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Innovation from students to students. *An experience of a free elective subject.*

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One of our tasks, as teachers, consists in proposing how the school curriculum is developed throughout de different subjects. Not only **what** (contents) but **how** (method) as well. Very often subjects' names are not really prescriptive, so under certain titles as Technology 2 or History 3 we can find some contents, which are more or less precise, which must be developed by the teacher, allowing the introduction of **innovation** at any moment.

It is easy to observe some innovative teachers who dynamically arrange their teaching every year, trying to improve methods, use new tools and incorporate new knowledge, while others repeat themselves year after year. However this kind of innovation is constrained by the subject title or, what is worse, by a more extended definition of the subject.

Free elective subjects allow innovative teachers to bring into the students' minds what they consider interesting, with no or almost no constrain. They can do it by introducing new knowledge, using new tools, producing new objects.

What we had experimented during the last spring semester in our school has been a new step in this direction. Not only we have used a free elective subject as a natural way for innovation, but we have even changed the natural procedure '*teacher-teaches-students*' by a new one '*students-teach-students*'.

Evidently such an experience doesn't come out of the blue. There is always a long process which eventually materializes itself in something objective, in this case in a teaching experience.

Some time ago, a group of seven students (some of them graduated in architecture during this experience)

1. Gerard BERTOMEU, student (Diploma February 2011)
2. Miriam CABANAS, student (Diploma ?)
3. Jorge DURÓ, Engineer (2010), student (Diploma February 2011)
4. Laia MOGAS, Architect (June 2009)
5. Marina ROCAROLS, student (Diploma February 2011)
6. Enrique SORIANO, student (Diploma July 2010)
7. Pep TORNABELL , Architect (February 2010)

started to self-learn, to talk, to exchange knowledge, etc. about *parametric architecture*. They discovered it by different ways, but all of them got so involved that decided to participate in some international workshops, where most of the

participants were graduated people. It was not easy, since their purchasing power did not allow them to attend these events. They had to invent ways and reason that opened those doors, but they got it.

After some months they had the opportunity to participate in the *Continuum f2f* workshop we held in our school and got in touch with me.

Continuum f2f is a Lifelong Learning Program, Erasmus Multilateral Project, that aims at putting together schools of architecture and small to medium sized enterprises to exchange research results, information, ideas, techniques, methods and expertise in the domain of design-to-manufacturing. A large number of contemporary buildings is generated through parametric design, that is the design of forms with the irreplaceable aid of computer softwares in a continuum to their manufacturing. At the same time technological advances in the genesis of new materials and methods for the fabrication of components creates a natural continuum from the design process of a building to its fabrication.

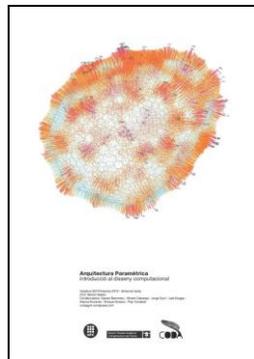
Chronology

A group of students share desire for knowledge in innovation
Visit Internet and the library
Attend some conferences, workshops, symposiums,...
Comment with friends and are asked to teach them
Pass this asking to the school
Looking for some teacher to join the group
Formalising the group: Create CODA
Propose a free elective subject for 2010, spring semester
Eventually the experience has been carried out

They showed their interest in proposing a new free elective subject for the spring semester. To do it, it was necessary to establish a good base. They needed me as it was completely necessary for a subject to be imparted to have a faculty responsible.



We all founded CODA, a group devoted to research on parametric architecture. Through a web site <http://codagym.wordpress.com>, the group started to gather information and proposing a programme for this new free elective subject. It was offered to the students and its acceptance was quite good, which allowed the subject to take place.



The poster to announce this course was not obvious. Under a strange graphic, the text “Parametric Architecture. An introduction to computational design” was the hook to capture possible students. Even the title “parametric Architecture” had to be discussed. I tried to put things clear about these three concepts:

1. Parametric geometry
2. Parametric design
3. Parametric architecture

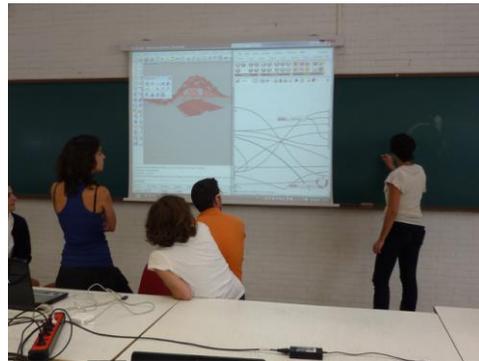
Parametric geometry was what really moved them at the beginning. They had been immersed in parametric software (GC, Grasshopper ...), scripts, open programming software (Processing), etc. They felt confident in these subjects, so there was a temptation to get stuck on this.

Parametric design was the natural following step. Applying rules to the geometry could be done through this software as well. But concepts become *more than* or at least *as important as* forms. Finally parametric architecture is the amalgam of parametric geometry and complexity. Architecture inputs are as varied as wanted, so teaching on this should deal with something else than software and strange drawings. Once this was agreed, the programme was generated around different topics:

- Discovering morphogenesis of different contemporary buildings
- Discovering available software: both programming and drawing-tools, used to design such buildings
- First steps in programming
- Design and build (make) with these tools and concepts

As contents were fixed, it was necessary to organize the ten sessions of the subject (4 hours each), as well as the practices the students must do and, finally, the design to be done as final work.

More than twenty students registered for the subject. Most of them belonged to the last year, although there were others from lower courses.



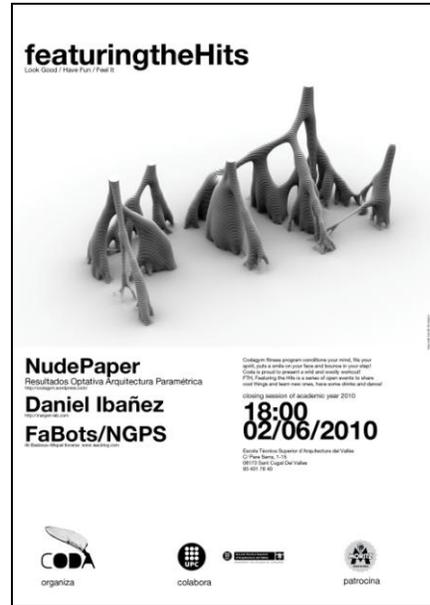
The global impression of the course is completely positive. I'm sure that the student-teachers have had an unforgettable experience that will change their opinion on teaching. And the students have had also a peculiar experience, not as strong as the teachers' one, but indeed very challenging. To share a class with a group of colleagues-students which explain you something is quite usual, but to take these colleagues as teachers is not. (See the announcing posters bellow.)

For me, it has been a challenging experience. And indeed it was an experience about innovation. It very curious to see how their doing reflects what we (the teachers) have been doing with them. From the talks we held together I could notice what the approved of "our" teaching system and what they rejected. And, consequently they tried to repeat these positive forms and avoid the others.

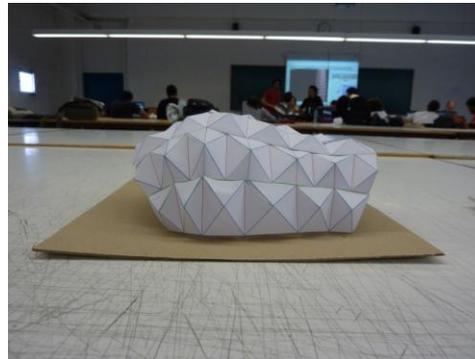
On the contrary, in my position of observer, I could intervene from time to time, but mostly I stayed aside, behaving as a student. This experience has been surprisingly positive. Much more than when I have the opportunity to share a class with a colleague teacher.

One of the things that took my attention more was the fact that they "invited" for two different occasions other students from other faculties to show their work as external lecturers. This kind of lectures are very common in the normal teaching at our schools and, due to the fact they copied it, I must think that they generally appreciate them. And I could say the same for other procedures (that I'm not going to mention here) that they used frequently in their classes.

Of course there were the negative aspects too. Well, not exactly negative but somehow inappropriate. One of the aspects I tried to harness was the natural inclination to explain "all" they knew.



They were aware of the time they had. Ten classes of four hours seemed enough at the beginning. But as the time passed and the end of the course was coming closer, they began to feel that they wouldn't have enough time to explain what they would have liked to. It was no point in my insisting that it was not necessary to deliver everything they knew. No point in telling them that coherence was more important than quantity. But eventually there was a nice and smooth ending of the course contents.



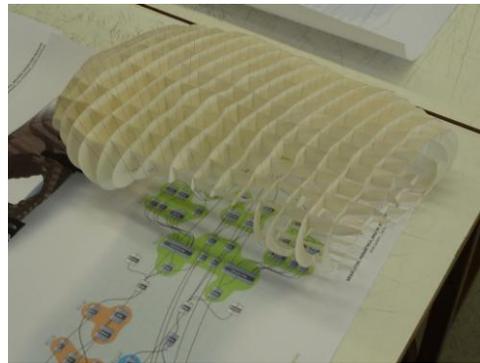
Finally, evaluation was the last step in this experience. Students have always seen this act from one side of the aisle, now they had been on the other side. I'm sure that it's been very interesting not only for them but for me as well. We had to decide how to mark each student. They had prepared some designs by groups. Each group proposed a technique that should be materialized in a paper structure. It was very important that they could recognize and explain which were the rules that governed their proposal.

During the last class, each group presented their work. They explained why and how they chose and carried out that project. The plans and models served as the objects to be evaluated, as well as the way they explained to the whole group their own project.

The "teachers" tried to get from the students the maximum information. They were eager to check how their teaching had produced knowledge transfer, what in fact would justify their good work.



Obviously, all the students that had followed the course passed. But the reason why each group had a different evaluation mark was the conclusion of this innovative experience we lived during the spring semester 2010. Discussions were not long but rich, and everyone in the group of “teachers” showed their personal appraisal of the course at the same time they evaluated each project.



There is the possibility to repeat something similar next spring, but this time, to be innovative, some new aspects must be introduced, otherwise what we would do would be just a repetition.

