

Summary

Delft University of Technology (DUT) is planning to build a learning centre. In this learning centre formal and informal learning is brought together and innovative learning methods in multifunctional, closed and open learning spaces are applied. For efficient use of its learning spaces information about occupation, utilization and presence of these learning spaces is required. This thesis presents a system to provide this information.

In the search for finding an optimal system for determining occupation, utilization and presence in learning spaces at first the new to build learning centre is described and analysed. A fictitious design of this learning centre is made, satisfying the requirements of the learning centre. Using this fictitious design the behaviour of people in the learning centre is analysed and different functions people do are distinguished. Based on this analysis facilities that accommodate monitoring systems were determined, which are the learning spaces themselves, doors of these learning spaces and chairs within these learning spaces.

A literature study is done for finding suitable monitoring technology. These technologies are described, containing the basic idea and operating principles behind them, followed by their possible application for one or more of the facilities.

Accordingly the design scope is discussed, resulting in design requirements for three distinguished parts, which are the learning centre boundary, closed learning spaces and open learning spaces. Based on the design requirements a comparative selection analyses was done to find the minimum (least possible number of technologies) needed system configuration for all three design parts combined into design scenario 1, which contains. Following, this minimum system configuration was improved in two stages, resulting in design scenario 2 and scenario 3 with increasing performance.

For the three scenarios detailed system designs were made in which the different hardware components are discussed, how they should be installed at the learning centre and what operating conditions they have to satisfy to generate data for determining the occupation, utilization and presence in learning spaces.

A comparison on performance and costs for the three scenarios was made. Here performance accuracy and the yearly CAPEX and OPEX are determined.

In the last part the conclusions of this research are stated and the final recommendations for each design scenario are given. Followed by a discussion in which advice for further research is given. Also some of the decisions for this research are discussed and possible alternatives are proposed.