

How to conceive the right problem: A method to reframe problems

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ABSTRACT

Keywords - facilitation, innovation processes, reframing, problem definition

Please indicate clearly the type of contribution you are submitting: __x_ hands-on, ___explore.

Background

The number of innovation and entrepreneurship activities in engineering educations are growing (Rae & Melton, 2016). Innovation and entrepreneurship activities can be categorized as being “About”, “For”, “Through” or “Embedded” (Pittaway & Edwards, 2012). Even if different forms of innovation and entrepreneurship activities in engineering educations exist, they all have in common that the innovative process is by nature iterative, where problem understanding including conceiving the right problem to solve are central activities (van Boeijen et al., 2014; Hurmelinnea-Laukkukanen & Heiman, 2012).

During their education engineers and engineering students are trained in solving well-defined problems. The problems might very well be complex, technical advanced and hard to solve, but students learn methods and approaches to tackle this type of problems. However, innovation activities are characterised by solving open problems, i.e. problems where there does not exist an infallible procedure that leads the engineer to a satisfactory solution (Eekels & Roozenburg 1990). When confronted with an open problem it is not trivial to figure out what the right problem to solve is (Wedell-Wedellsborg 2017). If you are stuck on a problem, it often helps to look at it from another perspective and try to find out what are the causes of the problem. This is an important competence to support engineering students to develop. Reframing can be one of several useful methods how to tackle problems to be used in Engineering Education. The point of reframing is not to find “the real problem” but to see if there is a better one to solve (Wedell-Wedellsborg 2017). It is important to be aware of that problems typically are multi-causal and can be addressed in many ways. Wedell-Wedellsborg (2017) has proposed seven practices for effective reframing:

1. **Establish legitimacy.** All in the group should know the method and accept to use it.
2. **Bring outsiders into the discussion.** It can be a good idea to get an outsiders perspective on the problem and ask them to come with inputs.
3. **Get people’s definitions in writing.** Very seldom, a group of people can agree on one idea. Therefore, it can be valuable to have each idea on paper.
4. **Ask what is missing.** Often people pay less attention to what is not described. Therefore make sure to ask explicitly what has not been mentioned.
5. **Consider multiple categories.** Ask the invited people to identify specifically what category of problem they think the group is facing and then try to suggest other groups.
6. **Analyze positive exceptions.** Look when the problem did not occur – by asking what was different about those situations? By exploring such positive exceptions sometimes called bright spots, which can often uncover hidden factors whose influence the group may not have considered

7. **Question the objective.** Focus on the objectives of the different parties involved. First clarify all the objectives and afterwards challenge them in order to uncover hidden objectives.

Reframing can be a powerful tool for engineering students to tackle open problems in a more qualified way. Besides reframing, as a method to handle problems in a better way, it can also be useful to teach engineering students how to do field research and how to meet customers, users and other relevant parties, e.g. maintenance persons. It is neither thinking nor testing alone, but a marriage of the two that holds the key to radically better results in problem solving (Wedell-Wedellsborg, 2017).

Hands on session

Introduction

The method “Reframing” will be introduced and examples of how it can be used in teaching activities in an innovation context will be presented. (10 minutes).

Hands-on activity

The next step will be to conduct a reframing exercise with the focus “*How to ask the right question and solve the right problem*”. The participants will be grouped into smaller groups. Each group will get a problem/challenge to which they apply the reframing method by Wedell-Wedellsborg. At the end of the session, there will be wrap up of the discussions. (60 minutes)

Discussion and conclusion (20 minutes)

In the last part of the session, the participants will discuss the result of the hands-on activity and share their experiences within this topic of problem solving.

Expected outcomes/results

The expected outcome from the hands-on session is creation of new experiences for workshop participants on how to use the reframing method as an example to find the right problem to solve. The participants will be provided with ideas to use in their own teaching.

References

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