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University teaching in the large classroom

Engaging different disciplines in didactic transposition and educational reconstruction processes

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THEORETICAL FRAMEWORK (1)

- **Francophone approach to university teacher training methods** (Frenay & Bedard, 2004; Langevin, 2007).
- **Adult education and pre-service/in-service teacher education** (Nigris, 2004; García & Roblin, 2008).
- **Didactic transposition**: Chevallard 1985; Martinand 1986; Perrenoud, 1998; Rossi, Pezzimenti, 2012; Nigris, 2016) and **educational reconstruction** (Duit, Komorek, & Wilbers, 1997; Komorek & Duit, 2004; Stavrou, Duit, & Komorek, 2008) (Duit et al., 2012; Van Dijk & Kattmann, 2007).

THEORETICAL FRAMEWORK (2)

- **Core concepts as knowledge organizers** (Ausubel, 1994) **and conceptual maps** (Novak, 2002; Damiano 2008)
- **The social legitimation of knowledge** (Damiano 2007; Rossi, Pezzimenti, 2012; Rivoltella, 2012)
- **The relationship between teachers' subject-matter knowledge and pedagogical content knowledge** (Shulman, 1987; Michelini, 2015; Rossi, 2017)
- **The relationship between subject-specific teaching methods, trans-disciplinary approaches and conceptual change** (Vosniadou, 1994; Bocchi, Nigris, & Passalacqua, 2016; Zecca, 2017; Nigris, 2018; Nigris, Balconi, & Passalacqua, 2018, 2019)

THEORETICAL FRAMEWORK (3)

Multidisciplinarity / Interdisciplinarity / Transdisciplinarity

- **Multidisciplinary:** (Rossi, 2011; Morval, 1993) Juxtaposition of scholarship from multiple disciplines that have explored a given topic, without relating the different paradigms to one another.

- **Interdisciplinary:** (Nicolescu, 2014) Inquiry in which a topic is explored from different disciplinary perspectives and in relation to different dimensions of knowledge (ontological, epistemological, methodological).

- **Transdisciplinary:** (Blanchard-Laville, 2000): Inquiry approach by which experts from different subject matter transcend disciplinary boundaries to confront and integrate ontologies, epistemologies and methodologies, giving rise to new knowledge and, sometimes, to new disciplinary fields

WORKSHOP: "TEACHING LARGE CLASSES"

Themes and activities	Methodologies
Module 1: four hours **Communication in the teaching-learning process**	
1. Introducing module and participants 2. Analysis of a conventional lecture on a humanities topic 3. Conventional lectures: eliciting the active involvement of students in the large classroom	• Conventional lecture and Dialogue-based lecture • Video Analysis/ Large-group discussion • Brainstorming
Module 2: four hours **Triggering student learning: using discussion in the large class**	
4. Discussion as a teaching-learning methodology 5. Analysis of a dialogue-based lecture on a science topic 6. The different types of lecture	• Conventional lecture/ Dialogue-based lecture • Discussion (large group) • Video Analysis/ Large-group discussion • Brainstorming • Individual writing activity
Module 3: four hours **Selecting content and choosing methodologies**	
7. Choosing learning contents 8. Choosing methodologies for teaching complex concepts or contents	• Role play • Pair group activity • Large-group discussion

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From MULTI-DISCIPLINARITY Toward TRANS-DISCIPLINARY

1. Multidisciplinary group of participants

Participants were selected from a range of different disciplinary areas to foster distancing from their own subject areas and disciplinary languages: 121 University teachers from 11 departments over seven editions of the workshop.

2. From a mono-disciplinary to an inter-disciplinary perspective

Activities most specifically designed to elicit these outcomes:

- (Individually and in pairs) Video analysis on teaching-learning activities in different disciplinary fields;
- Role play in pairs of a teaching-learning activity: each member, in turn, teach to the other a complex content/concept considered difficult by students;
- Semantic Group analysis starting from different ways to pose questions

3. From an inter-disciplinary towards a trans-disciplinary perspective

Debriefing moderated by teacher trainer belonging to Edicatonal field of research

RESEARCH QUESTIONS

A. Whether and how can an inter-disciplinary workshop help participants to reflect on their own teaching methods?

B. How educational researchers with expertise in teaching and learning methods can best guide an interdisciplinary group to engage in trans-disciplinary reflection (trans-disciplinary metacognition)?

METHODOLOGY

- **Phenomenological perspective**
  Aim: to analyze meanings within a specific context. Understanding based not only on quantification, but also on interpretive processes (Gadamer & Sinigaglia, 1994; Cohen, Kahn, & Steeves, 2000).

- **Data collection instruments**
  1) Pre-training questionnaire
  2) Analysis of the documentation of the training process (audio recordings of the group discussions)
  3) Post-training questionnaire

- **Method of analysis: constructivist grounded approach (Charmaz, 2014)**
  Analysis of discursive practices
  Construction of a set of core categories

DATA ANALYSIS: CORE CATEGORIES

a) Selecting the knowledge to be taught

b) Students' concept construction

c) Strategies for making subject-specific concepts more accessible

QUANTITATIVE RESULTS: Post-training questionnaire

Multi-disciplinarity and inter-disciplinarity: effectiveness ratings

Over 90% of participants confirmed that it had been useful to attend a workshop with interdisciplinary group of colleagues.

- **Over 75%** stated that they would like to participate in follow-up training with interdisciplinary groups of colleagues
- **About 15%** would like to follow up the interdisciplinary training with specific training specifically direct to their subject area

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QUALITATIVE RESULTS (1)

(Open-question questionnaire)

THE ROLE OF THE TRAINER

"**The trainer did not give us techniques to apply, but helped me to meta-reflect on teaching decisions** that I was unconscious of up to now"

"By asking me to think about how I go about choosing course content, **the trainer helped me to see that I don't have in mind my students when I select content**"

"I also learned from analysing how the **Workshop trainers** conducted the teaching activities during the workshop and **how they took up and reformulated our contributions, thoughts, statements over the two day"**.

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QUALITATIVE RESULTS (2)

SELECTING KNOWLEDGE TO BE TAUGHT

FROM ⇨ TO

From monolithic vision of knowledge ⇨ **Content selection and a multifaceted vision of knowledge**

"**I have to give them this content**"

"Because I [include] concepts that my students don't encounter anywhere, they don't have the foundation".

"**Out of all the definitions, we start out from the most difficult one**. I feel compelled to give them that one, rather than other unsophisticated [definitions]".

"This exercise in exchange among colleagues from different disciplines helped me to focus on conceptual transitions that I had been taking for granted; it helped me to grasp what is top priority in our disciplines. (…) to ask what is the essence of the problem we wish to examine**"**.

"They are two different methods with different applications. What emerged was to make a comparison, not to offer a closed solution, but to leave open the comparison, the dialectics between the two positions**".**

"Anatomic pathology is evolving, but just as general pathology is evolving. So these techniques are evolving dynamically because the theory [underpinning them] is evolving."

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QUALITATIVE RESULTS (3)

STUDENTS' CONCEPT CONSTRUCTION

FROM ⇨ **TO**

Gaps in students' prior knowledge

"When you approach complex topics, even with students who are on the second year of the master's degree programme, **they can't understand, they can't even imagine, they are lacking in experience.** Here, you see the difference with working students who in contrast are able to understand. (…) you want to get them to understand complexity but they are looking for neat formulas, a more narrative approach to the topic while they are not able to take a more analytical and critical approach".

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The different types of student

"Given that there are different cognitive models …. **I probably offer the most abstract explanation which only gets through to some of the students.** He gave me a suggestion for a more operational explanation of how to go about solving [the problem]".

"I have been teaching physics for a long time and I must say that I now have a good grasp of **what it means to teach physics to opticians and physics to physicists.** It's very different, especially with respect to what students know before starting the course and how they reason about the experiments I often do".

Learning as memorization

"I teach psychometrics(…). And in this subject, a majority of students learn concepts from memory, **then no sooner have they done the exam than they give a little shake to their heads and it's all gone"**.

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Taking the students' prior knowledge into account

"…, my colleague helped me to think about how this competence is managed during the course. **For example, by thinking of some background questions a few days before dealing with the concept … and starting from there".**

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QUALITATIVE RESULTS (4)

STRATEGIES FOR MAKING SUBJECT-SPECIFIC CONCEPTS MORE ACCESSIBLE

a) The relationship between amount of content and time devoted to teaching it

"I think my students don't understand the difference between the [everyday] definition of equal and equal [as it is defined in my subject] (…). While I was discussing this with [my colleague] earlier on, **I realized that I go too fast with my students as well (…). Perhaps I should spend more time building up that [initial part] because then maybe I could halve the hours I spend on the final concept**".

b) Rethinking the teacher-student relationship

"**I was interested at every stage to see what feedback she was giving me, what kind of questions she was asking,** and I tried to see when she was panicking a bit because I was introducing a trickier concept, so that my explanation would be useful to her, but based on language that was familiar/everyday".

C) Strategies for stimulating student questions

"And then **I tried to understand why my message doesn't get across to the students so easily** and what came out was precisely this aspect of **trying to stimulate their questions a little bit more, presenting the topic in a less pre-digested form, getting them to think it out for themselves".**

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QUALITATIVE RESULTS (5)

THE TRAINERS' STRATEGIES FOR MAKING SUBJECT-SPECIFIC CONCEPTS MORE ACCESSIBLE

e) Using accessible language

"Both of us started out using **very simple language, I gave her some everyday examples**. For example Facebook, building up gradually to complex concepts, giving other everyday examples along the way, with the theoretical aspect mixed in".

"Perhaps a lot of difficulty arises at the start [of introducing a topic], I am a mathematician and so I launch straight into the theory of a topic that is challenging and **maybe start giving examples halfway through, whereas earlier on with [my colleague] I gave the example at the beginning and then it was easier**".

f) Using examples to contextualize a concept

"In the sense that **you took an example that was an immediately familiar scenario for me or for a student,** and you added to that scenario a little at a time, getting me to understand that step in your formalization [of the concept]. **You not only provided an example, but you developed it, so that the formalization in your head became increasingly concrete for me, step by step**".

"**Obviously I didn't use any formulas, or formalism**. I tried to get the idea across just using the example. I used **several different examples try to engage [him] as much as possible without doing anything formal.** And then, after he had tried to deconstruct and reconstruct what I had just said, at that point it was possible to formalize a bit more".

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CONCLUSIONS

MULTI-DISCIPLINARY GROUP

ROLE OF TRAINER (EXPERTISE IN TEAHCING AND LEARNING METHODS)

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STEP 1: FROM A MONO-DISCIPLINARY TO AN INTER-DISCIPLINARY PERSPECTIVE

The participating lecturers' newly acquired perspective on their teaching practices may also be viewed in terms of a transition from a mono-disciplinary perspective to an interdisciplinary one

STEP 2: FROM AN INTER-DISCIPLINARY TO A TRANS-DISCIPLINARY PERSPECTIVE

Participants began to use concepts from a new area of knowledge

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PEDAGOGICAL AND DIDACTIC PERSPECTIVE ASSUMED BY PARTICIPANTS

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DEVELOPMENTS IN THE THE TRAINING PROJECT AND IMPACT ON UNIVERSITY CULTURE

1. **Request for ongoing support from the course participants**
   = customised consultations on teaching-learning methods
   = classroom observation

2. **Training tutors in teaching-learning methods for specific disciplinary areas**

3. **Request for the training programme to be delivered to the entire academic staff of a degree course** (educational psychology)

4. **Training programme for newly-recruited assistant professors**

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