



# 148

## In Search of new Learning Environments in Electrical Engineering

---

### K. Keltikangas<sup>1</sup>

Researcher  
Aalto University School of Electrical Engineering  
Espoo, Finland  
kirsti.keltikangas@aalto.fi

---

### H. Kettunen

Researcher  
Aalto University School of Electrical Engineering  
Espoo, Finland  
henrik.kettunen@aalto.fi

---

### J. Korhonen

Researcher  
Aalto University School of Science  
Espoo, Finland  
jaakko.korhonen@aalto.fi

---

**Conference Topic:** Engineering Education Research

**Keywords:** electrical engineering, learning and teaching environments

Space and environment have an essential role in teaching and learning [1, 2, 3]. However, this role is claimed under-researched and incompletely understood [4]. In general, engineering education has been taught in relatively traditional environments and buildings. Furthermore, engineering education has been rather teacher-centred and has often taken place in large lecture theatres [5]. Still, it also faces the rapid changes in the knowledge society and the accelerating pace of the changes, which challenge educational development in general [6, 7]. New technologies and pedagogical views challenge teaching, and the academic teaching faculty strives to keep up with this process. This study surveys the faculty's perceptions, expectations and wishes considering teaching and learning environments at their own university campus.

When a university has gone through a renovation in its buildings or a new building has been designed, academic teaching faculty has not got an active role in the process but architects and consulting companies have mainly been involved in the design process. We aimed to gain insight into how teachers would like to develop and design the teaching and learning spaces at their university. Our prior percep-

<sup>1</sup> K. Keltikangas, kirsti.keltikangas@aalto.fi



tion was that university teachers and students are experts of reflecting on best possible teaching and learning environments. However, this study focused on the teachers' perceptions. Additionally, another prior perception was that academic teachers should be involved into the design processes of the environments as active partners and planners, and use their expertise to enhance overall quality in engineering education. The data collected were qualitative and collected with semi-structured interviews.

We could divide the findings into two larger categories. The respondents regarded their environment and its development in physical or material ideas and thoughts, or either in immaterial things, as in form of social interaction. The results indicated that above all teachers yearned for more social interaction between different groups; teachers, students and others working at the School. Current environment did not enough support this. The respondents indicated that more interaction between different groups, either formally during the courses or informally e.g. meeting people in the corridors or other public spaces, would enhance motivation and better learning in the studies.

The arrangement of the space and the readily installed ICT appear to dictate the applied teaching methods and technologies. Traditionally arranged lecture theatres and classrooms mostly support only one-way delivery of information from teacher to students [5]. The results of this study indicated that the teachers are interested in the new technologies that can improve teaching. It seems, however, that the teachers very seldom adapt new technologies in teaching on their own. It is possible that adapting successfully new technologies in teaching without prior experience is time-consuming and that reduces the teachers' interest in taking part of the development process. The development process should start from the pedagogical philosophy and awareness, and then include those technologies which support teaching at best in each course. Further research is needed to cover this area more widely, in particular in engineering education. ■

## REFERENCES

- [1] Joint Information Systems Committee (JISC) (2006), Designing spaces for effective learning: A guide to 21st century learning space design, <http://www.jisc.ac.uk/media/documents/publications/learningspaces.pdf>
- [2] Oblinger, D. G., Ed. (2006), Learning spaces, Educause, Boulder, CO, <http://www.educause.edu/LearningSpaces>
- [3] Temple, P. (2007), Learning spaces for the 21st century: A review of the literature, The Higher Education Academy, [http://www.heacademy.ac.uk/resources/detail/publications/learning\\_spaces\\_21st\\_century](http://www.heacademy.ac.uk/resources/detail/publications/learning_spaces_21st_century)
- [4] Temple, P. (2008), Learning spaces in higher education: an under-researched topic, *London Review of Education*, Vol. 6, No. 3, pp. 229-241.
- [5] Jamieson, P. (2003), Designing More Effective On-campus Teaching and Learning Spaces: A Role for Academic Developers, *Int. Journal for Academic Development*, Vol. 8, No. 1/2, pp. 119-133.
- [6] Biggs, J. and Tang, C. (2007), Teaching for Quality Learning at University, 3rd ed., The Society for Research into Higher Education & Open University Press.
- [7] Crawley, E., Malmqvist, J., Östlund, S. and Brodeur, D. (2011), Rethinking Engineering Education. The CDIO Approach, Springer, New York.