Petit historique IT-WIMS

September 2000: first Italian translation of WIMS

In a short, in the whole system, you should translate each file or subdirectory terminating with an .en or a .fr into an additional file/subdirectory terminating with an .it. [...] To know what in the file is language-dependent (so should be translated) from what is not (for example the commands), you can compare visitor.phtml.en with visitor.phtml.fr, to locate the places where the two files are different.

October 2002: wims.matapp.unimib.it listed as a WIMS mirror site

Sporadic work on the translation, as teaching to no class suitable for the use of WIMS (no more linear algebra course) and no time/not enough time to write down my own exercises.

November 2004: colleagues in Florence start using WIMS.

Milano-Bicocca takes care of the translation of the core/adm modules, while Florence starts to translate the exercise modules.

October 2003: I was enrolled by the Facoltà di Scienze della Formazione

Teaching activity mainly in the pre-service primary school teacher training programme.

Courses not suitable for the use of WIMS
- no computer labs available for the students
- pedagogical concerns
Testing students' proficiency

Future teachers need to acquire abilities that go beyond computational skills: they need to be able to formulate abstract mathematical definitions or statements and to write simple proofs.

In the academic year 2005/06 computer labs were made available, so we could really start using WIMS with our students. The use of WIMS was also stimulated by the will of the faculty to start experimenting “e-learning”.

Maths for primary school teachers

The pre-service teacher training university degree course is a four years program. Future teacher have the following math courses

- “Istituzioni di matematiche I” (Elements of mathematics, first part): arithmetic (first year)
- “Istituzioni di matematiche II”: geometry (second year)
- “Didattica della matematica 1B” (mathematics education): probability and example of good teaching practice (third year)
- “Didattica della matematica 2”: more teaching practice (fourth year)

Basic computational skills

The easiest thing to do is to use WIMS computational capabilities in order to test students’ basic computational skills at the very beginning of their course of study.

All the first year students (about 400/450 every year) has to take the WIMS test. 10% of the students fail the test (Academic years: 2006/07, 2007/08, 2008/09 and 2009/10).

But with students in their second and third year, we need to go beyond testing basic computational skills.

When mathematics is concerned

- a few things are a must know
  - being able to do the computations (with integers and with fractions),
  - being able to convert between square meters and square centimeters, cubic meters and cube centimeters,
  - being able to tell a square from an hexagon
- but future teachers also need to be able to “talk” about maths

Esercizio

Calcolare \(? \frac{1}{2} + \frac{1}{3} \) 

Analisi della risposta

Numeratore = 14 / 6
Denominatore = 6
Il risultato è corretto: NO

Questo è l'esercizio numero 1 di una sessione di 4 esercizi.
Per passare a un successivo è necessario terminare una sessione per volta.
In my "Didattica della matematica 1B" course (third year), the exams consist in a WIMS test, a written test and an oral examination. The written test partly consists of giving a full explanation of one of the question already answered in the WIMS test.

Here is an example of a question from the WIMS test:

\[ \frac{2}{3} + \frac{3}{4} \]

Rispondere al seguente quesito WIMS, dando una piena giustificazione (NOTA BENE: in questo esame sarò valutata la capacità di argomentare e dare una giustificazione e non semplicemente il raggiungimento di un risultato corretto in quanto quest'ultimo aspetto è già stato verificato con la prova preliminare informatizzata).

During this academic year for the first time we are experimenting WIMS activities for the "Istituzioni di matematiche II" course (second year). A big effort in collecting (translating + creating) suitable exercises is being made. Still important part of the final exam should consist of exercises in which the student have to give explanations (i.e. still need for a written exam).

The university funds a project with the aim of experimenting e-learning on a vast scale. In particular, the Facoltà di Scienze della Formazione (Faculty of education) in the last academic year the Faculty has 37 courses taught in e-learning.

What the teachers say in the classroom is not unimportant, but what the students think is a thousand times more important (The idea should be born in the student's mind and the teacher should act only as a midwife).
...there is a grain of discovery in the solution of any problem. Your problem may be modest; but if it challenges your curiosity and brings into play your inventive faculties, and if you solve it by your own means, you may experience the tension and enjoy the triumph of discovery. Such experience at a susceptible age may create a taste for mental work and leave their imprint on mind and character for a lifetime.²

Problem-based learning

Typically a PBL session follows these steps ⁴:
- pupils are given a problem they have never seen before;
- they discuss the problem and/or work on the problem in small groups, collecting information useful to solve the problem;
- all the pupils gather together to compare findings and/or discuss conclusions; new problems could arise from this discussion, in this case
- pupils go back to work on the new problems, and the cycle starts again.

The “problem”

Nella revisione del testo vi chiedo in particolar modo tener conto dei seguenti aspetti:
- che cosa è una corrispondenza?
- saper dare esempi di corrispondenze (oltre a quelli contenuti nel testo)
- data una corrispondenza, saperla rappresentare in diversi modi

The assignment emphasized the need of “active participation” by all the students: only after going through the steps above the students could ask for help from the teacher. One of the main themes of the course was combinatorics, with respect to “counting correspondance, permutations and functions”, so it was easy to implement WIMS exercises corresponding to the exercises given in the textbook.手脚

Note: in the spirit of “discovery” the students were asked to find out the formulas by themselves.

Some relevant formulae:

- \( \text{PBL} \)
- \( \text{Problems and mathematics} \)
- \( \text{Problem-based learning} \)
- \( \text{The “problem”} \)

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Role of the teacher

As the aim of the course was indeed “teach to teach”, the actions of the teacher were meant to stimulate metacognitive reflections.

Secondo voi perché gli esercizi [del test di autovalutazione] vi costringevano a lavorare con numeri anche piuttosto alti?

(Why do you think WIMS poses exercises with quite big numbers?)

It was good to discover that some students did get the point.

mi viene da pensare che usare i numeri alti è stata una strategia per “costringerci” a trovare una generalizzazione e forse anche una giustificazione, che, a pensarci bene, con numeri piccoli non è necessaria.

(I sort of think that big numbers force us to find out a generalization ad a justification of our procedure, justification we do not feel the need for with lower numbers)