer support

Strijbos et al. (2004)

Learning objectives

Interaction type

Task type

Pre-structuring

Group size

Computer support

Assessment

Supervision

Learning objectives

Interaction

Task characteristics

Structuring

Group constellation

Facilities

Assessment

Guidance

De Hei et al. (2016)

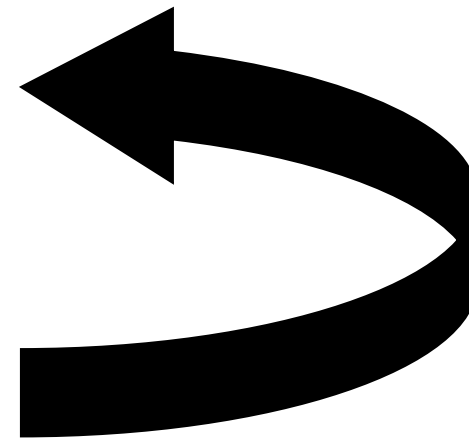**Learning objectives**

Assessment

Guidance

Interaction

Task characteristics

Structuring

Group constellation

Facilities

Alignment

De Hei et al. (2016)

ADDIE Step 2: Design

Interaction	**Learning objectives**	**Assessment**

ADDIE Step 3a: Develop instructional strategies

Task characteristics	**Structuring**	**Guidance**

ADDIE Step 3b: Logistics

Group constellation	**Facilities**

De Hei et al. (2016)

I cannot hire a substitute student.
I cannot hire a substitute student.
I cannot hire a substitute student.
I cannot hire a substitute student.
I cannot hire a substitute student.
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CL assessment practices

	N	Teachers' practices & needs
Ross et al. (1998)	13	Need for CL assessment literacy, professional development and CL assessment resources.
Gillies & Boyle (2010)	10	CL assessment as difficult: purpose, understanding degree of student involvement, addressing the group and individual level.
Frykedal & Chiriac (2011)	11	Vague descriptions. Teachers used mostly informal assessments, (b) focused on collaboration skills, and (c) assessed process & product at individual and group level.
De Hei et al. (2015)	100	(a) 84 teachers used CL as part of the course grade, (b) of the 84, 42 teachers used FA and 21 combined SA and FA, (c) 69 of 96 used PA/PF.

Assessment: mix formative/ summative

Group, individual, or combined

Assessing CL

I: 10%, G: 90% $\rightarrow$ free-riding

I: 90%, G: 10% $\rightarrow$ devalues collaboration

	Construct validity	(mis)aligned student behavior
Group assessment	(-) potentially invalid when assuming that curricula in higher education measure individual abilities (-) less capable might pass (-) more capable might fail	(+) positive interdependence (-) Invites free-riding, social loafing, sucker effect (-) Performance oriented vs. learning oriented approach (-) Dividing or taking over tasks
Individual assessment	(+) Higher construct validity (0) Collaboration-moderated individual assessment of CL	(+) individual accountability (-) Dividing subtasks (-) No incentive to engage in genuine collaboration (-) Rivalry, which might hamper collaboration
Group assessment + intra-group peer assessment	(+) Higher construct validity (+) Collaboration-moderated assessment of CL	(-) Rivalry, which might hamper collaboration (+) Counteracts assessment problems due to free-riding, social loafing, sucker effect

Meijer et al. (2020)

Rating

PA format

Distribution

Ranking

Nomination

Comments =
Peer Feedback

Peer Assessment

Interactivity

Assessor
Assessee

Constellation

Intra-group
Inter-group

... help the teacher assess "invisible" CL processes

F2F, online, *N* of groups

PA of CL to ...

... derive individual scores from group scores

Counteract free-riding

PA of CL: reliability

Zhang et al. (2008)	De Wever et al. (2011)
Generalizability Theory	Intra-Class Correlations (ICCs)
Study 1: N = 134, n = 26, s.gr = 3-4	Cohort 1: N = 342, n = 42, s.gr = 8-9
Study 2: N = 61, n = 15, s.gr = 3-5	Cohort 2: N = 317, n = 39, s.gr = 8-9
Group-level variance: 33% (Study 1), 25% (Study 2)	ES of ICCs for four criteria: medium (.30) to intermediate (.40); overall score intermediate (.40) to high (.50)
Dependability Index, holistic criteria: .79, .63 (Study 1), .63 (Study 2)	

CL process monitoring

Instrument	#	Factors
Quality of Working in Groups Boekaerts & Minnaert (2006)	10	4: situational interest, competence, autonomy and social relatedness
Self-report Teamwork Scale Wang et al. (2009)	30	3: cooperate, advocate/ guide and negotiate
Negative Group Work Experiences Pauli et al. (2011)	21	4: perceived lack of commitment, task disorganization, storming group (falling out, shouting), and fractioned group (exclusion, factions)
Knowledge building rubric Law & Wong (2003)	10	Blend of cognitive (idea generation, knowledge refinement) and social aspects (no one dominates)
CL process rating scheme Rummel et al. (2011)	7	5: communication, joint information processing, coordination, interpers. relationship, motivation

Monitoring & Assessment of Collaborative Learning (CL)		Related fields
CL mining	Access to system objects and student artifacts	Data-mining
	Student discourse and actions	
	System or instructional scripts/agents	
CL analysis	Integrate multiple data sources	Learning analytics
	Analyze multiple levels simultaneously	
	Analyze sequentiality and trace transformations	
CL display	Awareness displays	Awareness visualizations
	Dynamic monitoring and assessment displays	
	User group adaptable displays	

User-oriented visualizations

<u>Intuitive</u>: Users should be able to understand the meaning of a visualization immediately (after brief instruction)

<u>Efficient</u>: Users should be able to rapidly scan, analyse and decide on appropriate action

<u>Scalable</u>: The same visualizations for small scale classroom and large scale courses (e.g., collaboration in MOOCs)

"Tracing transformation"

Balancing act!

PA of CL has potential

Assessing CL

Constructive alignment

Integrated assessment

Key references

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