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The potential of online discussions for effective learning.
Combining individual and social perspectives to study cognitive presence

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Aim

▶ **Understanding some relationships between individual and social processes of knowledge construction in a text-based asynchronous learning environment, through the analysis of several dimensions involved in participants' "*cognitive presence*"**

Questions

▶ **Can we identify some patterns of evolution in the cognitive complexity of participants' individual contributions?**

▶ **Are there any relationships between this evolution and the progress of participants' learning of the specific content?**

▶ **Are there any relationships among participants' level of cognitive complexity, learning of the specific content, and socio-cognitive processes of knowledge construction?**

Socioconstructivist perspective on teaching and learning

Learning as a process of co-construction of shared knowledge. Teaching as a process of assistance in the ZPD

Bereiter & Scardamalia; Brown & Campione; Collins, Brown & Newman; CTGV; Järvela; Mercer; Palincsar; Tharp; Wertsch; …

Cognitive presence all along with social presence and teaching presence as key elements to understand individual and social processes of knowledge construction in text-based asynchronous learning environments

Anderson & Garrison; Gunawardena; Järvela & Hakkinen; Veldhuis-Dihermanse; Xin; …

Socioconstructivist perspective on teaching and learning

Cognitive presence: "the extent to which learners are able to construct and confirm meaning through sustained reflection and discourse in a critical community of inquiry" Garrison, Anderson & Archer, 2001

Dimensions involved in cognitive presence:
> **Cognitive level or complexity of individual contributions**
> **Meaningful, functional learning of the specific content**
> **Socio-cognitive level (construction from other's contributions; co-construction)**

Gunawardena et al., 1997; Jarvela & Hakkinen, 2000; Garrison, 2003; Onrubia et al., 2006

Method

Multilevel model of content analysis

Combining individual and group-level perspectives to analyse knowledge construction in an online discussion activity in a university course (Chiu and Khoo, 2005, Arvaja, Salovaara, Häkkinen, and Järvelä, 2007)

The context

▸ **School of Education of the University of Barcelona**
▸ **Moodle as VLE**
▸ **A teaching module on special educational needs and inclusive school practices**

Participants

17 students, randomly assigned by the teacher to one of two debate groups -in favour of or against ability grouping in schools

Method

The activity

The activity consisted in a debate forum on ability grouping in schools, lasting 3 weeks

The activity was a mandatory part of the module on "inclusive school practices"

Students had to submit at least two postings per week, providing arguments either in favour of or against ability grouping

The teacher set the participation rules, opened the debate and summarized it at the end, but she made no other contribution all along the process

The activity was developed using the standard forum tools afforded by Moodle

*The study is in an exploratory phase. 24% (N=30) of the contributions of a total of 124 contributions have been analyzed

The steps for content analysis

Coding, reliability and validity

▶ **Dimensions and units to analyse cognitive presence theoretically defined**

▶ **Codes for each dimension empirically tested and refined**

▶ **Reliability achieved through the development of coding rules**
  ▶ **Initial coding by independent coders (10% of contributions)**
  ▶ **Discussing disagreements. Decision rules. Codes re-definition.**
  ▶ **New independent coding. Realiabilty index: Cohen's Kappa (K) [PRAM]**

▶ **Qualitative coding, sorting and reduction of data with Atlas-ti**

Chi, 1997; Rourke, Anderson, 2004; Chiu & Khoo, 2005; Beers, Boshuizen, Kirschner, Gijselaers, 2007; De Weber et al. , 2006; De Weber, Van Keer, Schellens, Valcke, 2007

The set of the contributions posted by the participants

Dimensions of Analysis

▸ **Cognitive level of individual postings**

▸ **Meaningful, functional use of specific content**

▸ **Socio-cognitive level of the postings submitted by participants**

Units of Analysis

▸ **Thematic units raised in the postings**

▸ **Thematic units raised in the postings**

▸ **Individual postings belonging to a "conversationally contingent thread"**

Categories/Codes

Successive levels of cognitive complexity

Categories/Codes	Description
Identifying -. Describing **CC-id**	A unique, isolated element of the topic is presented
Classifying - Organizing **CC-cl**	Two or more elements of the topic are presented, with taxonomical or class relationships between them
Explaining **CC-ex**	Two or more elements of the topic are presented, and some kind of argument or reasoning is established
Concluding - Theorizing **CC-co**	Conclusions of the topic are established through explicit deductive arguments coming from scientific principles

Categories/Codes

Successive levels of the degree of learning of the module's contents

Categories/codes	Description
No content used **CA-nc**	The specific content of the module is not used
Rote learning **CA-rl**	Some terms of the specific content are used by the student, but in an apparently non-functional, literal manner
Functional use of content - partial **CA-ufp**	Student contribution is based to some extent on the concepts and ideas of the specific content, that are correctly used and correctly understood
Functional use of content **CA-uf**	Student contribution is fully based on the concepts and ideas of the specific content, that are correctly used and correctly understood

Categories/Codes

The successive levels of the process of joint construction of knowledge in an online conversation. The socio-cognitive level

Categories	Description
Giving information **CS_gi**	The contribution is not related with the previous contributions
Comparing or commenting information **CS-co**	The contribution comments, agrees or disagrees with previous contributions. There is no further elaboration or construction on the previous contributions, though
Discussing – Negotiating **CS-ne**	The contribution builds on the previous contributions (combining, summarizing, re-organizing, "rising-above")
Using new meanings **CS - nm**	The contribution builds on a new meaning, jointly negotiated and established in previous contributions

Results

Table 1. Levels of cognitive complexity

Level/code	10% initial postings		10% final postings		Total postings	
	Frequency	Percentage	Frequency	Percentage	Frequency	Percentage
1. CC_id Describing	11	28,205 %	11	28,205%	22	56,41%
2. CC_cl Classifying	2	5,13%	0	0,0%	2	5,13%
3. CC_ex Explaining	8	20,51%	5	12,82%	13	33,33%
4. CC_co Theorizing	1	2,56%	1	2,56%	2	5,13%

▸ **Postings show levels 1 and 3 of cognitive complexity (mainly isolated elements about the topic, but also arguments involving two or more elements on the topic)**

▸ **No significant changes in the level of cognitive complexity are found**

Results   Table 2. Levels of degree of learning

Level/code	10% initial postings		10% final postings		Total postings	
	Frequency	Percentage	Frequency	Percentage	Frequency	Percentage
1. CA_nc No use	5	14,71 %	9	26,47%	14	41,17%
2. CA_rl Rote learning	10	29,41%	5	14,71%	15	44,12%
3. CA-ufp Functional use - partial	2	5,88%	3	8,82%	5	14,71%
4. CA-uf Functional use	0	0,0%	0	0,0%	0	0,0%

▸ **Postings show low levels of functional, meaningful learning of the specific content**

▸ **Evidence of learning does not increase along the debate activity**

Results

Table 3. Levels of the process of joint construction of knowledge

Level/code	10% initial postings		10% final postings		Total postings	
	Frequency	%	Frequency	%	Frequency	%
1. CS_gi Giving infor.	2	7,14 %	1	3,57%	3	10,72 %
2. CS-co Commenting	11	39,29%	12	42,86%	23	82,14%
3. CS-su Summarizing	0	0,0%	2	7,14 %	2	7,14 %
4. CS-nm New meanings	0	0,0%	0	0,0%	0	0,0%

▸ **Postings show low levels of connection (co-construction, building-on) with previous postings**

▸ **Summarizing appears within the final postings (but with low frequency)**

▸ **Cognitive complexity of the participants' individual postings was not fully related to the learning of the specific content**

▸ **Results show a low level of joint co-construction (socio-cognitive), a low-medium level of cognitive complexity, and a very low level of learning of the specific content**

▸ **The nature of the task, and the absence of the teacher throughout the debate could explain, at least partially, these results**

Conclusions

▶ **Combining individual and social approaches to content analysis can offer a deeper understanding of knowledge construction in online discussions** (Arvaja, Salovaara, Häkkinen, and Järvelä, 2007)

▶ **Cognitive presence has to be defined not only in terms of cognitive or socio-cognitive complexity but also in terms of learning of the specific content**

▶ **The level of cognitive and socio-cognitive complexity in an online discussion is related to the characteristics of the task (debate-discussion) and to the sense that students make of the task** (Hmelo-Silver, 2003; Schellens, Van Keer, Valcke and De Weber, 2007)

▶ **Teaching presence during online discussion, specially in order to guide and help students to summarize and "rising-above"** (De Weber, Van Keer, Schellens, Valcke, 2007) **seems necessary to increase collaboration and co-construction between students and to improve higher levels of knowledge construction**

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THANK YOU FOR YOUR ATTENTION!

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