

ACTIVE LEARNING – AN INTRODUCTORY WORKSHOP

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ABSTRACT

Active learning is one of the key principles in the CDIO approach (standard 8: Active Learning). During this workshop the participants will learn different active learning methods. The workshop will use active learning methods such as jigsaw classroom and clickers. After the workshop participant understand active learning and have some tools to apply in practice.

KEYWORDS

Active Learning, Pedagogy, Introductory Workshop, Standards: 8

INTRODUCTION

One of the main motivation of the whole CDIO (Conceive-Design-Implement-Operate) approach is to make engineering more interesting, to increase students' motivation and to make engineering education more working life relevant (Crawley, Malmqvist, Östlund, Brodeur, & Edström, 2014). Active learning is one answer to support students' motivation, but also to engage students more on their learning. With active learning we can provide students concrete experiences on engineering practice. Student-centred learning is emphasized highly in various reports on higher education too (Bucharest Communiqué, 2012; Johnson, Adams Becker, Estrada, & Freeman, 2014; Julia & Robert, 2008; Royal Academy of Engineering, 2007). In CDIO approach, active learning is one of the 12 CDIO standards focusing purely on the pedagogy and the way teaching should be provided (CDIO, 2014a). According to the Standard 8, teaching and learning should be based on active and experiential learning methods (CDIO, 2014b).

Active learning methods engage students directly in thinking and problem solving activities. Active learning means less emphasis on passive transmission of information, and more on engaging students in manipulating, applying, analyzing, and evaluating ideas. Active learning engages students in thinking about concepts, particularly new ideas, and requires them to make an overt response. When students' intrinsic motivation is enhanced they are wholly engaged (Goldberg & Somerville, 2014). While being active in their learning process they should also recognize for themselves what and how they learn. Active learning is a step to student-centred learning where student takes a central role in his/her learning.

Active learning becomes experiential when students take on roles that follow professional engineering practice (Crawley, et al., 2014). Experiential learning is process of learning through experience (Kolb, 1984). Kolb (1984) introduced the experiential learning cycle (Figure 1) that has strong impact on the CDIO approach.

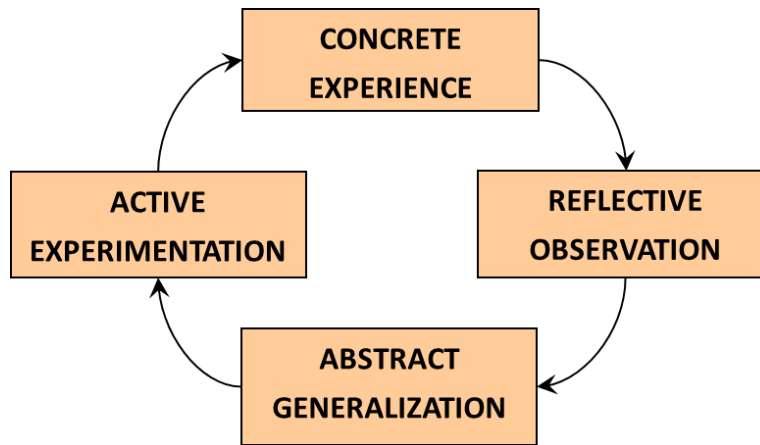


Figure 1. Experiential learning cycle (Kolb, 1984).

With active learning we can tackle some of the identified risk factors of student studying too such as low motivation (Smith & Beggs, 2003), poor quality of the student experience (Yorke, 2000) and lack of commitment to educational objectives (Schuetz, 2008). We should also remember that students expect to have versatile teaching with advanced learning methods (Kontio, 2009). In addition, we should remember that adopting a broad range of learning methods prepares students for work that is performed in a variety of ways (Confederation of Finnish Industries, 2011).

OBJECTIVES

The objectives of this workshop are

- 1) to understand what active and experiential learning means and
- 2) to understand the connection and difference with active and experiential learning
- 3) to learn five active learning methods and
- 4) to experience active learning in practice.

At the end, the participants have hopefully readiness to apply some of the methods in their own teaching. In addition, the participants can reflect their own programs on active and experiential teaching and learning.

ACTIVITIES

During the workshop the participants will work using active learning methods. The participants will study four different active learning methods:

- Muddy Cards,
- Recitation,
- Gallery Walk, and
- Formulate-Share-Create-Revise.

Muddy cards are tools to reach and collect immediate student feedback. Recitation is a simple example of integrated learning of disciplinary knowledge, problem solving, and communication skills. It is an active learning method that motivates students to spend more time on problem solution and thus promotes deep learning. In gallery walk there are a number of problems to be solved and students move from problem to problem like in a gallery from painting to painting.

Students work on the problems and continue and reflect the ideas and solutions of the previous student groups. Formulate-Share-Create-Revise is a cooperative learning approach that enhances student engagement with the study material and reinforces discussion with peers.

The workshop activities are organized using Jigsaw Classroom active learning method (Aronson, Blaney, Stephen, & Snap, 1978; Aronson & Goode, 1980; Aronson & Patnoe, 2011). Furthermore, electronic voting devices – clickers – are used during the workshop to activate participants and to test understanding of concepts.

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BIOGRAPHICAL INFORMATION

Juha Kontio, is a Doctor of Sciences in Economics and Business Administration. He received the M.Sc. degree in Computer Science from the University of Jyväskylä in 1991 and the D.Sc. degree in Information Systems from Turku School of Economics in 2004. At the moment he is Dean at the Faculty of Business, ICT and Chemical Engineering in Turku University of Applied Sciences. Previously he worked as Principal Lecturer and Degree Program Manager in Business Information Systems. His research interest is in higher education related topics. He has presented and published almost 90 papers. He is the co-leader of the European CDIO region.

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