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Title: Understanding and mind wandering.

An account of the silent conceptual experiences of the students.

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## Abstract

Fine-grained methods studying knowledge in transition proceed habitually by interaction analysis in small groups of students. But how could we investigate processes underlying conceptual change in large-group situations, in which most of students just attend and may encounter mind wandering or attention lapses?

We focused on large group but rather participative situations: we studied collective debriefings of role-playing activities in teacher education. We used “course of action” method from ergonomics in which “self-confrontation” interview technique aimed at accessing not only to the manifest experiences of students who were participating in interacting but also to the silent experiences of those just attending these interactions. Data were analyzed by indentifying units of experience, and then conceptual distinction and relations in these units. Afterwards we assessed the alignment of the conceptual experiences of each student on those of the teacher.

Results showed that the participation of the students in the debriefings may not reflect their alignment on the conceptual elements the teacher intended to present. Therefore the teachers have to avoid a “participative illusion” regarding the conceptual understanding in such large-group situation.

## Question

Different fine-grained methods allow tracking minute by minute the processes underlying conceptual change in natural learning situation. Most of them rely on various forms of interaction analysis in small groups – very often in pairs of student (Duit, Roth, Komorek &

Wilbers, 1998; Izsák, 2000, Parnafes & diSessa, 2013; Pratt & Noss, 2002, Roschelle, 1998; van de Sande & Greeno, 2012; Welzel, 1998). Therefore results are based on data capturable by video recordings: language or more generally behavior of persons who were interacting together.

But all of these analyses do not account for the processes occurring when persons are not participating but just attending the interactions. Such moments are widespread even in the most participative pedagogies and particularly in large-group situations. How could we access accurately to the individual experiences of all the students whereas only few (very often two!) of them can interact simultaneously? How could we study processes underlying conceptual change when students may drift off (Bunce, Fleins & Neiles, 2010) and their mind may wander (Szpunar, Moulton & Schacter, 2013)?

## Method

We studied sessions of a seminar in teacher education aiming at making the students know the professional concepts of “instruction”, “task”, “activity” and “cognitive strategy”. We focused on large group (n=25) but rather participative situations: we analyzed collective debriefing of small group role-playing activities that took place before.

Hypothetically, we endorsed a method from ergonomics, the “course-of-action” method (Theureau, 2003) allowing investigating the dynamic of the ongoing experience of agents in natural situations. It is based on data associating video recordings and interview technique of stimulated recall named “self-confrontation”: every agent, while viewing the video, is urged to recall and explain what he/she was personally experiencing at every moment (von Cranach & Harre, 1982). We gathered such data about the experience of five agents (the teacher and four of the twenty-five students); we also collected documents used during the session and notes taken by students.

We analyzed data by identifying and categorizing units of experience which were significant for each agent. At every moment of the sessions each agent was experiencing something even if he/she were not actively participating to the undergoing interaction – thanks to self-confrontation data we could access to those silent experiences.

In each unit we characterized conceptual distinctions, i.e. the discrete entities identified by agents (e.g.: to make a difference between “instruction” and “task”, that is between what is said and what is expected). We also investigate the relations they established between these distinctions (e.g.: “instruction makes the children act” or “teachers should write their instructions”). Then we compared the conceptual experience between each student and the teacher: we attributed a grade (ranking from 0 to 5) to their “conceptual alignment” combining the comparison of the distinctions and the comparison of the relations they experienced.

## Findings

The unit-by-unit grading of the “conceptual alignment” of the students objectified their level of understanding. It allowed us to draw unit-by-unit alignment graphs and to identify which conceptual elements introduced by the teacher were seized or not.

In this methodological presentation we only sketch an example of results about the collective debriefing of a role-playing situation which took place in the first session of the seminar. Whereas the four sample students participated actively along this debriefing, the global grade of their conceptual alignment with the teacher ranked from the minimum (0/20) to almost the possible maximum (19/20). Therefore the four sample students sometimes did not seize the conceptual elements the teacher intended to address even if they interacted with her and other students: for example none of the four students experienced the distinction of “two kind of instructions” (procedure to follow and problem setting) that the teacher tried to introduce.

Hence the participation of the students in this large-group situation did not reflect their understanding of what the teacher intended to present.

## Conclusion

From the teacher’s perspective, the active participation of “the students” often indicate some conceptual evolutions, and he/she may suppose that all of them evolve in the same way. In fact these evolutions seem actually distributed among students: each of them (even the most participative) may benefit of only a part of the apparent collective progress. So it appears that the teachers have to avoid a “participative illusion” regarding the conceptual understanding in a large-group situation.

As the guidance of the teacher varies throughout the sessions, further analyses will allow us to contribute to the discussions about guidance and effectiveness of constructivist approaches in education.

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