



XXVII FIG CONGRESS

11-15 SEPTEMBER 2022
Warsaw, Poland

Volunteering
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Geospatial excellence
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Overview of the PBL in Geodesy, Geoinformatics and Transport Engineering Education

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LBS2ITS



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



<https://lbs2its.net/>

- Location-based Services to Intelligent Transport Systems
- Erasmus+ Capacity Building in Higher Education funded project
- Partners:

Europe

Vienna University of Technology (TUW)

Dresden University of Technology (TUD)

National Technical University of Athens (NTUA)

Sri Lanka

Sabaragamuwa University of Sri Lanka (SUSL)

University of Moratuwa (UoM)

University of Sri Jayewardenepura (USJ)

General Sir John Kotelawala Defence University (KDU)



LBS2ITS: aims



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<https://lbs2its.net/>

- Curricula enrichment delivered through the application of LBS to ITS for four Sri Lankan partner universities
- Major aims in education in these domains include:
 - Geomatics / Geodesy dealing with PNT and sensors
 - LBS including cartography and GIS
 - Smart transportation and mobility
- Providing fully immersive and integrated teaching and learning experiences → Problem Based Learning



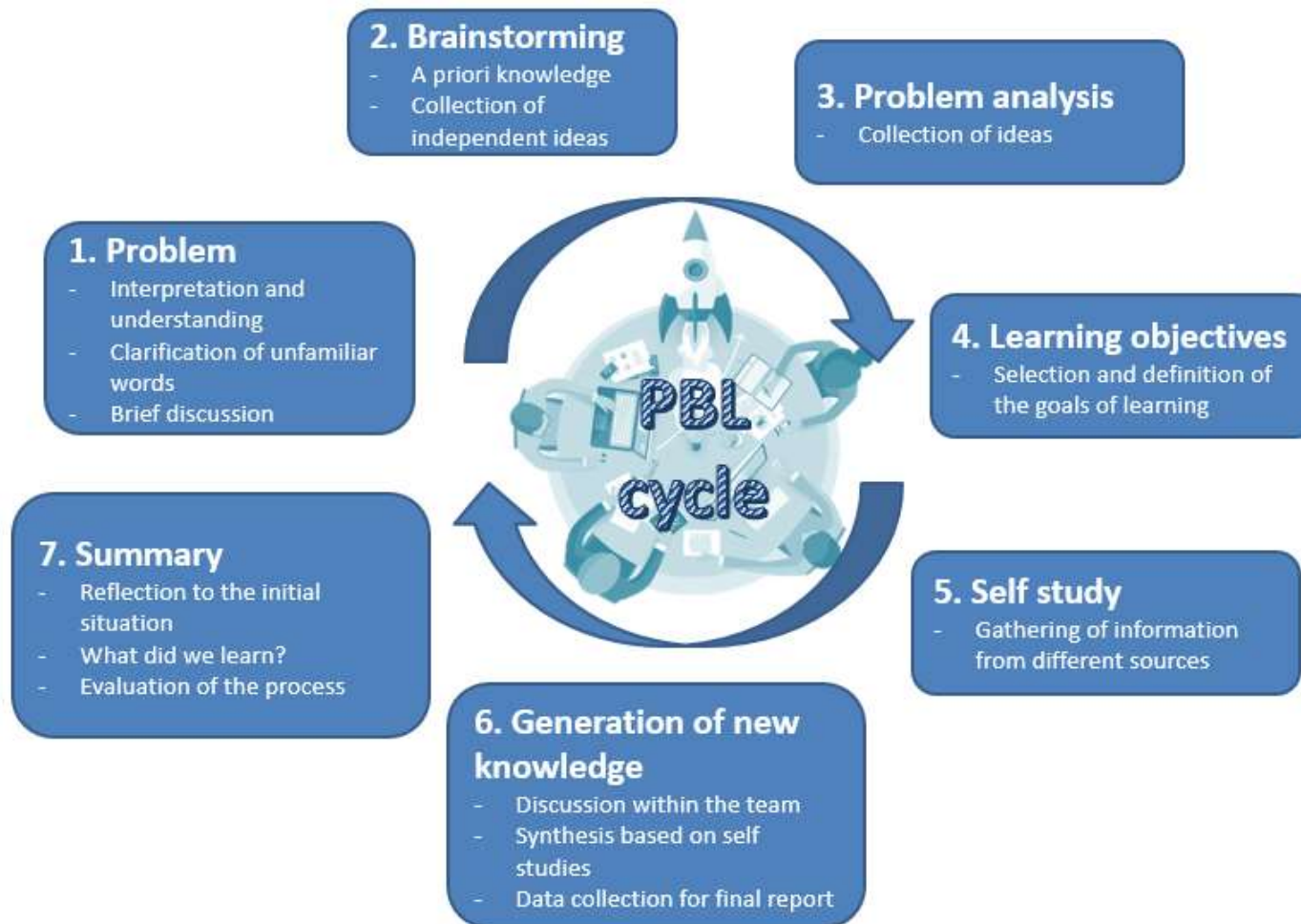
Problem Based Learning (PBL)

- **Learner-centered** pedagogic method
- Learners are given more responsibility → independent learners
- Teachers are there to facilitate learning
- “Learning by doing”
- PBL is based on **real world problems**, which stimulates
 - **Learning**
 - **Integrating**
 - **Organising learned information**with aim of ensuring recall and future application.
- PBL ≠ Doing projects

*“When we solve the many
problems we face
everyday, learning occurs”*

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PBL cycle



Classical Learning VS PBL

Classic learning	PBL
Teacher oriented	Student oriented
Students learn content knowledge and practice context-free problems	Embeds students learning processes in real-life problems
Problem (project) is a creation of the teacher with concrete instructions	Problem (project) is a creation of a group of students
Assessment based on the student's ability to reproduce told knowledge	Assessment based on more elements: creativity, active participation, leadership, level of general and technical knowledge, ability to find resources, etc.

PBL in engineering

- Much of the available literature is based on medical education
- The expansion of the PBL into other disciplines during 1990s: engineering studies, chemical engineering, law schools, architecture, business administration, physics, science courses, economics...
- Lack of literature in PBL for geodesy

What are the challenges of implementing PBL in geodesy, geoinformation and transport engineering education?

PBL in engineering: Benefits and disadvantages

- Perrenet et al. (2000) analysed the suitability of PBL for engineering
- Benefits
 - cognitive and motivational reasons,
 - application and the integration of theoretical and practical knowledge
- **Separate direct instructions and supervised practice are necessary for engineering**
 - Any missing concepts could increase the probability of PBL failure
 - ➔ Survey of all LBS2ITS project partners

Survey of LBS2ITS project partners

- 1 course from each of 7 partner universities
- All courses required a combination of PBL and classical lectures
 - Different *a priori* knowledge
 - To introduce students to certain theoretical concepts
 - The ratio between the PBL and traditional lectures depended on the maturity of the students
- PBL implemented similarly → PBL cycle steps
 - How do students find problems?

Conclusions

- LBS2ITS project → pilot courses based on PBL pedagogy + theoretical lectures
- **PBeL** → Retscher G., J. Gabela, V. Gikas (2022) PBeL—A Novel Problem-Based (e-)Learning for Geomatics Students. Geomatics 2022, 2, DOI: 10.3390/geomatics2010006
 - How can e-learning enhance the PBL experience?
 - Online session from field experts; Digital materials; Webinars; Moderation tools such as chats and forums etc.
- TUW introduced a new course based on PBeL → Positioning in indoor and GNSS challenged environments
 - 5th year students
 - Blended learning

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Questions?



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