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## Teaching In Student-Centred Active Learning Spaces: How Relational, Pedagogical, Spatial, And Technological Aspects Intertwine And Affect The Learning Environment

Guri Sivertsen KORPÅS

*Norwegian University of Science and Technology, Norway, guri.s.korpas@ntnu.no*

Trine Højberg ANDERSEN

*Norwegian University of Science and Technology, Norway, trine.andersen@ntnu.no*

Magnus Strøm KAHRS

*Norwegian University of Science and Technology, Norway, magnus.s.kahrs@ntnu.no*

*See next page for additional authors*

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## Authors

Guri Sivertsen Korpås, Trine Højberg Andersen, Magnus Strøm Kahr, Gabrielle Hansen, and Kari Anne Flem Røren

# **Teaching in student-centred active learning spaces: How relational, pedagogical, spatial, and technological aspects intertwine and affect the learning environment**

**G. S. Korpås<sup>1</sup>**

Department of Physics,  
Norwegian University of Science and Technology  
Trondheim, Norway

**T. H. Andersen**

Department of Physics,  
Norwegian University of Science and Technology  
Trondheim, Norway

**M. S. Kahrs**

Department of Physics,  
Norwegian University of Science and Technology  
Trondheim, Norway

**G. Hansen**

Department of Computer Science,  
Faculty of Information Technology and Electrical Engineering,  
Norwegian University of Science and Technology  
Trondheim, Norway

**K. A. F. Røren**

Section for Teaching and Learning Support,  
Education Quality Division,  
Norwegian University of Science and Technology  
Trondheim, Norway

## **Motivation and Learning Outcomes**

Higher educational institutions internationally have shown a growing interest in developing learning spaces that support student-centred learning approaches. For engineering education, this development aligns well with an increased emphasis on cross-disciplinarity and a system-thinking approach. However, research and our own experiences as teachers and evaluators of such learning spaces suggest that teachers who enter these learning spaces need support, as the complexity of the teaching situation becomes more apparent, compared to the traditional lecture hall. In this workshop, we will investigate this complexity together with the participants.

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<sup>1</sup> *Corresponding Author*

*G.S. Korpås*

*[guri.s.korpas@ntnu.no](mailto:guri.s.korpas@ntnu.no)*

Participants can expect to leave the workshop with a better understanding of:

- a conceptual framework that will assist the participants in navigating through the complexity of teaching in student-centred learning spaces.
- how to plan, implement and evaluate one's own teaching in such learning spaces (Do's and Don't's).

The take-home message from this workshop is an appreciation for how the relational, pedagogical, spatial, and technological aspects intertwine and affect the learning environment in spaces designed for student activity.

### **Background and rationale**

Higher educational institutions internationally have shown a growing interest in developing learning spaces that support student-centred learning approaches. This increased interest can be explained by a variety of factors: For one, institutions need to optimize the use of their limited physical space. usage of campus. Furthermore, traditional higher education institutions are grappling with the challenge of maintaining a vibrant campus in an increasingly digital world, and attractive learning spaces coupled with appropriate teaching and learning activities might play an important role in this respect. Finally, the emergence and development of these learning spaces have followed an increased awareness among faculty of the potential associated with student-centred and innovative teaching and learning approaches (e.g. Freeman et al., 2014).

However, the emergence of these student-centred learning spaces has elucidated the complexity of the teaching and learning situation, as both teachers and students are expected to take on more involved roles in these learning spaces. The complex interdependence between spatial, pedagogical, relational, and technological aspects and affordances become more tangible, compared to the traditional lecture hall. Our observations suggest that teachers and students who enter these spaces need support, in order to adapt to these new roles. We follow Leijon et al. (2022), who state that: "Space cannot be isolated as a single cause to positive learning outcomes, but people, space, interaction and learning are intertwined" (p. 15). One conceptual tool in this respect is the Pedagogy-Space-Technology (PST) framework, developed by Radcliffe et al. (2008). This framework emphasizes the interdependence of pedagogy, space, and technology – which is of critical importance concerning development and appropriate use of such learning spaces. It suggests that the design of effective learning spaces requires consideration of not only the pedagogical approach being used but also the physical space and technological tools that will support the learning process. The PST framework offers a holistic approach to designing learning environments.

### **Workshop Design**

In this workshop the participants will actively engage in discussions of how to use learning spaces designed for student activity. The outline for the workshop is as follows:

- A brief introduction, where we focus on student-centred learning spaces in general: typical technological, spatial and infrastructural affordances associated with these types of spaces. (15 min)
  - This introduction will be exemplified with visual representations of different learning spaces, which we will examine together with the participants.
- Participants are divided into small groups, where they will draw upon their own teaching experiences, discussing how and to what extent the different learning spaces could facilitate their students' learning processes. (15 min)

- Our team will facilitate these group discussions, and we hope to gain answers to questions such as (15 min):
  - What is the teacher's role?
  - What do we expect from the students?
  - How should we facilitate for learning, and what are our responsibilities?
  - What are the potential opportunities and constraints of these spaces?
- The workshop is finalised with a plenary discussion where we summarise the group discussions. (15 min)

### **Results of the Workshop 2-04, 8:00 – 9:00 Tuesday, 12. September 2023**

In the workshop the participants were asked to choose the learning space they would prefer, both from a teacher's perspective and a student's perspective. The distribution of their choices is shown in Figure 1, where blue notes indicate the teacher perspective, and yellow notes indicate the student perspective.



*Fig. 1. The participants preferred Learning spaces as teachers (blue) and students (yellow).*

In the group discussions that followed, the teacher's role and design of effective learning processes in these learning spaces were central. Finally, the participants discussed Do's (green) and Don'ts (pink) regarding utilizing spaces designed for student activities. The results from the groups are shown in Figure 2.

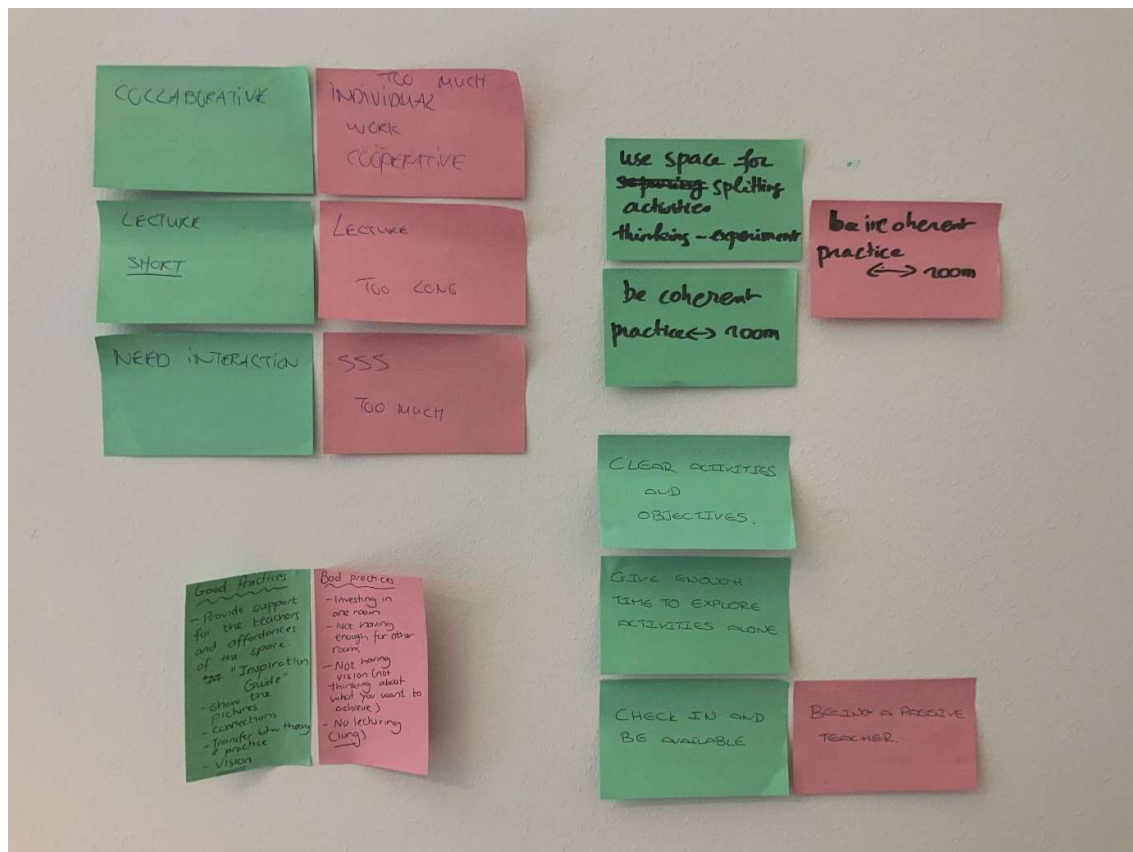


Fig. 2. Do's and don'ts results from group discussions.

### Significance for Engineering Education

As engineering education is moving toward emphasising cross-disciplinarity and a system-thinking approach (Crawley et al., 2014), there is an increased need to facilitate a study culture where students work actively in collaboration with each other to solve authentic problems, where the teacher takes on the role as a facilitator for the students' learning processes. In this perspective, the space and the infrastructure surrounding the students' learning processes become important.

Over the years, our own university has developed a range of student-active learning spaces specifically designed to facilitate student-centred teaching and learning in an engineering context. These spaces are designed with a variety of collaborative features such as group stations, work surfaces, and technology. Our team has extensive experience in utilizing, improving, and evaluating the affordances of these spaces, and we have been involved in instructing teachers on the pedagogical use of these spaces.

Both during and after the workshop we experienced interest from the SEFI-community regarding learning spaces and pedagogical aspects. Many Institutions in higher education, are working on these issues, and how to design learning spaces for student centred activities.

### Acknowledgements

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