

Problem Based Learning in the Digital Age

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Abstract

The Covid-19 situation has forced many educational institutions to re-think their educational offer in either blended or fully online formats. While classical lectures are easily adaptable to this new format – given that the technology and connectivity is in place – it is less trivial for active learning formats including Problem Based Learning. This workshop will focus on how Problem Based Learning projects can be carried out in an all-online setting, and walk through the different phases: Identifying problems, group formation, group collaboration, supervision and assessment. For each phase there will be a short presentation, then the participants work through the phase themselves, and finally reflect upon their experiences.

Keywords: Active Learning; Engineering Education; Problem Based Learning; Project Approaches.

1 Introduction

Problem Based Learning (PBL) is known as an efficient and motivating way of learning in engineering education that not only provide the learners with technical skills, but also supports the learning of competences related to teamwork, project management and other transversal skills (Kolmos et al., 2004). More recently, efforts have been taken to increase also the focus on integrating sustainability into the curriculum projects (Krogh-Hansen et al., 2014), and various projects such as EPIC (Pedersen et al., 2019) and COLIBRI (Pedersen et al., 2016) have explored international and interdisciplinary collaborations using PBL in a blended learning setting. While these experiences have been largely positive, it is also clear that virtual collaborations can be challenging, and that a proper design of the physical components of the collaboration are crucial for the virtual collaborations to be fruitful.

While some of these efforts, in particular the aspects of international collaboration, are based on the use of digital tools to support remote collaboration, the Covid-19 situation that emerged in the spring of 2020 took the extend of remote/virtual collaboration to a new level: With strong lockdowns hitting also universities, all teaching and learning activities - not just those including international collaborations - had to be done all-online for extended periods of time. This includes even those critical initial phases of student projects, where physical meetings were previously identified as important for the following phases of virtual collaboration.

This has provided us with experience in how all phases of a student project can be carried out in a virtual setting, including:

- Identifying problems in collaboration with internal and external stakeholders. This also includes initiating collaboration with organisations without prior history of collaboration.
- Group formation, where students form groups and choose problems. This is a critical phase, where both personal preferences and interests play a role.
- Group collaboration, where the students usually can work partly online, but where discussions, brainstorming and co-working often takes place in physical meetings.
- Supervision, including supervisor meetings.
- Assessment, which at Aalborg University is usually done in group exams, and where the dynamic is very different when done fully online.

The purpose of the workshop is to empower the participants to carry out PBL projects which are carried out partially or fully online: This includes designing the project itself and how this relates to the learning objectives, identifying and addressing the potential challenges especially with respect to the online collaboration, and also to recognize how to unleash the potentials of online collaboration.

The workshop is related to the conference theme of Active Learning and ICT support, yet also addressing the theme of Innovative experiences in engineering education.

2 Activities

The session will be hands-on, and the participants will mainly work in smaller groups of 5-6 people. The focus will be on the phases described above (identifying problems, group formation, group collaboration, supervision, assessment).

After a 5-minute icebreaker in the groups, for each of the five phases the following is done:

- 2-minute introduction to the phase in plenum
- 10 minutes discussion in groups, where the participants sketch 1-2 ways to carry out the phase in an all-online setting (written on posters).

Eventually there will be 15 minutes where groups are paired (so 10-12 people together) and discussing selected outputs with each other. During the last 10 minutes the facilitator will bring up highlights from the discussions in each group.

Eventually the participants will take pictures of the posters, and these will be collected and shared as a very concrete output of the workshop. Materials used will be posters and pens.

3 Expected results

At the end of the workshop, the participants will be better prepared to facilitate PBL projects in blended and virtual settings, and the posters will serve as concrete sources of inspiration.

4 References

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