Transformation to Problem Based Learning in Engineering Education

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During the last ten years, Engineering Education has undergone tremendous changes. A lot of these changes are caused by external and internal factors. The external factors as government policy concerning resources, educational and quality assurance policies are rather simple to describe. However, the internal factors at the institutional level may be unknown. Institutions have developed many different pedagogical models, using very different strategies for development.

Nearly all Danish Engineering institutions have implemented elements of Problem Based and Project Based Learning (PBL). Particularly 5 Engineering University Colleges have undergone changes towards PBL. The Pedagogical Network for Danish Engineering Education (IPN) has been one of the central agents in the change processes for engineering education in Denmark. IPN has been responsible for staff and faculty development at the engineering university colleges and has been running the co-ordination for exchange of experiences among all Danish engineering institutions.

However, it is not the same PBL-model which has been developed at the 5 different institutions – it is very different PBL-models, developed on the basis of very different development processes.

In this presentation, there will a presentation of:
1. The work with development of a model for transformation at the institutional level combining organisational learning theories and educational management theories.

2. Results concerning the transformation processes at 3 different institutions. The empirical data are based on interviews with rectors, central change agents and staff developers at the institutions. Three very different models have been developed:

- A holistic model: System change for the whole institution with the formulation of a common pedagogical model. The system change concerns all elements in the curriculum from formulation of goals, choice of methods, selection of content, space, organisation and assessment.
- System change at department level with development of different pedagogical models at different departments. This change does not concern all elements in the curriculum, typical there is no change of assessment methods.
- Sporadic changes in specific courses, but without influencing the system.

The result is clearly underpinning the hypotheses, that only top-down decisions at institutional level together with a pool of motivated staff will cause changes at a system level. A bottom-up approach with decentralised development at departments leads to a variation within the institution, but it might be difficult to develop curriculum models at system level.