The Logic, Affectivity and Ethics of Electronic Conferencing Teaching Strategies in Post-Secondary Mixed-Mode Courses

Milton Campos
University of Montreal

Introduction

This paper aims to identify and to understand the role of the logical, the affective and the ethical dimensions of knowledge in the online interactions of post-secondary teachers and students. By understanding how these dimensions are interwoven, I intend to demonstrate that the instructor's course design and teaching strategies must take them into consideration in order to achieve a healthy learning environment. By healthy learning environment I mean the online construction of a knowledge building community in which the students can develop arguments in order to acquire a more profound understanding of the topics and develop caring and fulfilling relationships in a respectful atmosphere. I adopt a constructivist perspective based on genetic epistemology (Piaget, 1950, 1991) as well as contributions by socio-constructivism (Vygotsky, 1979) and modern cognitive science distributed approaches (Salomon, 1993). Methodologically, I integrate two research methods: discourse analysis and the case study. Data collected come from transcripts of electronic conferencing, course documents and interviews. The study suggests that online interactions are shape by the teaching strategy adopted by the instructor in the electronic conferences.

Theoretical framework

This paper aims to identify and to understand the role of the logical, the affective and the ethical dimensions of knowledge in the online interactions among post-secondary teachers and students. According to Piaget, social knowledge has three interconnected dimensions: (1) the rules expressed by logical operations, (2) the values attributed to meanings that are of two orders: affective and ethical, and (3) the signs used for communication (Piaget, 1976). Both logical systems and meaning systems are expressed by signs coded through language. In the case of "online language" signs are verbal and non-verbal.

I apply the Piagetian Grize's communication model (1991) with a view of understanding the symbolic ecology of humans as an open system. This model is consistent with the understanding of Habermas, according to whom social theory can not ignore the dimension of discourse (1987). This symbolic ecological approach is interested in the psychogenesis as well as the sociogenesis of communication, integrating genetics and history whenever it is possible. In this paper, I provide examples of two university mixed-mode courses in which electronic conferences were integrated. By studying the communication dynamics of the symbolic ecological environment in which the actions of the professors adopting a given teaching made possible certain kinds of interaction with and among the students, I aim to identify and to understand the role of logics, affectivity and values. Consistent with genetic epistemology, these three interconnected dimensions of knowledge could provide an understanding on the dynamics of configurations of meanings (Campos, 1998). This understanding might shed a light on the complexity of communication and its role on the learning processes of the students.

Methodology and data sources

The core of our multi-method approach is discourse analysis of electronic conferencing and the case study. Our discourse analysis method is synchronic as well as diachronic. Synchronically, it highlights the logical forms and applied meanings present in the equilibration process of conceptual assimilation and accommodation that leads to the construction of arguments. Diachronically, it draws the relationships among configurations of meanings that form the online discourse that is expressed by meaning implication (Piaget, 1991; Campos, 1998, 2000). Further information on the method can be found in Campos, 2004.

Data sources and subjects

Data came from two postsecondary courses:

a) A Chemistry Lab course

b) A Medicine course on urology and the kidney

Both courses were mixed-mode (face-to-face and online), built around an online learning environment offering

many tools such as access to online materials, quizzes, self-assessment of the progression of learning, evaluation tools, private internal e-mail as well as a number of online discussion conferences dedicated to different topics (WebCT). We collected transcript data from electronic conferences of both courses, and made interviews with both professors and students.

Results

Chemistry Laboratory This chemistry mixed-mode (face-to-face and online) course was conceived for students registered in science program. In the studied session (fall 2003), the chemistry laboratory had 133 registered students. The goal was that of introducing students to experimental chemistry by adopting an approach integrating analytical, organic and physical chemistry. This one session course was organized around some lectures followed by lab sessions in which the students were requested to perform a number of experiences. The online component was electronic conferencing. The evaluation comprised two elements: laboratory activities and a final exam. The laboratory elements of the evaluation were the quality of lab work (10%) as well as lab reports (55%). The final exam counted 35% of the mark. Online conferencing was evaluated in terms of participation (2%) and quality (3%): these points were comprised within the laboratory elements of evaluation. For the participation mark, the professor used the conferencing statistical tool that shows how many times a student wrote and read messages.

The professor was not a first-timer: he already taught this course a number of times. This session was the second in which he integrated electronic conferencing in this course. This professor also integrates online conferencing in other courses, meaning that this second experience in the Chemistry Laboratory course was not his second experience with online conferencing. According to this professor, online conferencing was used because of its efficacy. First of all, the tool was considered to be useful because students could ask questions about scientific concepts that they did not understand. Secondly, the professor considered essential the mastery of the language to communicate precisely the intended meanings and conferencing was seen as a good writing exercise. Thirdly, electronic conferencing was considered to be a collaborative tool in which students could help each other. The professor decided neither to interfere constantly nor to answer or comment immediately after a question or comment was published. The strategy adopted was that of waiting to see whether the students would try to answer and help their colleagues before any intervention by the professor was needed. According to the professor, intervening happened when the answer already given by a student was incomplete or incorrect, or when nobody had answered a question, or else, to provide information about the course. The professor finds electronic conferencing to be adequate for this kind of course because even if the students demonstrate to be capable of solving chemistry problems, they normally are unable to properly explain what they do and why. The availability of such a communication tool allows them to explain to each other the processes involved in the calculations which would enable learning. The professor also points out that the dynamics enables first year students to do things that only last year students used to do beforehand. The students that we interviewed found participation in the online conferences a rich and useful experience. They considered that the possibility of asking questions online helped them to follow the course. They also found that this tool was particularly relevant for those who are shy and have a difficult time asking questions in the classroom. The students perceived the strategy adopted by the professor in the intended way. According to them, the professor's strategy was one of trying not to give a response right away to encourage discussion. However, they were not in agreement concerning the character of the community: one student considered it a learning community, while the other a "consulting" community, the students did not share the same degree of enthusiasm about the experience although they considered it to be positive.

Discourse analysis We start with a quantitative view of the studied conference to introduce the reader to the major trends of interaction. The study was done upon 45 messages of a general conference, open to everyone. Participation was not mandatory. Messages with and without arguments were split almost equally (Figure 1).

Messages	**#**	**%**
With arguments	23	51
Without arguments	22	49

Figure 1 - Presence of arguments

However, only a third of the total of messages with arguments had a construction (i.e. somebody building upon what another person had written). A significant number of messages with arguments presented no construction

at all, meaning that what those persons wrote died right there, without a continuation. It is expected that most messages without arguments presented no construction at all but it is interestingly enough to see that some messages presented a sort of construction (meaning) anyhow (Figure 2).

Messages	**#**	**%**
With arguments and construction	14	31
With arguments and without construction	9	20
Without arguments and construction	3	7
Without arguments and without construction	19	42

Figure 2 - Arguments and construction

In terms of values, most messages had a positive content. However, an almost even number of messages were negative or neutral. This trend suggests that this conference was not particularly engaging (Figure 3).

Values 1	**#**	**%**
Positives +	18	40
Negatives -	14	31
Neutral +-	13	29

Figure 3 – Intensity of values

When relating the kind of message with the value intensity attributed to it, we verify that most messages with arguments had a negative content, followed by a reasonable number of positive and neutral ones. We also note that messages without arguments were mainly positive but with a fair number of neutral and negative ones (Figure 4).

Values 1 (%)	**Positives +**	**Negatives -**	**Neutral +-**
With arguments and construction	11	11	9
With arguments and without construction	7	9	4
Without arguments and construction	2,5	0	2,5
Without arguments and without construction	20	11	13

Figure 4 – Intensity of values according to messages with or without arguments, with or without construction

In terms of the content of messages, most messages had an affective value attached to the writing. A non negligible number was just information publishing. A fair number of messages had a moral content (Figure 5).

Values 2	**#**	**%**
Affective	28	62
Moral	7	16
Informational (neutral)	10	22

Figure 5 – Type of value

Concerning how the type of value was distributed, it is worth noting that all messages with a moral content were part of a discussion in which participants constructed upon each others' comments. Most messages with an affective content were found in messages without arguments or construction, i.e. manifestations of care that were not responded to (Figure 6).

Values 2 (%)	**Affective**	**Moral**	**Neutral**
With arguments and construction	11	13	7
With arguments and without construction	13	2	5
Without arguments and construction	5	0	0
Without arguments and without construction	33	0	11

Figure 6 - Type of values according to messages with or without arguments, with or without construction

When we cross the values, what is striking is that most messages with a moral content were negative. In addition, affectivity does not mean necessarily to be positive as show in the table (Figure 7).

Crossing values (%)	Affective	Moral	Neutral
Positives +	36	4	0
Negatives -	20	11	0
Neutral +-	0	7	22

Figure 7 - Crossing intensity and type of values

We would like to provide additional quantitative information that is interesting analyzing. From those messages with arguments and construction (14 messages), 8 were built upon previous questions, 2 upon themes unrelated to any arguments, and only 4 upon a previous argument. Three of these four messages had a moral content. In addition, we verify a phenomenon of over presence: 57.8% of the messages (26) were written by the professor – 56.5% (13) of the total number of messages with arguments (23) – most of them to answer questions. Hereunder we show examples of such a construction dealing with moral dilemma:

Message n (Informational / Neutral value – with argument – no construction)
(Professor)
Premise – I must remember you that you should a copy of your laboratory report with your assignment...
Premise 2 + conclusion – IF you don't do this (THEN) your evaluation will be affected… Good work. (Signed with initials)

Message n' (Negative / Moral value – with argument – with construction upon the previous theme)
(Student A)
Premise 1 – I need to express my deception concerning the delivery of assignments.
Premise 2 – As other students I left my assignment in the requested box left is a corridor without surveillance.
Premise 3 – Anyone could steal or copy the content of one or many of those assignments.

Premise 4 – Some other things that happened in this course make me doubt of the reliability of our colleagues.2
Premise 5 – IF this method continues, THEN is because nothing serious had already happened…
Premise 7 – This is another reason not to take a chance…
Conclusion - IF (the previous are true) THEN it would be better to assure security…

Message n'' (Negative / Moral value – with argument – with construction upon the previous argument)
(Student B)
Premise 1 - I agree. (Given what you said, THEN) I would also prefer to give my assignment to the professor…
Premise 2 - We worked hard for this… and it would be a pity to have someone punished by a stealer.
Conclusion – (IF this continues THEN) chances might be low but previous happenings… in this course… do not assure anybody.

Message n''' (Positive / Moral value – with argument – with construction upon the previous argument)
(Professor)
Premise 1 – I will investigate (the previous cases reported).
Premise 2 – I will take measures in the future to avoid risks of fraudulent behaviour.
Premise 3 – As I remember, in a previous case similar to the one that you reported, the student was expelled from the university.
Premise 4 – It's certain, though, that nobody saw him…
Premise 2 + conclusion – IF you have precise facts (THEN), please, let me know… (Signed with initials)

In order to also present one of the few examples of knowledge co-construction (of arguments) among students, we chose one of the longest in which the students help each other in the search of a response to a difficult problem:

Message m (Negative / Affective value – with argument – no construction)
(Student A')
Premise 1 – The table at page 4 (in the college book) that we must fulfill does not respect the rules concerning significant numbers particularly in the mmol column…
Premise 2 – We perform a three rule and the equivalences are expressed with 2 numbers…

Conclusion 1 – THEN, the data that should be written (in the college book) should also have 2CS.
Conclusion 2 – (IF) One could not be more precise than the least precise data. THEN, why it is written 3CS in the correction (of the exercise)?

Message m' (Positive / Moral value – with argument – with construction upon the previous theme) (Student B')
Premise 1 – I also noted that it seems that the rule was not respected…
Premise 2 – In addition… I do not understand why the uncertainty value of 0.05ml is multiplied by 2… From where this information come from??? Thanks in advance
Conclusion 1 – (Given this) THEN, an explanation is needed to avoid problems in the exam.

Message m'' (Informational / Affective value – with argument – with construction upon the previous question) (Student C')
Premise 1 – Hi, IF there are two additive measures measured with the same instrument, THEN the respective absolute uncertainty values should be summed up.
Premise 2 – For example… IF you want to measure 10.00ml…
Conclusion 1 – (Given this) THEN, the result is a volume of 10.00 +- 0.02ml.

Medicine Course This mixed-mode (face-to-face and online) course on urology and the kidney was conceived for students registered in the medicine program. In the studied session (fall 2003), the chemistry laboratory had 123 registered students. The goal was that of introducing students to understanding the functioning of the urological system having kidneys at its core. The course had the help of 24 tutors (15 nephrologists, 5 urologists, 3 residents in nephrology and 1 generalist). In addition, it had 4 non expert teaching assistants. The professor coordinated this team during the session. This one session course was organized around lectures, working groups focusing on problem-solving processes, modules of self-learning, modules of self-assessment, online conferencing, and other materials. The course had strong online components. In addition to online materials (course notes, Power Point presentations, a calendar and a private e-mail system), sessions of self-learning were prepared to follow discussions of the problem-solving working groups. The students could repeat the online modules until mastering the content. The self-assessment tool had a similar goal but could only be used once. Electronic conferencing was used as an online peripheral complement of the face-to-face working groups. The evaluation comprised three elements: final exam (75%), evaluation of the student by a mentor (20%) and participation in the online learning environment (5%). The last item was broke down in 2% for participation in the online conferences, 2% for answering the self-assessment quiz, and 1% for answering an online questionnaire about the learning environment.

We needed to explore the mechanics of the problem-solving working groups to understand how the conferences were used. The problem-solving working groups had, each one, a dozen students tutored by an expert. There were seven problems to be solved and hence seven online conferences were created. Given the high number of students in the course, for each problem (and related online conference) there were a number of assigned groups. These groups had as goal a problem-solving assignment that was structured in the course notes published in the online learning environment used in the course. The first task of the group was one of clarifying what the objectives of the discussions were so as to enable the resolution of the discussed problem. All this process was followed by a tutor and had a working group student assigned to lead the process. Parallel to these face-to-face discussions, the students were requested to participate at the online conferences open for each of the seven problems. The students were requested to participate in those conferences in order to clarify and define the objectives specific to a given problem. Other online conferences were open (for discussion, for instance) but did not work. The only online conferences that worked were those related to the problem-solving working groups. However, most students just "listed" the requested objectives with no discussion and sense of politeness. Although the professor had presented a netiquette link, the resulting discussions could hardly be called a "conversation", so unattached were they.

There are already two years that the professor is using electronic conferencing in this medicine course. The goal, according to the professor, was to make homogeneous the objectives of the problem-solving working groups that were discussing the same problem. In order to help them to fix the objectives, the professor found that electronic conferencing would be ideal. Although the professor believes that students did not like electronic conferencing, there are doubts about whether it was really useful. The intervention strategy was one of waiting for student-student interaction and answering questions in the hope that conferencing would create a need of mutual help. However, the professor recognizes that the online conference strategy adopted to facilitate logistics

provided, in fact, minimum effort from students. The professor had the impression that students only participated in order to get points (which were considered significant in the context of a medicine course) and was disappointed with what was considered to be poor results. The students interviewed found the online experience positive but in their answers they focused mostly on other aspects of the online experience rather than on electronic conferencing. It was noted that although participation was mandatory the use of conferences had a positive impact on the process.

Discourse analysis

The study was done upon 49 messages of 7 problem-solving working group online conferences, open to those assigned groups. Participation was not mandatory but students got participation points. Messages with arguments were almost non existent: most messages did not have any arguments (Figure 8).

Messages	**#**	**%**
With arguments	3	6
Without arguments	46	94

Figure 8 - Presence of arguments

Co-construction of arguments was also almost non-existent but some construction could be seen in messages without arguments, mostly because of the use of the reply function to answer a question (Figure 9). The professor participated in 26.5% of the conference (13 messages written) and was responsible for 84.6% of messages with construction (9 messages). Most messages had no arguments and construction: just information publication ("listing the objectives").

Messages	**#**	**%**
With arguments and construction	2	4
With arguments and without construction	1	2
Without arguments and construction	9	18
Without arguments and without construction	37	76

Figure 9 - Arguments and construction

In terms of values, most messages had a negative or neutral content. Most students did not even use to say "Hello" (Figure 10).

Values 1	**#**	**%**
Positives +	15	31
Negatives -	24	49
Neutral +-	10	20

Figure 10 – Intensity of values

As stated above, most negative and neutral messages were those that just presented crude information (the objectives) with any kind of attempt to interact. Many positive messages, though, were those that presented arguments (Figure 11).

Values 1 (%)	**Positives +**	**Negatives -**	**Neutral +-**
With arguments and construction	2	0	2
With arguments and without construction	0	0	2
Without arguments and construction	12	4	2
Without arguments and without construction	16	45	15

Figure 11 – Intensity of values according to messages with or without arguments, with or without construction

As expected, most messages had a neutral information value (Figure 12). A significant number had also an affective value and few messages a moral value (all of them written by the professor exercising authority in a way or another).

Values 2	#	%
Affective	21	43
Moral	3	6
Informational (neutral)	25	51

Figure 12 – Type of value

Concerning how the types of value were distributed, the figure below (13) just highlights what has already been suggested above.

Values 2 (%)	Affective	Moral	Neutral
With arguments and construction	4	0	0
With arguments and without construction	2	0	0
Without arguments and construction	12	4	2
Without arguments and without construction	25	2	49

Figure 13 - Type of values according to messages with or without arguments, with or without construction

When we cross the values, we further confirm the trends of these conferences. Negativity was related to neutral (informational) statements because most students just published objectives disregarding any usual polite words used in written communication such as e-mail (Figure 14).

Crossing values (%)	Affective	Moral	Neutral
Positives +	31	0	0
Negatives -	0	4	45
Neutral +-	12	2	6

Figure 14 - Crossing intensity and type of values

Hereunder we show one of the few examples of knowledge construction emerging from the conferences in which two students and the professor discussed a problem to be solved:

Message p (Informational / Affective value – with argument – no construction)
(Student A'')
Premise 1 – Hi Dr…. In the self-assessment quiz of the problem-solving working group 6, question 8, response about hypocalcaemia is related to the augmenting of phosphor-calcium product and vitamin D…
Premise 2 – I thought I had understood from my readings that the phosphor-calcium product was a kind of constant, THEN how could it augment?
Conclusion – (IF the previous THEN) I understand that as the augmentation of the phosphate triggering a diminution of calcium to guarantee that the phosphor-calcium product does not change… (Signed)

Message p' (Informational / Affective value – with argument – with construction upon the previous argument)
(Student B'')
Premise 1 – Hi there, I am not sure whether I have the good answer or not but if PO4 augments, it produces the diminution of Ca2+ because it will precipitate both the PO4 and the Ca… Conclusion – (IF this) THEN it will lead the phosphor-calcium product at a constant level (after having diminished the Ca2+).

Message p'' (Positive / Affective value – no argument – with construction upon the previous message)
(Professor)
Rhetorical procedure – You have the good answer! (Signed)

Conclusion

Our research suggests that, although the quality of online interaction cannot be strictly attributed to a given teaching strategy, the nature of the discipline, planning of the course and management of the online conferences shape the level of participation. The use of online conferencing can hardly be considered a success in these courses but our goal here was not one of evaluating them in terms of a dichotomy success/ failure. In fact, the conferences served those who asked questions and had them answered, served as a communication tool

about administration information the professors were willing to broadcast, and served for those unhappy voices that used the conferences either for legitimate or non legitimate reasons. Argument co-construction was reasonable in the Chemistry course and poor in the Medicine course indicating a low to medium level of online learning emerging from the written interactions. However, nothing could be said about effective student learning in those courses because they were not limited to the virtual and also had a face-to-face component.

These experiences, however, show the potential of the use of online conferencing. They certainly should be re-thought in the context of the sciences, and the strategies employed adjusted with a goal of extracting a more consistent engagement and participation. This adjustment should be one of reconsidering the rules employed in order to avoid negativity in the exchange of values, critical for promoting co-argument building and knowledge construction.

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