

“Metacognitive presence” in asynchronous online learning environments: self, mutual and hetero-regulation”
Learning through collaborative groups

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Symposia title: Promoting knowledge construction in different online learning scenarios in Higher Education.

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Theoretical framework

Asynchronous online learning environments in higher education.

Totally online university and classroom. Asynchronous and written communication.

Knowledge construction.

Learning is the individual construction of knowledge facilitated by educational interaction between participants and by the interaction of students with the technological tools used for educational purposes.

Collaborative learning.

The process of social interaction in collaborative group work. A group of students contribute towards achieving a common learning objective.

Metacognitive presence.

Basic regulatory aspects seen in online teaching and learning processes.

Metacognitive presence in asynchronous online learning environments, in learning through collaborative groups

Three types of regulatory process (depending on the person providing the reflective elements and monitoring procedures with regard to their own learning in terms of awareness and self-improvement) in collaborative learning in groups of students:

Hetero-regulation. Regulation by the teacher.

Mutual regulation. Regulation among students.

Self-regulation. Regulation carried out by the students themselves.

Three levels of regulation of the learning process.

Methodology

Sample

1 teacher and 18 students

4 different groups of collaborative learning

Subject: Psychology of Education

Course: Second semester 2005-6

Degree: Honours Degree in Psychopedagogy

Online campus of the Open University of Catalonia

Sample details

| | No. of students | No. messages | Duration |
|---------|-----------------|--------------|--------------------|
| Group A | 5 | 65 | 13 days |
| Group B | 4 | 97 | 17 days |
| Group C | 5 | 107 | 21 days |
| Group D | 4 | 56 | 20 days |
| TOTAL | 18 students | 325 messages | Average 17.75 days |

Procedure and instruments

Data collection

- Selection of subject, learning activity, of the work groups and the students.
- Teacher interview before, during and after the learning activity.
- Collection and classification of electronic messages.
- Collection of information from the students' self-reports.

Data analysis

The Atlas.ti program has been used to categorize the data collected. The emails are codified in terms of the contributions to exchanges between teachers and students in the different areas of the virtual classrooms. An interjudge agreement procedure was used to apply categories in the communication exchanges, identifying fragments of written discourse (electronic messages) in online media corresponding to the four categories.

Categories and indicators of metacognitive presence analysis

| Category | Description |
|------------------------------------|--|
| 1. Hetero-regulation | Unclear representation of the task by participants. No joint plan exists nor explicit regulation of the learning activity among members. Participation by teacher. |
| 2. Low level of mutual regulation | Partial representation of the task by the majority of participants. Processes of planning and regulation of global aspects of the task contributed among members of the group. |
| 3. High level of mutual regulation | Sufficient and appropriate representation of the task. Processes of planning and regulation of detailed and concrete aspects of the task contributed among members of the group. |
| 4 Self-regulation | Very appropriate representation of the task. Members of the group work in a coordinated and autonomous way. |
| Episodes | Group of interrelated messages from the same category of regulation. |
| Positive transitions | Group of episodes of interrelated messages that increase the level of regulation. |
| Disruptions | Number of episodes that do not form part of a positive transition and that break the continuity of a level of regulation. |

Group A Results

| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 |
|---|---|---|---|---|---|---|---|---|---|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|
| 1 | 1 | | | | | 4 | | | | 2 | | 1 | | | | 1 | | | | | | 1 | | | |
| 2 | | | | | | | | | | | | | | | | | | | | | | | | | 1 |
| 3 | | 2 | | 1 | | | 1 | | 1 | | 1 | | 1 | | 2 | | 1 | | 2 | | 1 | | 2 | | |
| 4 | | | 3 | | 1 | | | 3 | | | | | | 1 | | | | 1 | | 1 | | | | 1 | |

| | 26 | 27 | 28 | 29 | 30 | 31 | 32 | 33 | 34 | 35 | 36 | 37 | 38 |
|---|----|----|----|----|----|----|----|----|----|----|----|----|----|
| 1 | | | | | | | | | | | | | |
| 2 | | | 1 | | | | | | | | | | |
| 3 | 1 | | | 1 | | 2 | | 1 | | 1 | | 5 | |
| 4 | | 2 | | | 4 | | 2 | | 2 | | 6 | | 1 |

| | |
|-----------------------------|----|
| Episodes | 38 |
| Positive transitions | 13 |
| Disruptions | 6 |

| | Absolute frequency appearance | Relative frequency appearance (%) | Number of episodes | Relative frequency appearance (%) | Average messages per episode |
|--------------|-------------------------------|-----------------------------------|--------------------|-----------------------------------|------------------------------|
| 1 | 10 | 15.4 | 6 | 15.8 | 1.6 |
| 2 | 2 | 3 | 2 | 5.3 | 1 |
| 3 | 25 | 38.5 | 17 | 44.7 | 1.5 |
| 4 | 28 | 43.1 | 13 | 34.2 | 2.2 |
| TOTAL | 65 | 100 | 38 | 100 | 1.7 |

Group B Results

| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 |
|---|---|---|---|---|---|---|---|---|---|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|
| 1 | | | | | | | | | | | | | | | | | | | | | | | | | |
| 2 | | | 2 | | | | | | | | | | | | | | | | | | | | | | |
| 3 | 3 | | | | 1 | | 1 | | 1 | | 4 | | 1 | | 1 | | 2 | | 1 | | 10 | | 2 | | 1 |
| 4 | | 3 | | 2 | | 3 | | 1 | | 4 | | 3 | | 1 | | 9 | | 1 | | 1 | | 1 | | 3 | |

| | 26 | 27 | 28 | 29 | 30 |
|---|----|----|----|----|----|
| 1 | | | | | |
| 2 | | | | | |
| 3 | | 1 | | 1 | |
| 4 | 1 | | 5 | | 27 |

| | |
|-----------------------------|----|
| Episodes | 30 |
| Positive transitions | 16 |
| Disruptions | 1 |

| | Absolute frequency appearance | Relative frequency appearance (%) | Number of episodes | Relative frequency appearance (%) | Average messages per episode |
|--------------|--------------------------------------|--|---------------------------|--|-------------------------------------|
| 1 | 0 | 0 | 0 | 0 | 0 |
| 2 | 2 | 2.1 | 1 | 3.3 | 2 |
| 3 | 30 | 30.9 | 14 | 46.7 | 2.1 |
| 4 | 65 | 67 | 15 | 50 | 4.3 |
| TOTAL | 97 | 100 | 30 | 100 | 3.2 |

Group C Results

| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | |
|---|---|---|---|---|---|---|---|---|---|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|---|
| 1 | | | | | | | | | | | | | | | | 1 | | | | | | | | | | |
| 2 | | 3 | | | 1 | | 3 | | 2 | | 1 | | 2 | | | 6 | | 2 | | 1 | | 2 | | | | |
| 3 | 5 | | 2 | | | | | 1 | | 1 | | 1 | | 1 | | | | 2 | | 2 | | 6 | | 4 | | |
| 4 | | | | 2 | | 3 | | | | | | | | | 2 | | | | | | | | | | | 3 |

| | 26 | 27 | 28 | 29 | 30 | 31 | 32 | 33 | 34 | 35 | 36 | 37 | 38 | 39 |
|---|----|----|----|----|----|----|----|----|----|----|----|----|----|----|
| 1 | | | | | | | | | | | | | | |
| 2 | | | | | | | | | | | | | | |
| 3 | 2 | | 3 | | 1 | | 1 | | 8 | | 3 | | 2 | |
| 4 | | 2 | | 6 | | 3 | | 1 | | 2 | | 2 | | 12 |

| | |
|-----------------------------|----|
| Episodes | 39 |
| Positive transitions | 16 |
| Disruptions | 1 |

| | Absolute frequency appearance | Relative frequency appearance (%) | Number of episodes | Relative frequency appearance (%) | Average messages per episode |
|--------------|--------------------------------------|--|---------------------------|--|-------------------------------------|
| 1 | 1 | 1 | 1 | 2.6 | 1 |
| 2 | 23 | 21.5 | 10 | 25.6 | 2.3 |
| 3 | 45 | 42 | 17 | 43.6 | 2.6 |
| 4 | 38 | 35.5 | 11 | 28.2 | 3.5 |
| TOTAL | 107 | 100 | 39 | 100 | 2.7 |

Group D Results

| | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|----|----|----|----|----|
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 |
| 1 | 2 | | 3 | | | | | | | | | | | |
| 2 | | 1 | | 2 | | | | | | | | | | |
| 3 | | | | | 8 | | 1 | | 9 | | 2 | | 2 | |
| 4 | | | | | | 4 | | 3 | | 5 | | 7 | | 7 |

| | |
|-----------------------------|----|
| Episodes | 14 |
| Positive transitions | 6 |
| Disruptions | 0 |

| | Absolute frequency appearance | Relative frequency appearance (%) | Number of episodes | Relative frequency appearance (%) | Average messages per episode |
|--------------|--------------------------------------|--|---------------------------|--|-------------------------------------|
| 1 | 5 | 9 | 2 | 14.3 | 2.5 |
| 2 | 3 | 5.3 | 2 | 14.3 | 1.5 |
| 3 | 22 | 39.3 | 5 | 35.7 | 4.4 |
| 4 | 26 | 46.4 | 5 | 35.7 | 5.2 |
| TOTAL | 56 | 100 | 14 | 100 | 4 |

Summary of results

| | | Group A | Group B | Group C | Group D |
|-------------------------------------|----------|---------|---------|---------|---------|
| % Appearance of messages | 1 | 15.4 | 0 | 1 | 9 |
| | 2 | 3 | 2.1 | 21.5 | 5.3 |
| | 3 | 38.5 | 30.9 | 42 | 39.3 |
| | 4 | 43.1 | 67 | 35.5 | 46.4 |
| % Appearance of episodes | 1 | 15.8 | 0 | 2.6 | 14.3 |
| | 2 | 5.3 | 3.3 | 25.6 | 14.3 |
| | 3 | 44.7 | 46.7 | 43.6 | 35.7 |
| | 4 | 34.2 | 50 | 28.2 | 35.7 |
| Average messages per episode | 1 | 1.6 | 0 | 1 | 2.5 |
| | 2 | 1 | 2 | 2.3 | 1.5 |
| | 3 | 1.5 | 2.1 | 2.6 | 4.4 |
| | 4 | 2.2 | 4.3 | 3.5 | 5.2 |
| Positive transitions | | 13 | 16 | 16 | 6 |
| Disruptions | | 6 | 1 | 1 | 0 |

Discussion of results

Group A

High level of hetero-regulation

Medium level of mutual regulation

Medium level of self-regulation

High level of positive transitions

Very high level of disruptions

Group B

Zero level of hetero-regulation

Low level of mutual regulation

Very high level of self-regulation

Very low level of positive transitions

Very low level of disruptions

Group C

Low level of hetero-regulation

Very high level of mutual regulation

Medium level of self-regulation

Very low level of positive transitions

Very low level of disruptions

Group D

Low level of hetero-regulation

Medium level of mutual regulation

Medium level of self-regulation

Very low level of positive transitions

Very low level of disruptions

Final comments. Implications for the research

Our research consists of relating these results on the metacognitive presence in collaborative learning in groups with other results obtained on teaching presence and cognitive presence.

This interrelation will allow us to respond to the following three research questions:

What relationship can we establish between the different types of teaching presence and the profile obtained in each group of metacognitive presence?

What general relationship can we establish between the profile obtained of metacognitive presence in each group, and cognitive presence?

What relationships can we establish between each type of metacognitive presence and different types of cognitive presence, for example: the cognitive level of group work and the cognitive level of constructed knowledge?