

CyberMaths:

Mathematics learning website (including some theoretical notions and interactive exercises) for the pupils of the school, from 1st to 3rd year secondary.

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Abstract

CyberMaths is an educational environment developed by Dominique Cheron. It is presented on the web site of the school. It serves in assisting the didactic process in the lesson of Mathematics. It can be used at home by students who need more time to learn, or were absent; also, in the class to do more exercises or in the "cours de soutien" to help those who have difficulties.

In the educational environment CyberMaths the student can find some theory and a lot of interactive exercises in algebra and geometry. He/she can contact the teacher and have an on-line discussion.

The main aim of CyberMaths is to engage the students in the learning process of Mathematics; this, can be achieved by:

- Presenting the educational material in a pleasant, interesting, interactive way
- Encouraging to continue in spite of their initial mistakes

There is an evaluation of the CyberMaths in process in all the European schools. The evaluation is quantitative – questionnaires to the students, teachers and parents- , and qualitative – continuous feedback and adaptation to the needs of the students and the teachers.

1. Background:

Support tool for the mathematics course and for the "cours de soutien" with the teacher or at home to fill in specific gaps in the pupils' knowledge. It allows the pupils who are absent due to illness to follow the course at home and it can also help SEN children.

This website could also provide entry to other mathematics sites.

This site proposes specific sources of help to solve the problems which arise for the pupils, for example:

Aids to learning mathematics

- Correction of **exercises** in an interactive way to guide the pupil
- Contact with the teacher by **email**
- A **forum** for questions.
- Contact with the teacher and other pupils on an interactive **chat** 'Messenger' with use of the whiteboard at times agreed upon with the student (see report) or contact with the teacher by Visio conference (not yet practised).

Technology

- Explanatory **syllabus** of the course and the use of the website.
- **Orders** on each exercise on the website
- **Tools** for the efficient functioning of the site

2. Objectives:

To provide assistance, either in class with the teacher or by distance learning at home, to those pupils with difficulties in learning mathematics.

This website has as an essential objective fighting effectively against the disillusion of certain pupils towards mathematics.

How?

1. Learning mathematics is more pleasant and more fun

- Play with classification of records
- The pupils aim to improve their mathematics result to the best of their potential, no matter how long it takes. The improving results are recorded and this encourages the pupils. The same series of exercises can be redone several times because they are chosen from several forms of exercises and each exercise consists of random numbers.
- No lassitude because the selected statements are presented vary unceasingly and in a random way.
- Each pupil can progress at his own rhythm.
- In general the pupil concentrates better in front of his PC than in a class.
- The system of accumulating points as one goes along stimulates the pupil to succeed

2. The anchoring of errors is avoided because the exercises are corrected immediately; an interactive correction is proposed in order that the pupil can begin the exercise again - part of the process is to follow the problem through to its resolution.

- The pupils are often requested to play an active role in the correction; they do not receive the solution in a passive way, they are guided stage by stage through the correction to the correct answer. They must carry out intermediate calculations and thus manage to discover it by themselves.

3. Development of a support lesson

Before

The pupils receive precise written instructions on the work and exercises to be carried out during the lesson.

The explanatory syllabus contains the necessary explanations, as do the instructions for each of the exercises.

During

The pupils work and when in difficulty, address their questions to the teacher. In the event of distance learning, they can contact the teacher by chat or visioconference with the use of interactive whiteboard which can be used as a medium for the explanations.

After

The teacher can control the work done on the computer (results) or consult the work files which the pupils have recorded or sent.

4. Content and Presentation of the site:

The first page presents the forms of assistance suggested for the user: chat, Visio conference (calendar with the appointment dates), forum, teacher's email and a menu which enables the user to move from one subject to another.

The current menu presents the subjects classified by:

1. decimal numbers
2. whole or relative numbers
3. fractions
4. geometry

Each subject presents some theoretical concepts, possibly calls at concepts acquired and necessary to solve the exercises.

The exercises

The pupils themselves must provide a draft sheet in order to do the exercises, which are in various forms:

1. Selected exercises in a random way among several types with variables. The answers are analyzed immediately and when that has been done, an interactive correction is proposed. The pupil must provide intermediate answers during the correction which earn him points. Sometimes the response time intervenes for a classification.
2. Exercises whose answers are sent automatically via the site by email to the teacher concerned.
3. Geometrical construction exercises that the pupil records and will send later on by email to the teacher.

5. Equipment

The PC must be equipped with:

- a webcam
- an Internet explorer 6.0 browser
- a plug-in Flash, integrated in IE6
- X controls: **ActiveX GPO** for geometry.
- Messenger (email with hotmail)

6. Evaluation

CyberMaths is used in the European Schools of Brussels III, Mol and Frankfurt, in classes of the third year (+/- 250 pupils), the schools of Brussels I and Brussels II will also use it.

Summative evaluation:

The course is adapted according to the needs of the pupils and the teachers who use it. I attend the lessons given by my colleagues in Brussels III (3 hours per week) and can also modify the site in light of the problems encountered and the reactions of the pupils and the teachers.

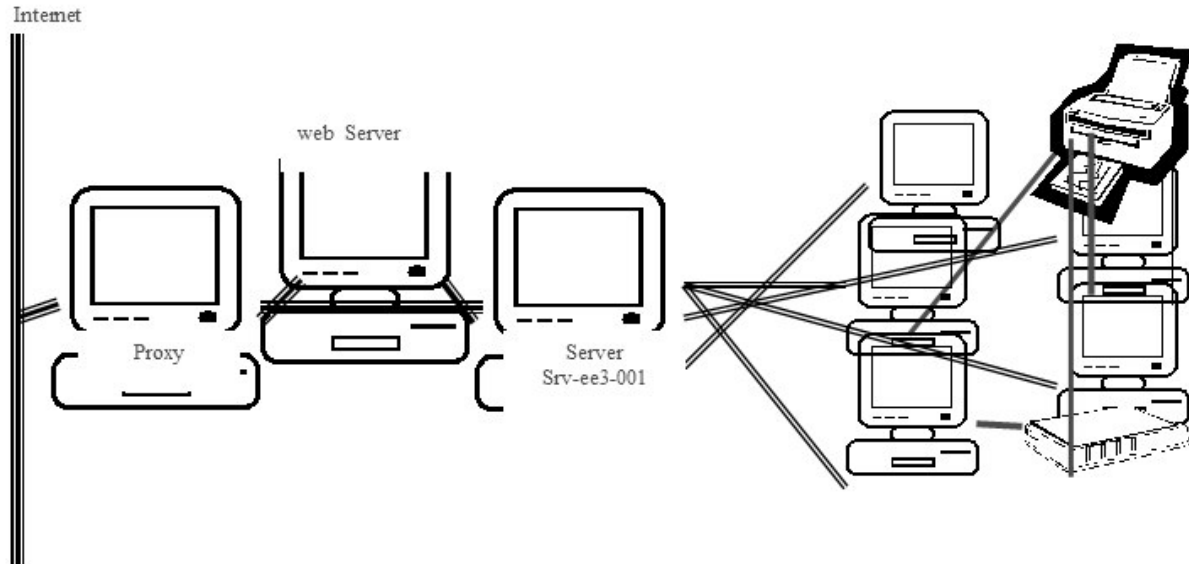
The exercises are evaluated and the points are revised in a database which is available to the pupil him/herself (personal score) and the teacher's (class list which the teacher manages), which also enables the

teacher to follow the pupil's progress. Other criteria have to be taken into account to make a more precise evaluation: for example the number of times a pupil did a certain exercise, the development of his/ her score for that exercise etc...

Qualitative evaluation

A questionnaire with open questions in electronic form will be at the disposal of the pupils and parents who worked with this type of course in order to evaluate it and to improve it at the end of the year.

The Structure of the physical network



1 Server (Windows-server 2003)

1 ISA-Server

1 Firewall one

175 Workstations Windows XP

48 pc distributed in 3 class rooms for the ICT courses

20 pc in the new class room of multimedia

The class rooms are available for the teachers of the general subjects; they have to arrange the occupation of the class room in advance.

4 pc in the server room in order to create the masters and one pc for testing.

51 pc distributed in the normal class rooms. The teachers can use them in class to demonstrate didactic material.

1 pc in the library available to the pupils.

4 pc in the entertainment room available to the pupils

10 pc in the art class can also be used by the pupils.

16 pc for the primary school in a multimedia class room

15 pc distributed in different classes at the primary school.

3 pc in the study

4 pc for the pedagogical personnel.

The printers, scanners, interactive boards, as well as, the projectors, are available for the pupils who follow the ICT courses and other lessons in the multimedia class room.

The teachers can read and write CD ROMs in the ICT class rooms, as well a,s in the multimedia class room.

For the protection of the data an antivirus system is installed:

McAfee and a Firewall n°1

Software

Ms-Office XP (Word, Excel, Access, FrontPage...)
Visual Basic 6.0
Géoplan and Géospace (software for geometry)
Paint Shop Pro 7, Corel Draw 9.0, Adobe Reader
Utilities in Windows (Paint , Notepad, Calculator...)
Web Browser :IE6

The users

Every user has an ID and a personal password which enables him/her to enter the network from any work station of the ee3 school. The personal settings are available to the user, each time he/she logs in.

There are three groups with different rights

1. **The pupils** : they have the right to write and read their files in their folders and the files that the ICT teachers make available for them.
2. **The ICT teachers**: they are powerful users. They have access to the pupils' folders as well as to some of the folders of the teachers in the network.
3. **The art teachers**: They have access to a common directory, available to their pupils as well.
4. **The teachers of the general subjects**: powerful users.