



INTRODUCTION to
INNOVATIVE TEACHING METHODS
&
ELECTRONIC ENVIRONMENTS

Erasmus+ Project “Physics”

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- Model of a powerful learning environment

Introduction

- Educational vision of BaMa concept:
 - **new approach:**
 - student oriented
 - interactive
 - **new methods:**
 - teaching
 - learning

Introduction

- Crucial element of BaMa concept:
 - digital teaching & learning:
 - latest ICT technology
 - **digital learning environment** ➤ distance learning

Introduction

Conventional didactics

- process of knowledge transmission (passive)
- instructor-centred (instructor transmits)



Digital didactics

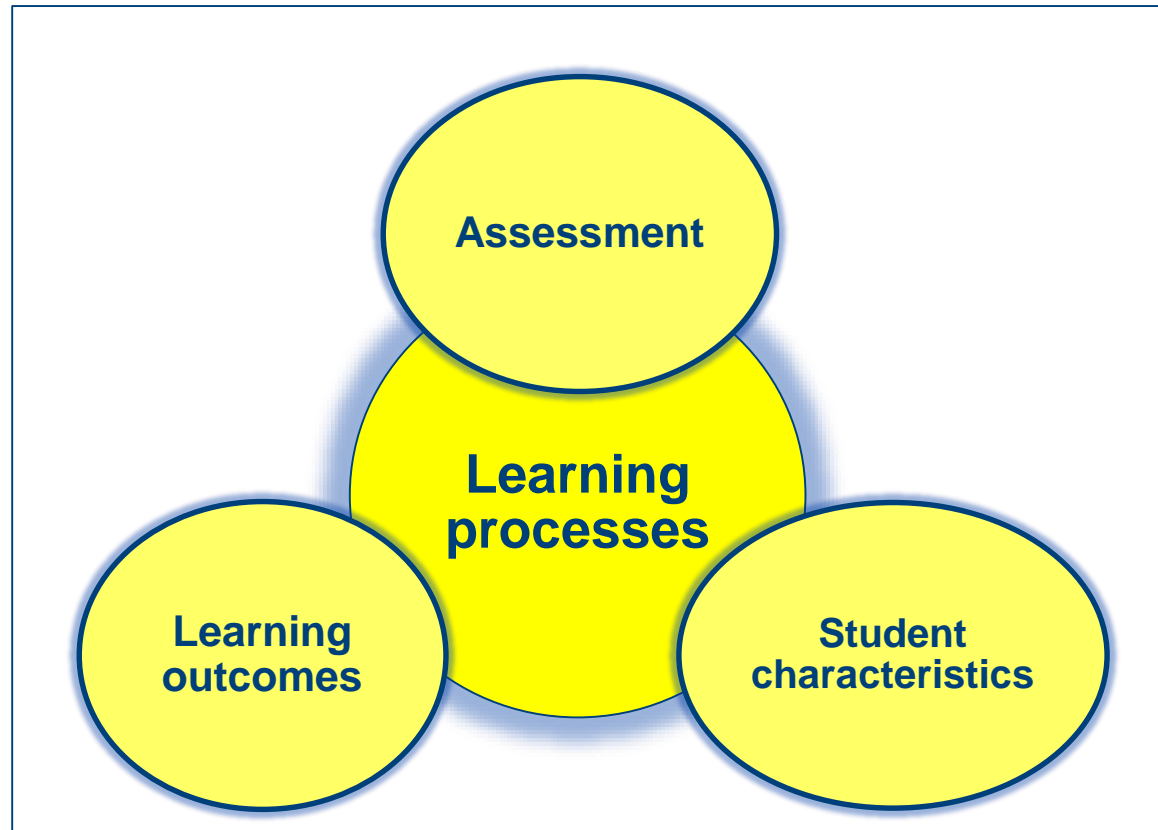
- process of knowledge construction (active)
- student-centred (instructor supports)

⇒ role of teacher is changed!

Powerful learning environment

- Didactic model:
 - different components
 - mutual influence
 - in perfect harmony!
- Basis for demo-course “Applied Physics”


Powerful learning environment



Learning outcomes

- **Definition:**
 - descriptions of what the student is expected:
 - to know
 - to be able to perform
 - related to:
 - knowledge
 - skills
 - behaviour

Learning outcomes

- Important for:
 - teacher (design of learning environment)
 - student (management of learning activities)
- **Digital learning environment** is useful tool 
clear and transparent communication

Student characteristics

- Student is responsible for own learning!
- Typical student characteristics:
 - prior knowledge
 - learning level
 - motivation and interests

Prior knowledge

- Determines the new information which student can process himself
- In **E-learning** related to:
 - subject content
 - ICT field
- **Important!**
 - adjusted learning outcomes
 - activation of prior knowledge

Learning level

- Teaching matter in line with learning level
- Important!
 - good balance concretization ↔ abstraction

Motivation and interests

- Nature of motivation:

Intrinsic motivation


within student and teaching matter



Extrinsic motivation

outside student and teaching matter

Motivation and interests

- Important!
 - learning fits with students' needs and requirements
- **Digital learning environment** is useful tool 
differentiation in flexible way

Assessment

- **Definition:**
 - determination and evaluation of acquired learning outcomes
 - consistent with didactic methods and learning activities

Assessment

- Many aspects:
 - Moment (when?)
 - Type (what?)
 - Objective (how?)
 - Evaluator (who?)
 - Feedback

Moment (when?)

- Three main moments:
 - first evaluation: after initial phase
 - mid-term evaluation: intermediate
 - final evaluation: at the end

Type (what?)

- Two main types:
 - **process evaluation:**
 - focus on learning process
 - questions: to what extent? in which way?
 - **product evaluation:**
 - focus on result of learning process

Objective (how?)

- Two main objectives:
 - **formative evaluation:**
 - focus on progress of learning process
 - intermediate and diagnostic
 - feedback!
 - **summative evaluation:**
 - final assessment

Evaluator (who?)


- Several evaluators:
 - teaching team
 - externals from profession field
 - fellow students ('peerassessment')
 - student himself ('selfassessment')

⇒ diverse character of evaluation process

Feedback

- Characteristics:
 - linked to formative evaluation
 - constructive
 - encouraging
 - guiding (where necessary)

Feedback

- **Digital learning environment** is useful tool 
 - follow-up independently of:
 - location
 - time
 - automatic and individual feedback
 - learning tips
 - references to interesting learning materials
 - self-evaluation tools \Rightarrow practice on own tempo


Learning processes

- **Components:**
 - subject contents
 - learning activities
 - student support

Subject contents

- Exponential growth of knowledge \Rightarrow inexhaustible supply of subject contents
- Task of teacher:
 - well-informed selection
 - dynamic subject contents

Subject contents

- **Digital learning environment** is useful tool 
 - digital contents can be:
 - easily changed ⇒ adapted
 - saved for long periods of time ⇒ frequently re-used

Learning activities

- Objective: achieving learning outcomes
- Many variation in learning activities:
 - discussions
 - assignments
 - experiments
 - project work

Learning activities

- “blended learning”:
 - in general, combination of different:
 - modes of teaching
 - styles of learning
 - concrete, combination of:
 - traditional face-to-face instruction
 - computer mediated instruction

Student support

- Many variation in support of students during learning activities
- For example: solving complex task in digital learning environment: support towards:
 - content of task
 - strategies for solving a problem
 - handling of technology of the environment

Student support

- “**Instructional scaffolding**”: support:
 - tailored to needs of student
 - fading:
 - autonomy and self-regulation of student ↗
 - ⇓
 - support of teacher ↘
 - (dynamic and adaptive!)



THANKS!

ANY QUESTIONS?

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