_IT_ – Rossella Masi, teacher

Report on teaching visit – Vienna, Austria – 15.12. - 19.12.2008

Before the visit

I started the preparation of my visit taking part to four five-hours sessions in English, part of the Mathematical Science course of the Scuola di Specializzazione per l'Insegnamento Secondario (SSIS). The lessons addressed some central topics of Mathematics teaching, offering useful views on the subject, as well as interesting thoughts about teaching in general and different European school cultures. Though lectured in English, rather than German, they had a very important role in the overall preparation of my visit.
At the same time, I refreshened my knowledge of the German language, that I studied when I was in high school and that I practiced very seldom in the past 16 years.
At the beginning, I focused on grammar studying on my own, with the support of my old school books. Afterwards, from October, I took a German class at B1.2 CEFR level, organized by the *Centro Linguistico Interdipartimentale* of the University of Pisa, with a mother tongue teacher. In this way, I could improve reading and writing and, most of all, listening and speaking, two very important aspects for the success of my visit. Unfortunately, I could not improve the math technical language, because the lessons was addressed to a broad non mathematical audience.
To reach this goal, I used the math textbook of the school I would have visited and the mathematical German-English and English-German vocabulary that Prof. Favilli borrowed to me. Though I worked very hard, I always kept being concerned about the German language related difficulties, both before and during my visit.
At the same time, I contacted my hosting teacher, Ms. Christine Brunner, by email, the first time in August. At the beginning, we talked about general topics, such as the period of my visit. As regards the lessons I was scheduled to offer, I asked for info about didactical media, and the sort of lessons the pupils were accustomed to.
Afterwards, we started to define logistical details, such as the amounts of hours I was supposed to spend observing and teaching.
I always received quick, detailed and friendly answers. In particular, the hosting teacher let me always feel free to ask her for help and to plan teaching the way I preferred.

The visit

Teaching observations
Unfortunately, I couldn't use so much time as I would have needed to observe my hosting teacher, because one of her classes was out during the whole week. Nevertheless Christine took care of the organization in such a way that I could observe other Maths teachers of the school.
A first comment concerns the textbook, that is a bit different from the typical Italian books. In fact, the theory section of each topic is very short, with the main concept contained in a little box; the student can obtain any other important correlated

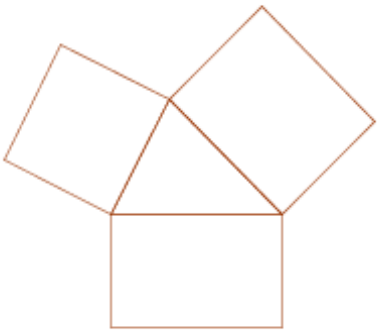
concepts from the exercises. I think that such an approach can be very successful if the students are offered the opportunity to work out concepts by themselves, under teacher guide; on the contrary that book would not have been adequate for a teaching style aimed at transferring notions from the teacher to a passive students audience.
The first one is indeed the teaching style I'm used to adopt while lecturing: I begin with a *starting point*, that I propose to the students, then I try to let them make good use of their brains, so that we can get to the lecture goal together. However, I think that the theory part of a typical Italian book is useful to the students while they study alone in the afternoon, to help them retain in their brain what they have learned in the morning. Reading the book of my hosting school, I wondered how it could help the students with this type of individual work, in particular with regard to those students who couldn't listen to the lesson, i.e., because they were ill. Moreover, the aim of most all of the exercises in the book is to let the students discover new concepts, one for each exercise, but there are not so many of them aimed at helping the students to deepen their understanding of already discovered ones. I think that some mechanisms have to be repeated a number of times before they can really become part of a student knowledge system. On the other hand, this approach is much easier to read of the Italian one, that sometimes uses too many words.
As far the lessons of my hosting teacher are concerned, for what I could see, they were not very different from mine. The teacher involved the students, some of them worked at the blackboard, while the other ones participated from their seat, supported by the teacher and made the exercises from the workbook. The atmosphere was really calm, the pupils felt free to take part or make questions, with a real collaboration.
I noticed the use of the blackboard: according to my experience, the rooms have small blackboards that cannot contain everything is written in a lesson. So I am used to write until it is full and then to wipe the board and carry on writing. In the school I visited, the blackboards were much bigger and can slide one on the other, so that everything was written on them could be read for the full lesson. I confess I envied the teacher of that school...

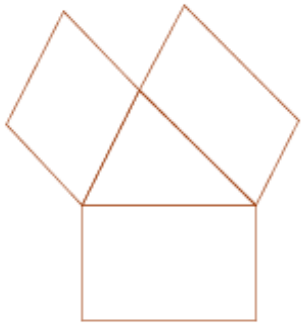
My own teaching
In my first contacts with Christine Bruner, I got info about the didactical supports of the school. In particular, I knew I could use a computer room and a video-projector. So, I prepared a presentation regarding the introduction of the Pythagorean Theorem and a computer activity with the didactical software GeoGebra that the pupils could do in the computer room. Afterwards I thought to program alternative lessons without using computer or video-projector; in fact, I didn't know the pupils ability with computer and if laptop with video-projector were handy. I transposed on card board the geometrical construction I had in mind to use for the lessons; in this way I could avoid making too difficult drawings on the blackboard, gaining time and, I hope, clarity too. Until the day before the lesson, I couldn't decide whether to use or not the didactical supports; finally, I chose not to use them, because in this way I felt confident to keep everything under my control, and that was important for my tranquillity.

So, I started my first lesson telling a legend about Pythagoras that let me show that it applies to right-angled isosceles triangles. This first part has been, perhaps, the most difficult one, because I had to speak German a lot to tell the legend and to present the rest of the lesson. With my classes I normally involve the pupils, but my German is not so fluent to permit me to do as I am used to. Nevertheless, I tried and some students participated Videoclip1.

Afterwards, I wanted to "prove" that the Pythagorean Theorem applies to every and just right-angled triangles. Moreover, I wanted to show that it is possible to distinguish if a triangle is right-angled, acute or obtuse, by verifying if applies respectively $a^2 + b^2 = c^2$, $s^2 + b^2 > c^2$ or $s^2 + b^2 < c^2$; consequently, I told the pupils to draw a triangle each and the square built on the sides; afterwards, they had to measure the sides and verify if the area of the square on the longer side was the same of the sum of the areas of the squares on the shorter one.

Most of the pupils paid attention on their work (even if someone sometimes needed to be solicited), but I noticed two different problems. First of all, the construction of the squares built on the sides was very difficult for some student; some of them drew rectangles or even parallelograms instead of squares, as it is shown in the figure:





Videoclip2 – Videoclip3.

I thought that the pupils would have found it difficult because my Italian students often have problems with it, but I asked them to draw the squares because I wanted that the geometrical meaning of the theorem was evident. I thought that I could avoid these problems by using the geometrical software GeoGebra, but I didn't choose this solution because of two reasons. First of all, I didn't know if the class could use GeoGebra for this; Christine Brunner, in the e-mails before the visit, told me that almost all of the students were acquainted with the geometry software GeoGebra, but I didn't want to risk, even because it would have been very difficult for me to give accurate instruction using the German language to the ones that needed help. But overall I thought that it could be an important opportunity for the pupils to face the difficulties of this construction.

The second problem is probably due to me: I probably did not paid enough attention while I was giving the instructions; in fact, I told the pupils they should name the sides of the triangles with a, b e c, but I guiltily forgot telling them that c should have been the longer side. So, when we collected the data in a table at the blackboard, the result weren't in some cases consistent. When I saw the mistake, I tried to explain it, but, due to my German, I'm not sure everyone understood Videoclip4.

At the end of the lesson, I felt very happy that some pupils made me some questions, and some of them was also sharp; in particular, one of them was about the use of other letters for the sides of the triangle than *a*, *b* e *c*; I thought important for everyone to think on this, so I changed my plans for the next lesson, using an exercise from the book. This exercise has been useful because it let me make evident a mistake, that is typical of some of my students too. In fact, in some triangles, the name of a side was, for example, a/2; many students wrote $a^2/2$ instead of $(a/2)^2$ or $a^2/4$. So, I had to improvise a short revision of properties of powers; I am not so sure that my German language was good enough, but I think I made me understood Videoclip5 – Videoclip6 – Videoclip7.

Besides that, in the second lesson, we made exercises to use the Pythagorean Theorem to obtain the length of a side of a *right-angled* triangle knowing the length of the other ones, so I needed just a few talking. For this reason and because I felt much more confident with the class, I felt more calm.

In the third and last lesson, I thought it would have been important to revise the results that we obtained in the lessons before and to give one other "proof" of the Pythagorean Theorem; in this case too, I could choose between the presentation with laptop and video-projector and an alternative on paper of the geometrical constructions I wanted to show. And in this case too, I choose not to use the presentation with the computer. This choice let me also involve as "helper" two students that sometimes had been a bit rebellious or inattentive, so they could take part in a better way.

The atmosphere of the lessons has always been calm; the pupils, as I have always written, have been cooperative, but I have to say that sometimes, someone (and one in particular) didn't behave good enough for my standards, and I had to reproach him. Since I was their teacher just for a few hours, I thought I shouldn't be so hard as I am used with my classes.

Should I have to judge this experience, I can say I am satisfied. I was really worried due to the problems of teaching in a foreign language (and a language that I have studied so long ago) and in fact sometimes my personal German vocabulary was too poor and I couldn't say everything I wanted, sometimes I couldn't understand everything the pupils said, but it was interesting to see that I managed, in some way.

Moreover, everything I presented in these lessons, had already been experimented in my teaching experience, even if not exactly in the same way and in the same order, because every lesson must be thought considering the class and the context. It has been very interesting to compare my Italian and Viennese experience and discover that, as I have always written, the difficulties of the Viennese students are the same of my Italian ones.