

# DECODING THE DISCIPLINES

## A PILOT STUDY AT

### THE UNIVERSITY OF LIÈGE (BELGIUM)

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# Advanced organizer

- I. Context
- II. Method
- III. Results
- IV. Discussion and further work



# I. CONTEXT

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# A pilot project

- Goal: to evaluate the potential of the approach (pedagogy, didactics, staff development)
- Internal fundings (failure prevention & retention program): a researcher one day per week during 9 months.
- 7 teachers / two pedagogical advisers

# Vocabulary

bottleneck / Treshold concept / learning obstacle / **learning lock/bolt**

- A series of mental operation
- , needed for the aqcuisition/mastery of a know-how/attitude,
- which over and over again cause trouble, confusion, failure to learn
- to a large number of students
- despite efforts of teachers (frustration)

Intellectual processes targeted by the approach are critical to become an expert in the field.

# Assumptions

- The bottleneck can be explained by a gap between what is taught and what should be taught
- This gap is a « by-product » of the teacher expertise (Bottleneck  $\approx$  Eriksson)

# What We Need to Teach

(From Airport to University College Cork)

- Use caution - may involve errors or sections not suited for walking
- Cork Airport Kinsale Road, Cork, Ireland
- Head south
- At the roundabout, take the 2nd exit onto Avenue 2000
- Go through 1 roundabout
- At the roundabout, take the 2nd exit
- At the roundabout, take the 1st exit onto N27
- Slight left onto Forge Hill
- Turn right onto Pouladuff Rd/Pouladuff Road
- Continue to follow Pouladuff Road
- Go through 2 roundabouts
- Turn left toward Glendalough Park
- Continue onto Glendalough Park
- Continue onto Hartland's Ave
- Continue onto Dorgan's Rd
- Continue onto Highfield Ave
- Continue onto Gaol Walk
- Turn left
- Destination will be on the left

# What We Actually Teach

(From Airport to University College Cork)

- ...
- Cork Airport Kinsale Road, Cork, Ireland
- ...
- ...
- Go through 1 roundabout
- At the roundabout, take the 2nd exit
- At the roundabout, take the 1st exit onto N27
- ...
- Turn right onto Pouladuff Rd/Pouladuff Road
- Continue to follow Pouladuff Road
- ...
- ...
- Continue onto Glendalough Park
- Continue onto Hartland's Ave
- ...
- Continue onto Highfield Ave
- Continue onto Gaol Walk
- ...
- Destination will be on the left

(Bottleneck  $\approx$  Tyler, Leclercq, Biggs)



## Слайд 8

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**U1**

domi; 07.06.2017

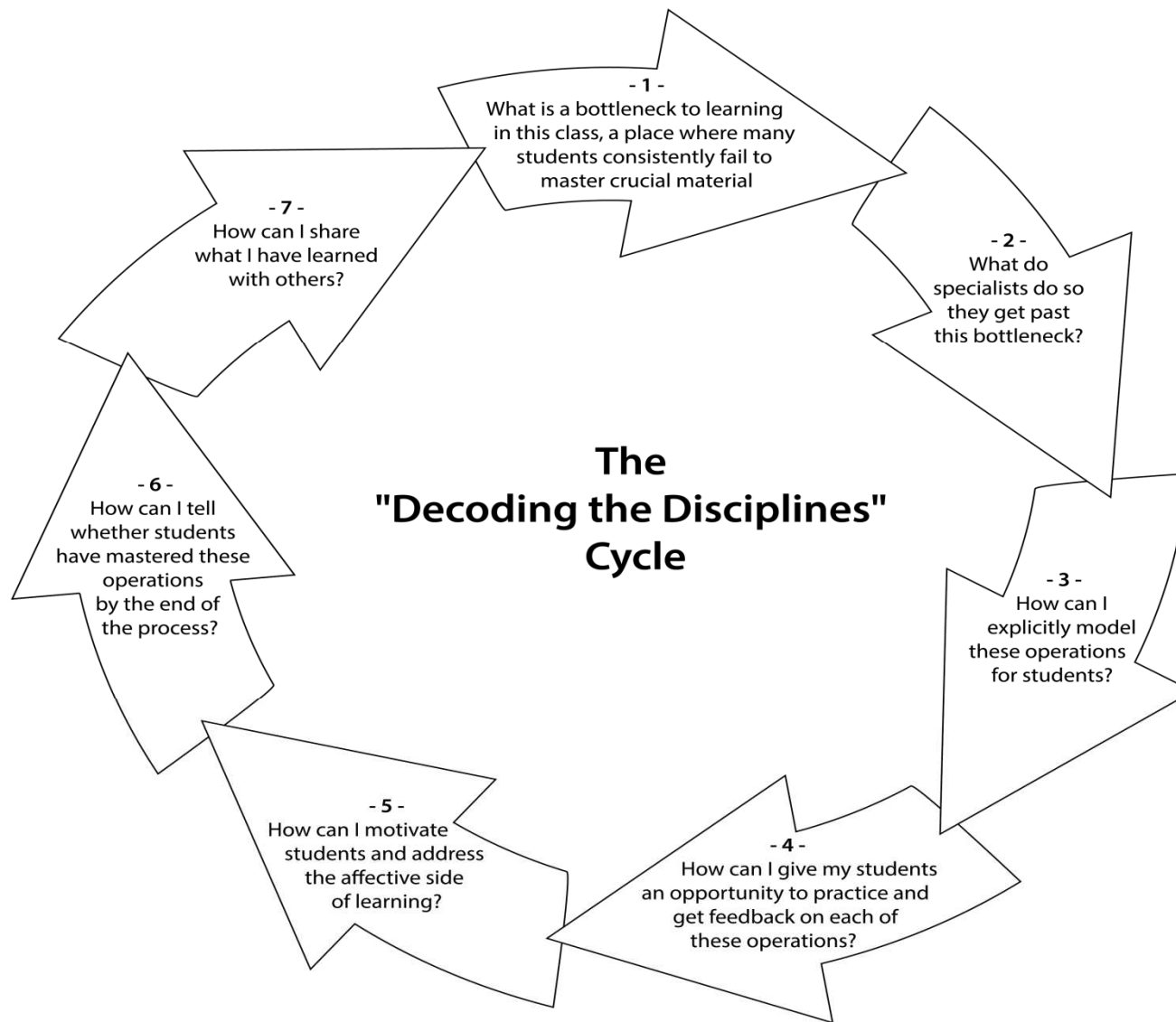


Fig. 1. The pilot study targeted Stages 1 and 2 of the Middendorf and Pace cycle (2004)



## **II. METHOD**

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# Step 1 - Project presentation

- Standardized individual meetings (15') introducing volunteers to the Decoding the Disciplines approach *(may – june 2016)*
- Short online questionnaire collecting spontaneous views on the approach *(june –july –2016)*
- Optional readings on bottlenecks and/or threshold concepts sent to volunteers

# Step 2 - Bottlenecks description

- 10-line description of 2 or 3 bottlenecks they thought of for their courses  
(september-october 2016)

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## Les verrous d'apprentissage

I. Décoder sa discipline ?

Si cette démarche suscite votre intérêt, nous vous proposons de tester les deux premières étapes du cycle de Pace (2016), à savoir, l'identification de l'un ou l'autre verrou d'apprentissage présent dans un de vos cours et de tenter de les expliciter en réalisant une interview avec deux membres de notre équipe. Nous offrons la possibilité aux enseignants qui le souhaitent d'effectuer la suite du cycle de décodage de leur discipline.

**LECTURE : *The Decoding the Disciplines Paradigm: Higher Education as if Students Really Mattered*, David Pace with Joan Middendorf (2016)**

Quels sont, d'après vous, les deux ou trois verrous d'apprentissage que vous identifiez dans votre discipline?

De façon générale, je mentionnerai la difficulté de passer de principes théoriques relativement abstraits dispensés en cours à une application concrète lors de l'examen. Deux exemples de verrous d'apprentissage me viennent à l'esprit, qui concernent le cours d'initiation à la méthodologie des sciences sociales. Il s'agit d'un cours d'introduction aux principes de recherche en sciences sociales, donné principalement aux premiers bacheliers en science politique et en sciences sociales de l'ULg. L'objectif principal est de familiariser les étudiants à la recherche en sciences sociales, en leur décrivant comment se décline un parcours de recherche et ses principes.

1) La marge d'erreur en statistiques

Nous leur présentons notamment de façon superficielle comment se construit une enquête statistique. En effet, nous ne sommes pas du tout des spécialistes et les étudiants auront l'occasion d'entrer dans les détails avec des cours spécifiques. Dès lors, nous nous contentons de travailler quelques principes généraux qui permettent, nous semble-t-il, de comprendre l'économie générale d'une enquête statistique. Parmi ces principes, nous leur expliquons celui de marge d'erreur, qui

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doit nécessairement accompagner toute enquête, afin de fonder sa validité. On entre un tout petit dans le détail en leur expliquant la formule qui permet d'y parvenir. Lors du dernier examen, nous avons posé la question suivante :

Un récent sondage sur les intentions de vote en Wallonie annonce les résultats suivants :

- PS : 25,8%
- MR : 20,1%
- PTB : 13,5%
- CDH : 12%
- Ecolo : 10,8%

Sur base de ces informations et sur base des enseignements du cours, quelles conclusions pouvez-vous en tirer ?

Nous avons imaginé que cela sauterait aux yeux des étudiants qu'aucune conclusion ne peut être sérieusement tirée puisque la marge d'erreur n'est nulle part précisée. Or, la plupart s'est essayée à des commentaires boiteux sur l'état des intentions de vote en Wallonie, ce qui n'était absolument pas l'objet de la question. D'ailleurs, durant l'examen, nous avons oralement précisé qu'on voulait un commentaire méthodologique, que peu d'étudiants ont correctement réalisé. Bizarre, car cela ne nous semblait pas hors de portée puisque nous avons maintes fois précisé qu'une marge d'erreur doit être précisée si on veut accorder du crédit à par exemple un sondage. Mais cela ne semble pas avoir percuté. Pourquoi, je l'ignore.

2) La théorie du suicide chez Durkheim

Dans une autre partie du cours, nous leur présentons la théorie du suicide de Durkheim. Entre autres, nous leur présentons la typologie des suicides imaginée par Durkheim, qui en comprend trois (voire quatre). Nous appuyons la présentation théorique des différents types d'un petit exercice en séance visant à identifier les types de suicide en fonction d'images, comme par exemple un kamikaze japonais s'appretant à écraser son avion sur Pearl Harbor.

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Lors du dernier examen, nous leur avons soumis la question suivante :

Le 24 mars 2013, Anders Lubitz, co-pilote de la compagnie Germanwings, provoquait volontairement le crash de l'A320 reliant Barcelone à Düsseldorf, entraînant le mort des 121 occupants de l'appareil. Nombreuses furent les tentatives d'analyse de ce geste.

Parmi celles-ci, nous avons relevé la suivante :

« Alors que l'hypothèse d'un suicide du co-pilote de l'A320 de Germanwings progresse, le psychiatre Patrick Légeron avance la thèse d'un "suicide altruiste," dans lequel "on entraîne la vie des autres en pensant qu'on les libère » (BFM TV, 26 mars 2013, consultée le 26 avril 2013)

Dans son analyse du suicide, E. Durkheim a notamment conceptualisé la catégorie de « suicide altruiste ». Son explication de cette catégorie de suicide rejoint-elle l'interprétation du psychiatre Patrick Légeron telle que mentionnée ci-dessus ? Argumentez.

De nombreux étudiants sont passés complètement à côté de la réponse attendue qui était grosso modo que l'interprétation du psychiatre ne rejoint en aucun cas celle de Durkheim. De nouveau, cela ne nous semblait pas extrêmement compliqué à argumenter mais ce fut le cas. Pourquoi, de nouveau, je l'ignore.

[3]

# Step 3 - Decoding interview

45' video-recorded decoding interview with each teacher

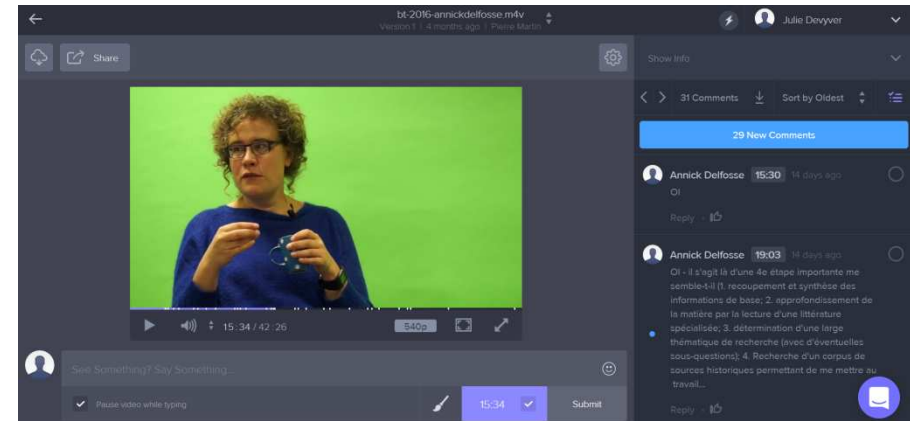
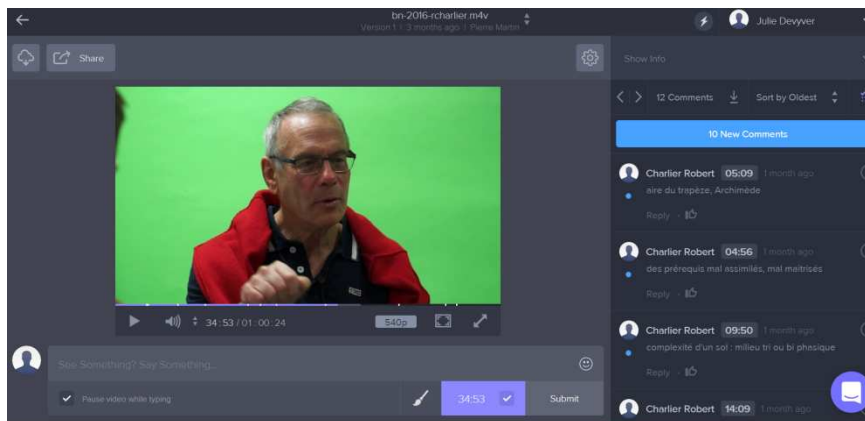
Guidelines: D. Pace recommendations (2017), a list of relevant questions collated from different sources, examples of Decoding interviews

(<http://decodingthedisциплиnes.org>) (*october-november 2016*)



# Step 4 - Cross-analysis

- Interviews uploaded on Frame.io platform
- Teachers/pedagogical advisers tag mental operations they detect in the own discourse.  
*(november –décember- january 2017)*
- <https://app.frame.io/?p=HIY9ulzT>







## Data gathering (according to the 3Ps)

- **P**articipation (engagement): data source = the plain observations of professor's engagement and persistence in the project.
- **P**erception: data sources = short questionnaires filled in at Step 1 + feedback given at Step 5.
- **P**erformance: data source = tags in the decoding interviews videos.



# III. RESULTS

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# Participation

Out of the 10 professors contacted (on the suggestion of the “Study Guidance Service” of the university), 2 declined, invoking a lack of time, and one entered the process but gave up at Step 3

# Participation

R. 1	Geomechanics (Faculty of applied sciences)
R. 2	
R. 3	Chemistry (Faculty of sciences)
R. 4	
R. 5	History (Faculty of Humanities)
R. 6	Sociology (Faculty of Social sciences)
R. 7	Electronics (Faculty of applied sciences)

# Performance

- Out of the 28 bottlenecks written down “on paper” at Step 2, 16 were examined in the decoding interviews during a time period running between 4’ and 42’ ( $M = 19'$ ,  $SD = 10$ ).
- Short durations usually reflected – but not always – that the assumed bottleneck turned out not to be one.
- Professors related a total of 62 mental operations to the bottlenecks while the pedagogical adviser identified 119 thereof.

Respondents	Decoding interviews (Step 3)			Cross-analysis (Step 4)	
	Bottlenecks considered	Bottlenecks confirmed	Bottlenecks discussion time	Intellectual moves tagged by professors	Intellectual moves tagged by the adviser
R. 1	V1	No	19'58	/	/
	V2	Yes	12'05	9	8
	V3	Y	15'14	5	5
R. 2	V1	N	4'05	/	/
	V2	Y	19'26	3	15
	V3	Y	11'07	1	4
	V4	Y	21'03	1	13
R. 3	V1	Y	22'01	4	10
	V2	N	12'05	/	/
	V3	New*	6'29	2	3
R. 4	V1	Y	24'15	8	14
R. 5	V1	Y	42'35	27	25
R. 6	V1	Y	29'	2	9
	V2	Y	28'	0	6
R. 7	V1	N	12'	/	/
	V2	Y	21'	0	7

New\* = Bottleneck that emerged in the Decoding Interview (not described at Step 2)

# Perceptions before exposure to DD approach

Based on the information they received at Step 1, professors credited DecoDisc of potential benefits:

- Identify student needs;
- Identify what can be problematic;
- Fostering own reflective practice;
- Improve their teaching;
- Increase student success;
- Explain the implicit;
- Nurture a personal reflection on professors' attitude;
- Directly resolve specific problems;
- Weave both didactic and pedagogical approach of topics;

# Perceptions before exposure to DD approach

Beforehand, the approach also aroused some professors' reluctance due to:

- the time entailed by the participation to the process;
- the lack of knowledge about threshold concepts and bottlenecks;
- the fact that the approach is based only on their own experience
- intuitions that, to be effective, DecoDisc must be linked with higher-level teaching/learning strategies



# Perceptions after having been exposed to DD approach

- **Ratio workload (7h, optimistic estimate)/benefit** considered positive by all teachers.
- **Unpleasant** to see oneself on the screen (6 teachers) but “re-listening to what I said on the spot was interesting (R.3) and “seeing myself talking was revealing of the extent to which certain intellectual operations seemed to him seamless” (R.6).
- **Satisfaction** : “I noticed buried things” (R.3), “I took a step back” (R3) and “I had to take the time for an enriched reflection” (R.1).
- **Déjà vu**: “the type of questions raised by interviewers (i.e: “what do I do as an expert when I face this problem”) was already present to their mind when they developed the instructional scripts of their courses (R1) + R7 similar


- **Discomfort (introspection)**: “it is not easy to analyze one’s own practice with one’s glasses” (R1).
- **Anxiety**: “This reveals my limits as an expert” (R5)
- **Novelty**: (R.3): “It brought a different view on a course that I have been giving for 10 years and that I have depleted in terms of pedagogical reflection and action” and “it’s always a pleasure to get to know new proposals in pedagogy that can inspire ways to do better or differently” (R. 4).
- **Eye-opener**: “The final debriefing enabled me to realize that aspects of disciplinary know-how are not easy for his students” (R.6) + “it yielded ideas for further interventions in my course” (R.3, who, interestingly, set up tests in order to confront some reflections on bottlenecks to his students’ performance) + R6: “it allowed me to realize that some teaching/learning elements seemed to me, wrongly, very obvious and basic”



# **VI. DISCUSSION AND FURTHER WORK**

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- Observation 1 – DecoDisc helps teachers to make aspects of teaching and learning (here: bottlenecks) an
  - *object of attention OK*
  - *object of action UNSURE (satisfaction, learning, new or renewed awareness, effect next year – no public decision to move ahead and even no genuine “private” intention expressed). Transition to step 3 was OUR bottleneck*
- Explanations:
  - a) the whole cycle should have been presented, right from the start, as a “take or leave” option,
  - b) the teachers were already aware of the bottlenecks which were not enough “striking” to impulse a treatment
  - c) the bottlenecks were too “big” to be dealt with, possibly due to a lack of training of the interviewers to manage the conversation at the “right level”
  - d) hard-pressed teachers rightly considered that they had spent efforts on the approach and had no time left for a follow-up
  - e) the following idea was maybe in some heads: “despite years of student support, despite all efforts I have been doing, the average success/failure rate remains desperately even, so why would this approach make a difference?”.
  - Others ?

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- On their side, the pedagogical advisers remain strongly convinced by the DD approach because its Cycle addresses a core concern of the teaching practice (obstacles to learning) and, doing so, can help concentrating disciplinary/pedagogical efforts on the courses themselves, and then possibly prevent remedial schooling.
  - However, the pedagogical advisers have also to admit that they hit upon their own bottleneck in this pilot: the transition to Stage 3.

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