



Spatial Data Infrastructure and Earth Observation Education and Training for North Africa

Curriculum Design

Integration problem-based learning into your curriculum

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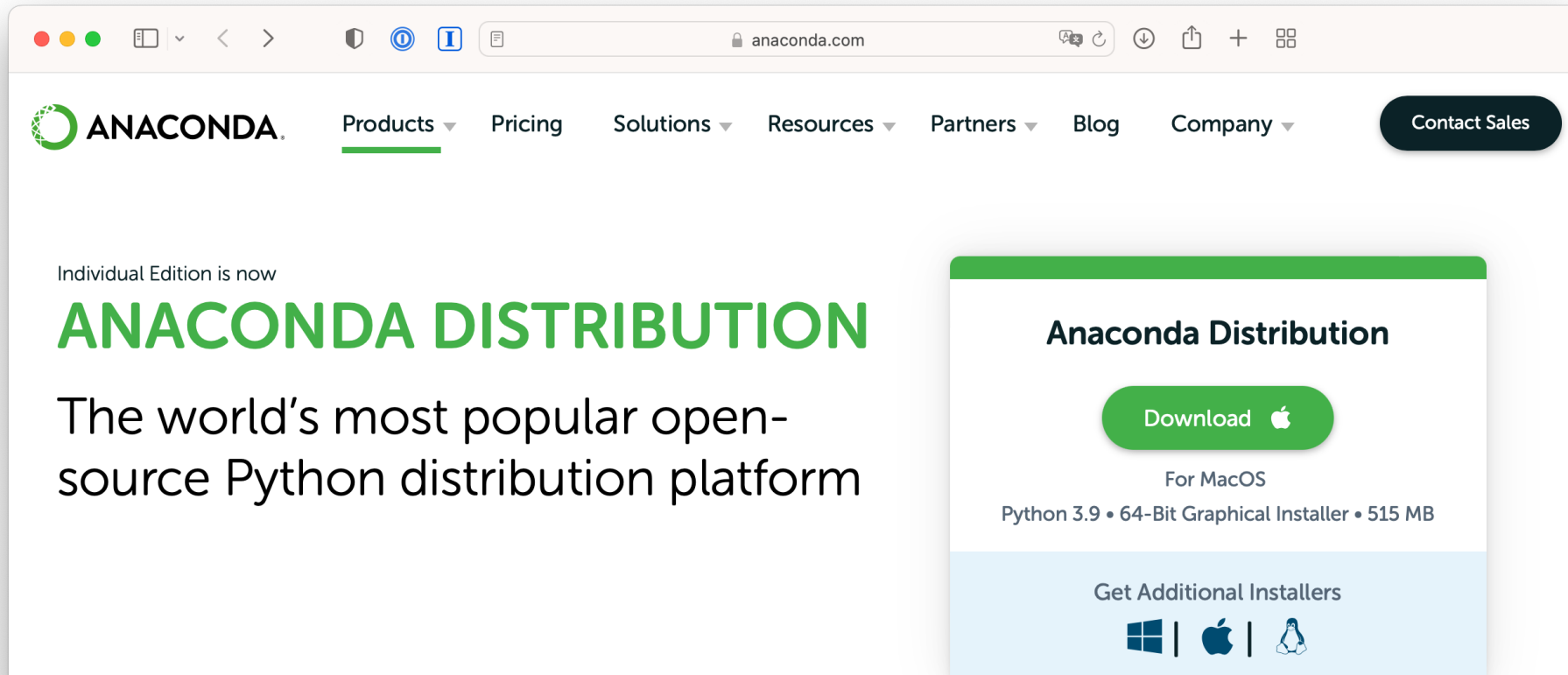
SEED4NA Summer School Dubrovnik

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👉 Preparation for this afternoon 👉

- Install Anaconda:

<https://www.anaconda.com/products/distribution>



Learning Objectives

- You will be able to explain the concept of *Problem-Based Learning* (PBL)
- You will understand the challenges of finding a suitable project and phrasing a good problem statement
- You will have a first idea how to include PBL in your own teaching

What is Problem-Based Learning?

- Student-centred active learning approach
- Concrete, real-world problem drives the student's learning process
- Application of theory and research-based knowledge to an authentic problem
- Additional benefits from self-organised group work

PBL Principles

- Project framework: Phrasing, analysing and solving a problem towards a tangible result
- Project work at the center of studies: Courses are there to support the project work
- Cooperation: Small groups work on individual projects
- Exemplary work: Supervisors ensure that approaches can be transferred to other problems
- Ownership and responsibility: Students are responsible for their own learning achievements

Central role of the project

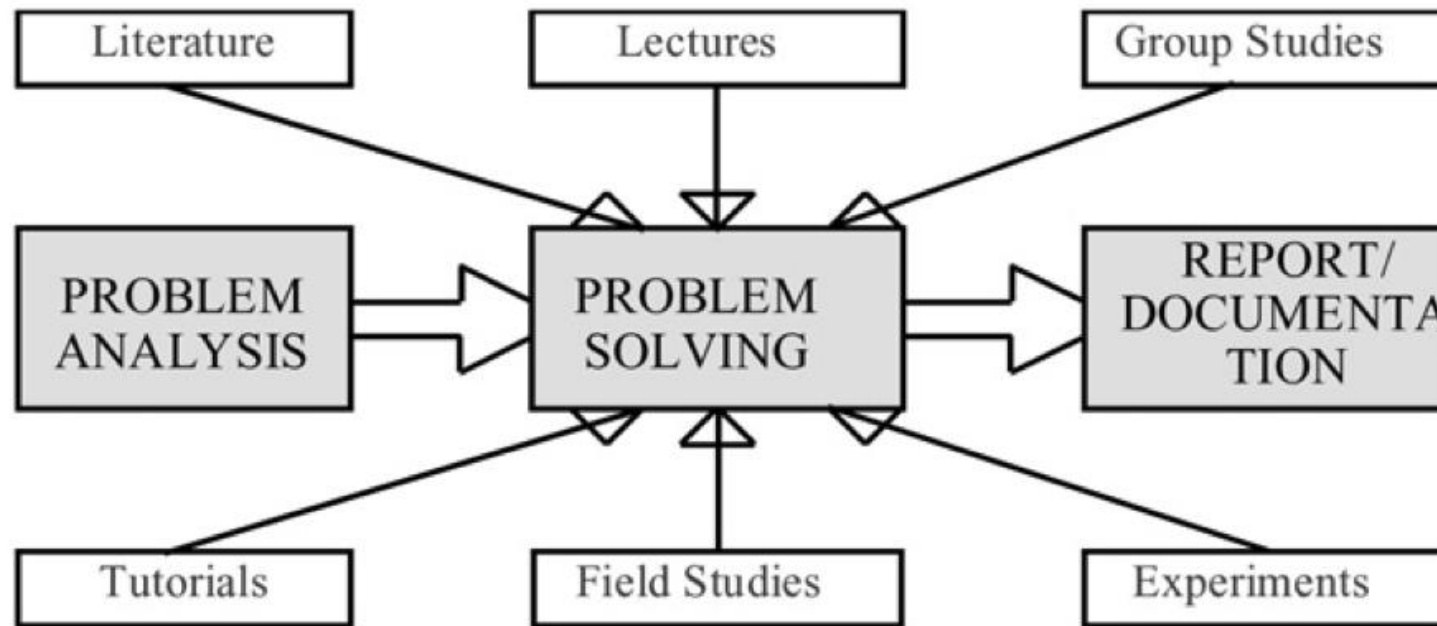


Figure 1: Principles of project-organized problem-solving
(Kjærdsdam and Enemark, 1994)

Group formation

- Let students suggest broad topic areas that they are interested in – e.g., renewable energy, cycling, flooding, traffic planning, soccer, ...
- Ideas are collected on the board
- Voting rounds where students “pitch” their ideas and explain what they have in mind/why they are interested in the general topic
- Students vote for all topics they would be interested in
- ... repeat until it is clear which topics “stick” and each topic has a reasonable number of students assigned
- Each group is assigned a supervisor from the group of teachers

Exercise: Topic finding

- In your team, try to find a project topic that could be used to support the learning objectives for the course you are designing

Phrasing the problem

- Within the chosen subject area, students try to phrase a short research question/problem statement they want to address
- Can be broken down into sub-questions
- Start with a “one pager” as the outset for the report
- It is the supervisor’s role to make sure that
 - The problem statement is relevant for the study program
 - The problem is manageable within the given time frame

Exercise: Phrasing the problem

- In your team, try to write a problem statement or research question the project would focus on (max. 3 sentences)

Supervision meetings

- Students meet with their supervisor on a regular basis to discuss progress, get feedback, clarify questions
- **Everybody needs to be prepared** – send questions and drafts, read them, etc.
- More meetings in the early and final phases
- Less meetings and more independent work in the middle

- However, this depends! ---> **be flexible!**

Final report

- Detailed collaborative report (one per group)
- 30-40 pages base length + 25 pages per student
- Needs to cover:
 - Motivation
 - Problem statement
 - Background research
 - Development of solution
 - Critical discussion

Assessment

- Formative assessment: Discussions and feedback during regular supervision meetings
- Summative assessment consists of two parts:
 - Final report
 - Extensive oral exam where the group presents their work and answers questions – **individually graded!**



Advantages

- High motivation for students to be able to work on a topic they are interested in
- Skills learned in theory are applied to an actual problem ---> true understanding!
- Students learn a whole range of soft skills, including independent group work organisation and conflict solving, project management, writing, presentation

Challenges and pitfalls

- Both teachers and students have to be trained in PBL for it to be effective
- PBL can be difficult to implement within a more traditional curricular context
- PBL is more challenging to implement the more students you have
- Regular supervision meetings and feedback are a fundamental requirement
- Projects can change every semester – not so easy to build a stack of existing materials for us as teachers
- Master's thesis projects as group work can be problematic

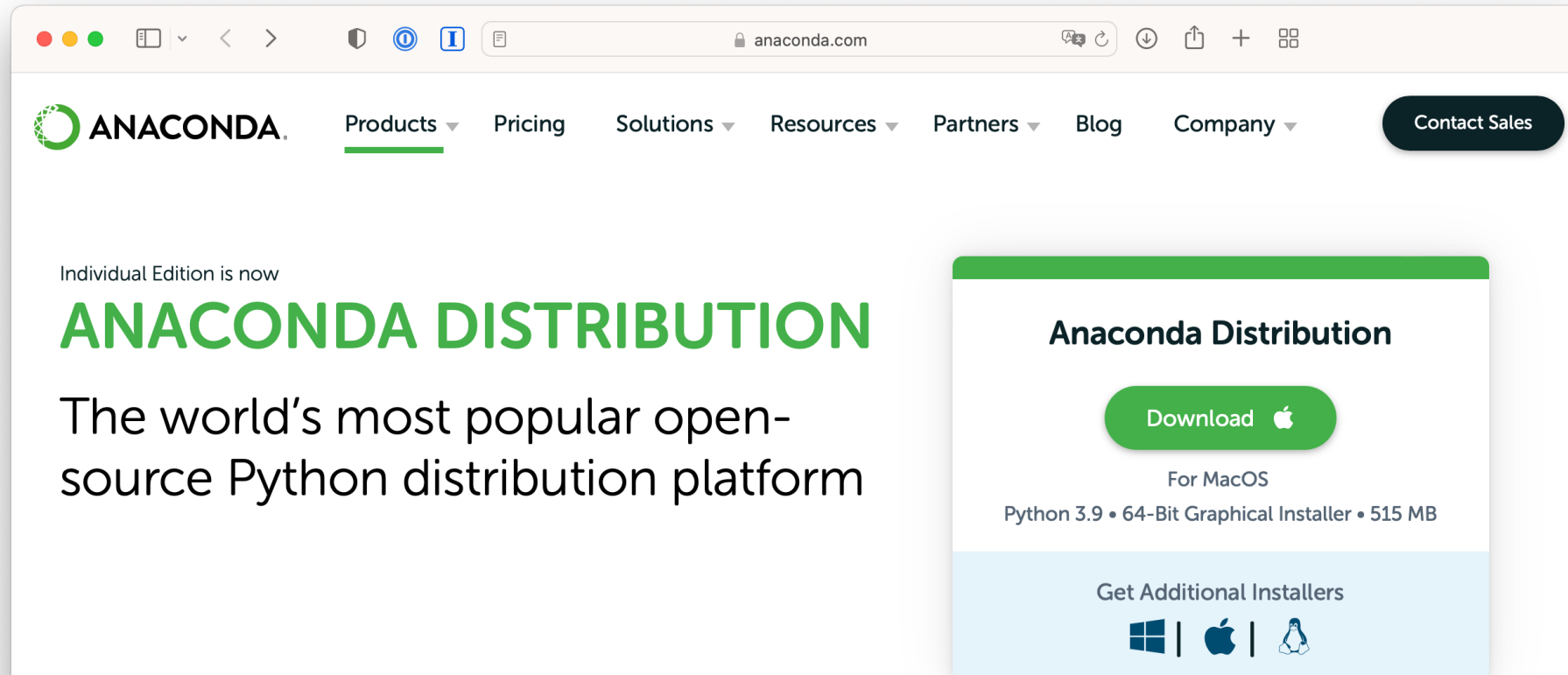
Exercise: Curriculum design

- In your team, come up with a suggestion to include project-based learning in the course you are designing

Preparation for this afternoon

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Thank you for your attention!



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