



# INTEGRATING LEARNING ANALYTICS AND SEMANTICS IN PROBLEM BASED LEARNING

**Erasmus+ Forward-Looking Cooperation Projects**

**Call: EACEA/33/2014**

**2016-2018 (3 years)**



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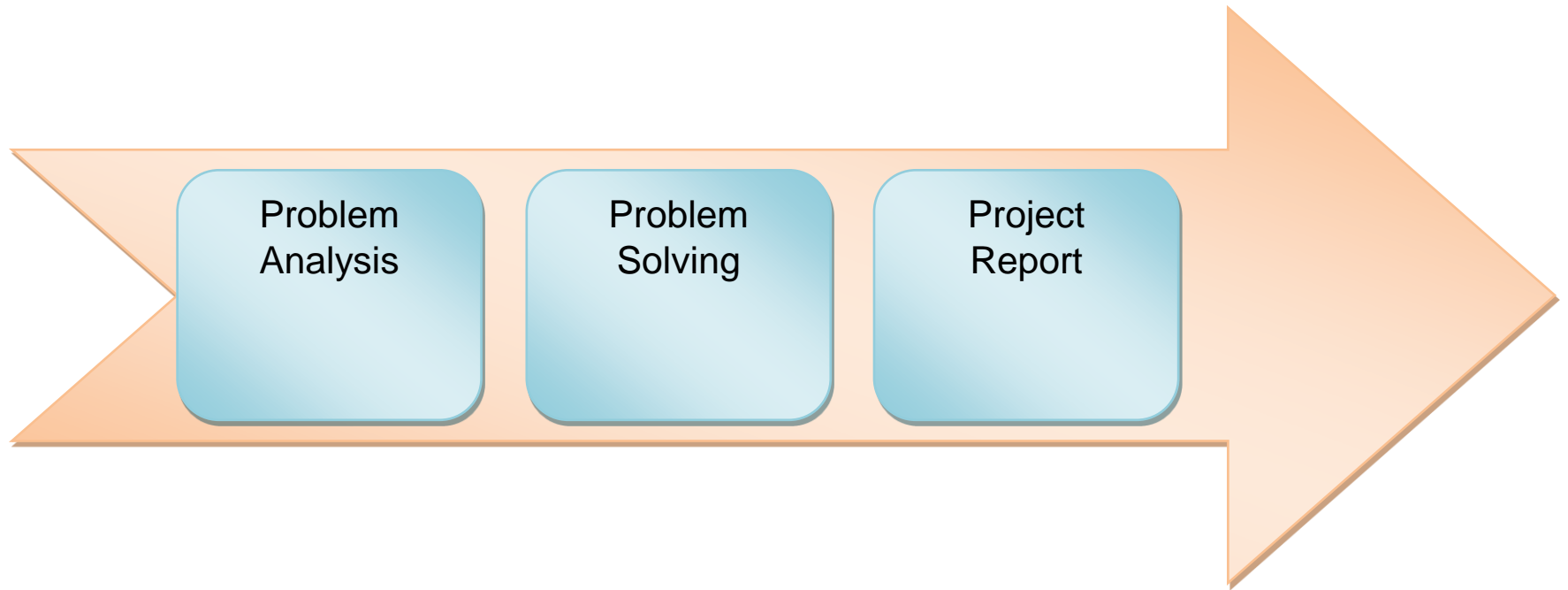
# PROJECT TEAM

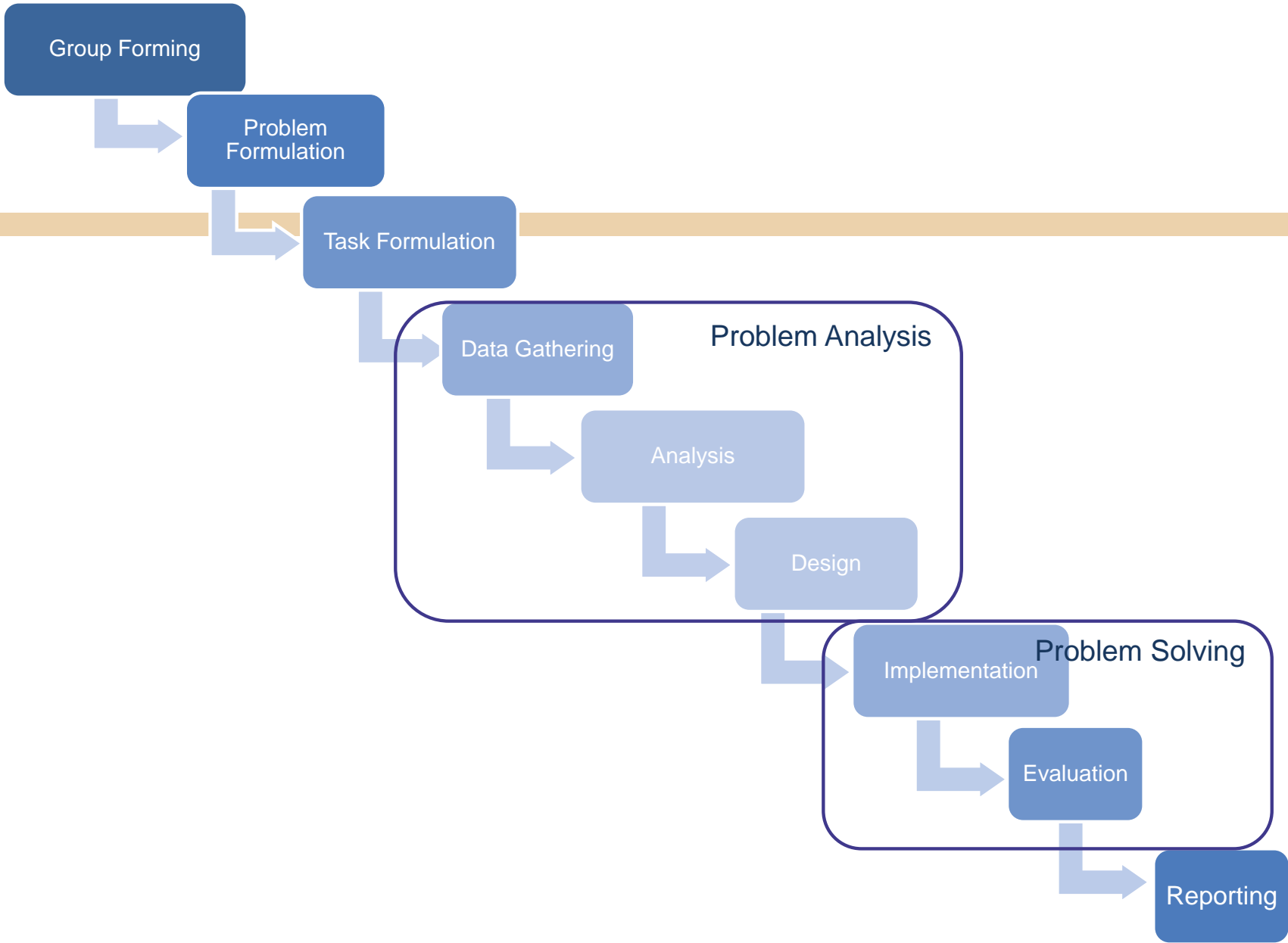
- University of Macedonia, Greece - Coordinating partner
- Open University of the Netherlands
- Aalborg University Copenhagen, Denmark
- University of Alcalá, Spain
- BOC Asset Management GmbH, Austria

# OVERALL AIM

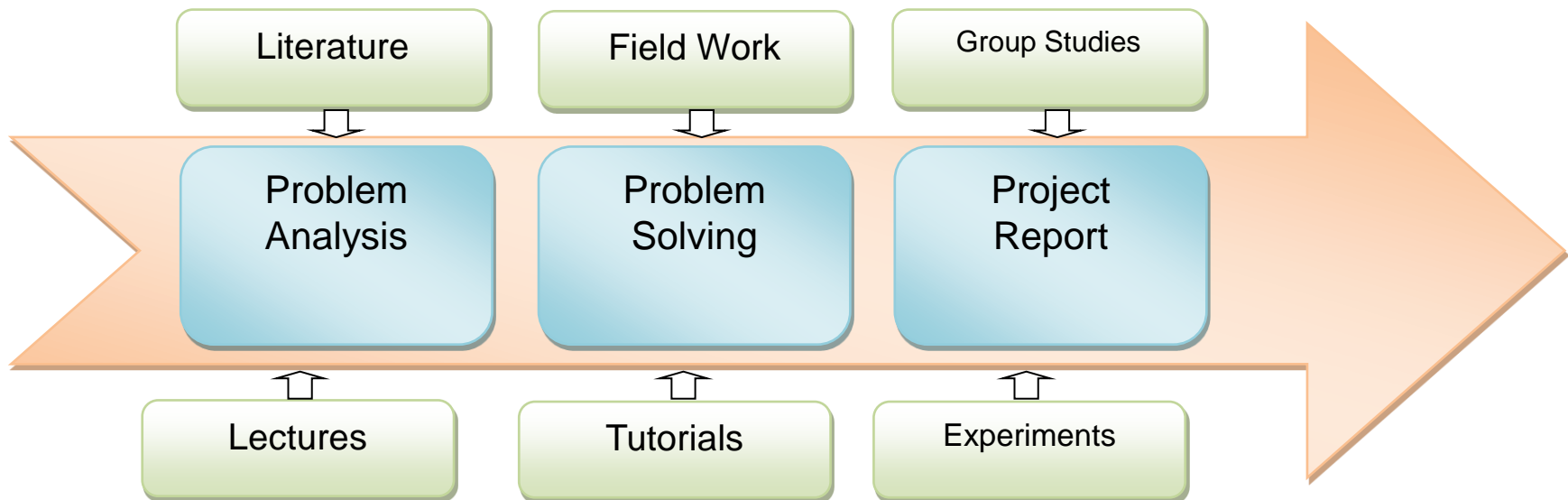
- Enhance **Problem Based Learning (PBL)** with **Learning Analytics (LA)** and **Learning Semantics (LS)** in order to produce a new educational paradigm and pilot it to produce relevant policy recommendations

# PHASES IN THE AALBORG PBL MODEL





# RESOURCES DURING PROJECT WORK IN PBL



# LEARNING ANALYTICS

- The measurement, collection, analysis and reporting of data about learners and their contexts, for purposes of understanding and optimizing learning and the environments in which it occurs (Wikipedia)

# LEARNING ANALYTICS IN PBL

- **Data gathering** by identifying educational data that is generated in **each and all steps of PBL**
- Information processing by analyzing processes and techniques that transform **educational data to meaningful, multi-modal information**
- Knowledge application by identifying all **intervention mechanisms** that could be put into practice based on all LA feedback during **course design** and **course execution**



# SEMANTICS

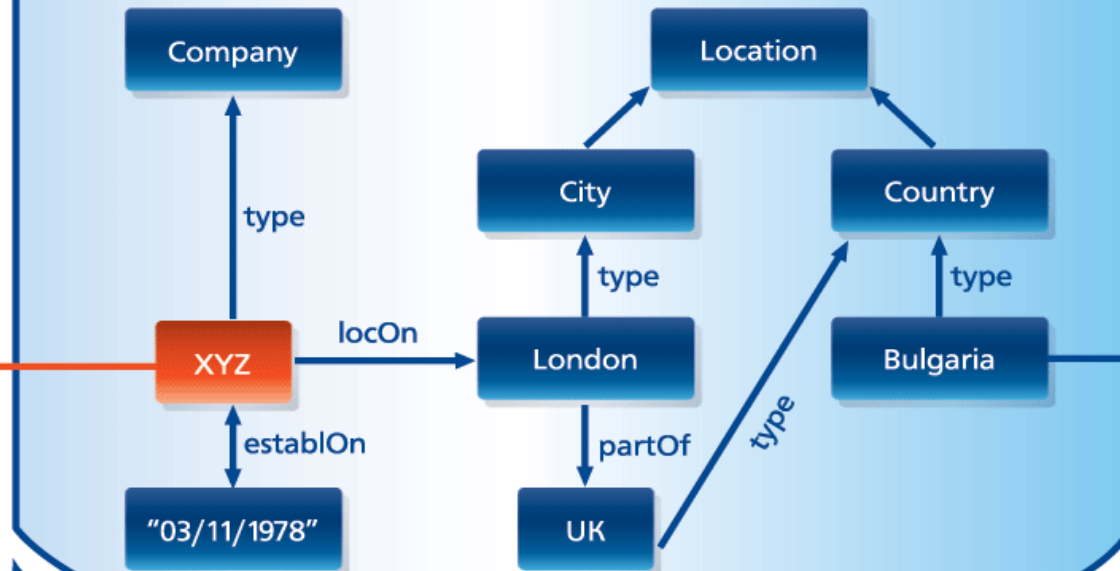
- a method of structuring data in order to represent it in a specific logical way
- **Semantic model**: a conceptual data model that includes semantic information that adds a basic **meaning** to the data and the **relationships** that lie between them → easy maintenance of data consistency when data is updated

# LEARNING SEMANTICS IN PBL

- Design a **semantic model** for PBL\_LA which will indicate all the necessary elements (e.g. learning objectives, learning topic, skills, learning outcomes, type of materials etc)
- A **semantic annotation tool** based on this model in order to enable learning resources annotation by all learning content providers
- Foster content **discoverability** and **linkage** of learning resources with the **Web of Data**

**XYZ** announced profits in **Q3**, planning to build a **\$120M** plant in **BULGARIA**, and more and more and more and more text.

## Semantic Repository



# TOOLS

- Supporting PBL\_LA and the semantic model based on existing LMS (e.g. Moodle)
- Analytics tools (e.g. RapidMiner, Gephi etc.)
- An intuitive semantic annotation tool

## CURRENT WORK

- The PBL steps are decomposed in specific learning activities
- For each activity, results and processes are described
- Competencies-skills-knowledge are mapped to specific activities/PBL phases
- A model is being constructed that connects PLB phases-activities-evidence-assessment-competencies
- Annotate information related to skills and qualifications using the ESCO (The European Skills/Competences, Qualifications and Occupations) ontology developed by the European Commission

# BENEFITS FOR THE TEACHERS

- Be aware of learning activities and learning goals during their courses
- Connect learning activities with learning goals
- Reflect on assessment of learning goals
- Utilize multidisciplinary and state of the art content and learning activities
- Monitor students' performance and re-design their course by using learning analytics techniques

# THANK YOU!

- Questions?