KU LEUVEN

TECHNOLOGIECAMPUS OOSTENDE

Co-funded by the
Erasmus+ Programme
of the European Union

Application of Innovative ICT Based Teaching Methods & Electronic Environments (related to **WP3**)

Erasmus+ Project "PHYSICS"

June 29th 2017, University of Cyprus

Renaat De Craemer, Joan Peuteman, Anik Janssens
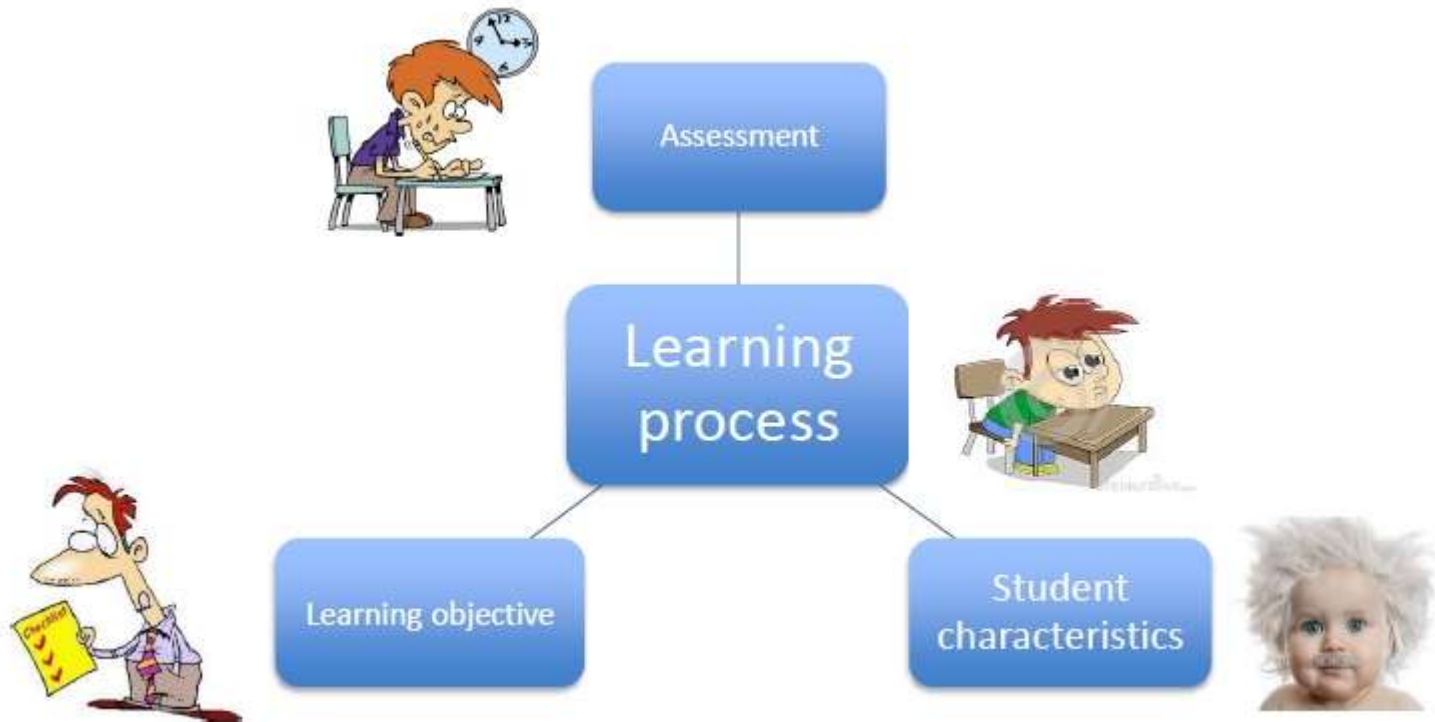
Main goal

- Teaching and preparing students:
  - ✓ *To think and act as an academic skilled person*
  - ✓ *Preparing students, both for:*
    - *An academic and **research oriented** career*
    - *An **industry oriented** career*
  - ✓ *Preparing students and teaching staff to gain (ICT)-**communication skills***

KU LEUVEN

Main goal

Realizing a **learning process**:

→ Model:

KU LEUVEN

Main goal

- The **learning objectives** for each course need to be formulated:
  - ✓ knowledge, attitudes, skills, … to be reached
    - ➤ the teacher as well as the student need _a clear objective, a clear reference_

- The **student characteristics** are important:
  - ✓ prior knowledge, learning level, motivation, interests, age, …
    - ➤ the teacher as well as the student need to know _where to start from…_

- The student needs to be **evaluated (assessment)**:
  - ✓ formative and summative, … when, what, how,…
    - ➤ The assessment needs to be representative in relation to the learning objectives

KU LEUVEN

Practical realization

- The traditional way of teaching in a classroom did not change a lot during the last century.

KU LEUVEN

Practical realization

- Traditional 'ex cathedra' teaching will not disappear:
  - It is an efficient way to transmit **knowledge** and academic insights.
  - **Learning objectives** can be formulated in a clear way.
  - Traditional **written and oral exams** evaluate a number of important learning outcomes (academic and technical knowledge, insight by making exercises, …).

  But there are number of important **restrictions**:
  - It is very hard to deal with **different student characteristics** (differences in prior knowledge, learning level, interests, motivation, …)
  - A number of learning outcomes (skills and attitudes) and the learning process itself are difficult to evaluate (communication skills, …)

Practical realization

Traditional 'ex cathedra' courses will not disappear.

But, technological evolutions allow **new opportunities**.

Digitizing the content of courses is useful. There are several approaches:

- Digital Learning platforms like BlackBloard or Moodle

- Interactive websites

- Dedicated software tools

KU LEUVEN

Digital Learning Platform

Digitizing the content of courses ***makes it possible*** to apply a digital learning platform, such as Moodle, in a dynamic way, i.e. to:

- ✓ Frequently re-use the digital content
- ✓ Adjust and elaborate the course content
- ✓ Structure and re-structure the content, while adapting to
  - ➢ The learning outcomes
  - ➢ The students needs
  - ➢ The students' learning process

On the other hand, a learning platform remains only a tool,

    ... to be used by the student… and the teacher/tutor.

KU LEUVEN
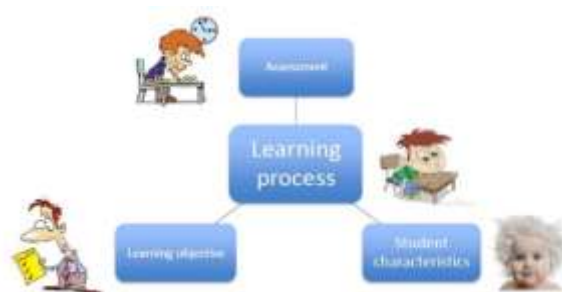
Digital Learning Platform

- A **Digital Learning Environment** allows to:
  - o provide students with study material of different types (for example e-books, downloadable video recordings)
  - o follow the evolution of the learning process
  - o observe the performance of a student in specific tasks
  - o give (individual) feedback to the students

KU LEUVEN

Digital Learning Platform

- A Digital Learning Environment is known to be useful when teaching '**science**' and '**physics**'.

- Objects of many kinds can be used:
  - Text documents
  - Videos & Images
  - Links to websites
  - Animations
  - Simulations
  - …

The use of Moodle

- In **the Moodle system**, an online course "Applied Physics" has been made.

- Other courses of the Physics project are available.

- Let's have a look… :
    - → MOODLE: See http://dl.bsu.by/
    - → Hands-on "presentation"

The Moodle course "applied physics" contains several **downloadable video recordings**.

KU LEUVEN

Interactive websites

- **The Moodle system** has been used to realise a scientific/technical course on "applied physics".

- When teaching (English) communication skills, **interactive websites** are very useful.

Interactive websites

- Interactive websites allow
  - distance learning
  - making exercises in a classroom
- Let's have a look… :   https://ilt.kuleuven.be/english/
  - ○ 'digital tools' (below: 'More info')
  - ○ 'Engels', 'bekijk alle tools'
  - ○ 'scientific English online'
  - ○ One needs to login
 - ○ **Example**: choose 'vocabulary', 'scientific vocabulary', 'nouns'

Interactive websites

- Let's have a look… :   http://ilt.kuleuven.be/english/

  o Example: choose 'vocabulary', 'scientific vocabulary', 'nouns'

    The exercise can be made and the student gets appropriate **feedback**.
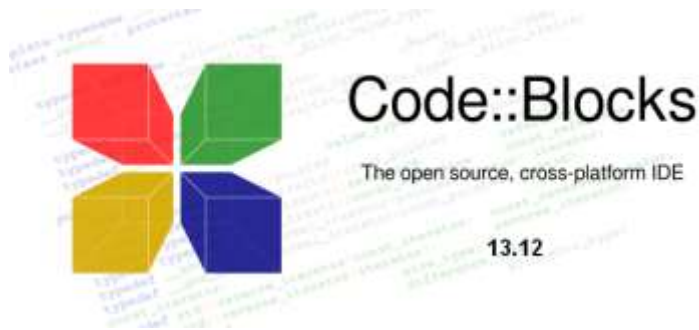
KU LEUVEN

Software tools

- **The Moodle system** has been used to realise a scientific/technical course on "applied physics".

- When teaching (English) communication skills, **interactive websites** are very useful.

- When teaching a programming course, **dedicated software tools** can be useful.
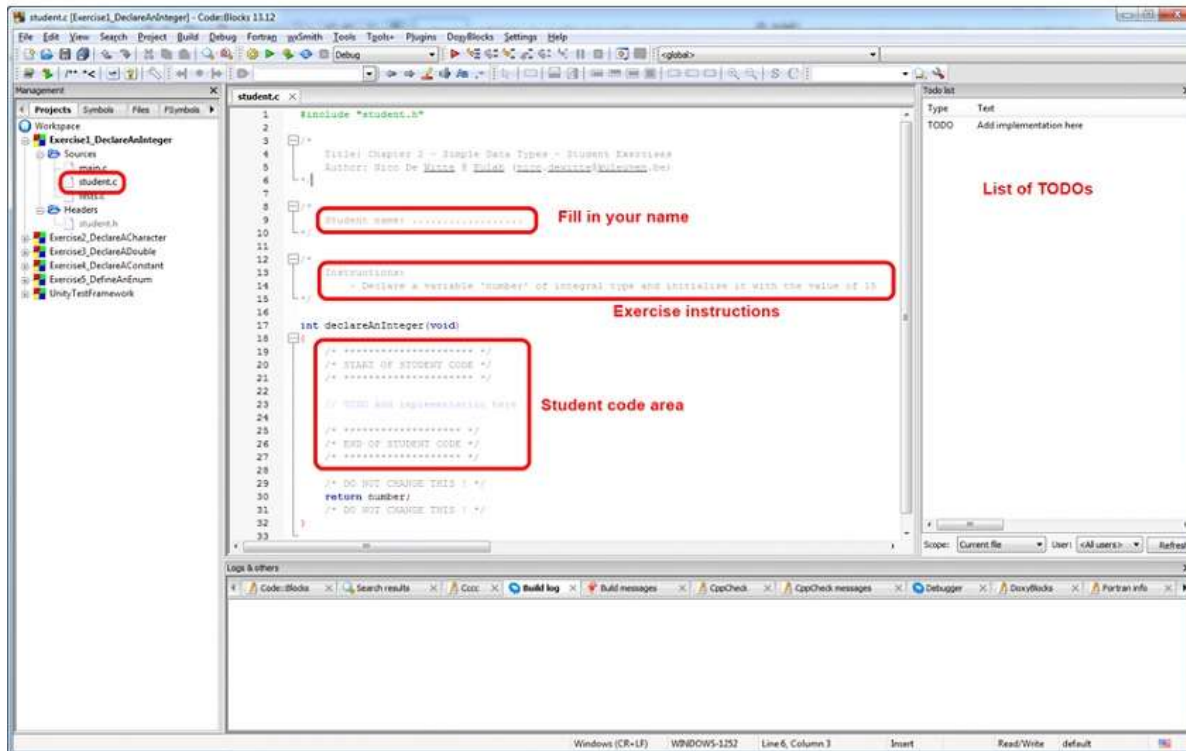

KU LEUVEN
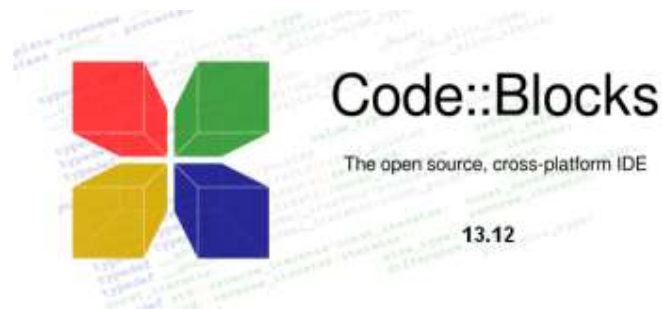
Software tools

- Example: teaching a C programming course

Code::Blocks is an IDE (Integrated Development Environment) which contains a source code editor, a compiler and a debugger.

Software tools

- Code::Blocks can be installed on the PC of each individual student. The student can make programming exercises at home.

Code:Blocks

Software tools

- Using **distance learning** when educating students performing programming exercises is a challenge. More precisely, the students:

  - students have **power point presentations** and downloadable **video recordings** of theoretical lectures
  - have **interactive moments with a teacher** on distance using webcams
  - students have an **IDE** like Code::Blocks on their PC
  - student use a digital learning platform like **Moodle** to communicate with each other and the instructor (using a **forum**)

17

KU LEUVEN

Software tools

- Additionally, the students obtain **offline feedback** concerning their programming exercises based on:

    - **software tests** which validate the programming exercises,

A trouble-shooting guideline for the students' solution.

Conclusion

- **The Moodle system** has been used to realise a scientific/technical course on "applied physics".

- When teaching (English) communication skills, **interactive websites** are very useful.

- When teaching a programming course, **dedicated software tools** can be useful to realise **distance learning** (e.g. EOLES-project).

KU LEUVEN

Application of Innovative ICT Based Teaching methods & Electronic Environments (related to WP3)

Questions?

Erasmus+ Project "PHYSICS"

Renaat De Craemer, Joan Peuteman, Anik Janssens

KU LEUVEN