HIPing Innovation Education in University:

Introducing Socio-technical concepts for Cross-disciplinary teams in Applied Computer Sciences

Mariusz Nowostawski[1], Stewart Kowalski[1], Jeffy Mwakalinga[2]

[1]Gjøvik University College, Gjøvik Norway

[2]Dept of Lingustics University of Stockholm

{mariusz.nowostawski, stewart.kowalski}@hig.no, jeffy@ling.su.se

Learning terminologies and concepts of the socio-technical innovation is for many master students in computer science a trivial task. This is the case for both, students and teachers alike. For example, one can present to students a series of academic articles, which start with sentences such as: "There is no consensus on the definition of innovation in the computer science literature". At the end of the course, we, as educators, can examine the students on their individual ability to reflect on the strengths and weakness of definition "X" as compared with definition "Y". This type of examination can also be used to demonstrate to external reviewers of the course that we have achieved the courses intended learning objective (ILO) and provide evidence that the students after taking the course can reflect on the process of innovation. However, the question remains if the students have achieved the main ILO of the course which is that "they can contribute to the innovation process", as required by Norwegian high education authorities. This is one of the general competences a Master Students in Norway should acquire while completing a Masters at a Norwegian university [1].

In this poster we describe our findings and ongoing work on a cross-disciplinary team innovation exercise that we have held over the last two years. The goal of these exercises is to improve students' general competences and ability to contribute to the innovation process in their future work lives.

Pedagogical practice and Theory

There are those that say: "Innovation is as essential to a successful modern economy as water is to life" [2]. However, from our experience in teaching innovation at the 1st and 2nd levels of university education over the past four years we have found that you can lead some students to innovation, but you cannot make them all "drink". That is to say that it is important to match the difficulties of teaching innovation activities in the context of varying learning styles, motivation and skills [3]. In general, it has been found that teaching information systems and IT development, requires more of an apprentice-master approach, or learning by doing approach, and typical university class room setting are not conducing for knowledge and skills transfer in this

particular discipline. Bider et al. have attempted to use multi-media simulation to tackle this problem [4]. Innovation contests have been used by societies and industry since the 18th century. However, with the advance of the computing and communication they have become a popular way to engage students [5]. Bullinger and Moeslein have done an extensive literature review of innovation completion and they have suggested a common model and propose ten design elements [6].

While the practice of innovation exercises seems to be developing extensively today, the pedagogical theoretical bases for innovation education at the 1st and 2nd levels of university education appears to be based on a great deal on theoretical work done by Kolbs and the experiential learning schools [7]. To the authors' knowledge no research has been done as to the relationship between teaching systems theory and innovation theory. Some experiments have been performed to see how the introduction of systems theory mental model into work group in IT security team can affect solutions outcomes but none has been done on how [8]. Figure 1 is a screen shoot from the webpage used to present the socio-technical model

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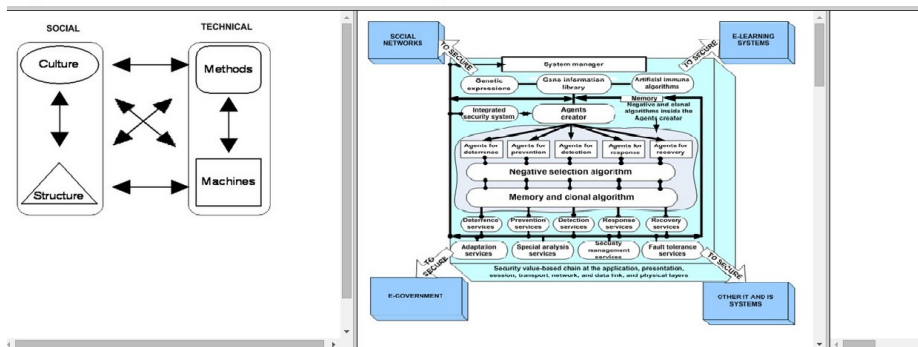

Fig. 1. HIPed presentation of the socio-technical theory

Preliminary results

2014 exercise received mixed reviews from the students. From one hand, some of the students have enjoyed the cross-disciplinary nature of the exercise, and the ability to scope and control the various stages of the innovation process. On the other hand, we have not got Innovation Norway support and have not been able to provide real-word, or close to real-world evaluation of the student projects. Some students also felt that during the exercise they had to take on roles and skill sets that they believed were not necessary for their subject area. To some students, this made the exercise not realistic. From their perspective, it was more a "game" than an exercise. Many of the students just felt overwhelmed by the exercise.

In the 2015 exercise we have purposefully engaged Innovation Norway as well as experts from the field that provided the students with general, high level expertise and help when evaluating their proposals. Students were asked to prepare pitch for their idea, and iterate over the various stages based on the feedback received. This turned out to be a valuable element that helped the students to fully appreciate and understand the complexity of the innovation process. To facilitate the communication between the various teams: the main development team, the UX design team and the security team, the main group was required to provide a presentation for the hyper interactive presentation platform (HIP). The HIP platform is a custom-build hyper-interactive presentation toolkit, that allows mixing various modalities in a single uniform presentation. This includes slides, video/audio, questions and logical pointers at which the presentation can be consumed. Students have prepared this themselves and provided as part of the documentation to the other teams. Figure 2 below is a screen shot from the platform that was used in the 2015 exercise.
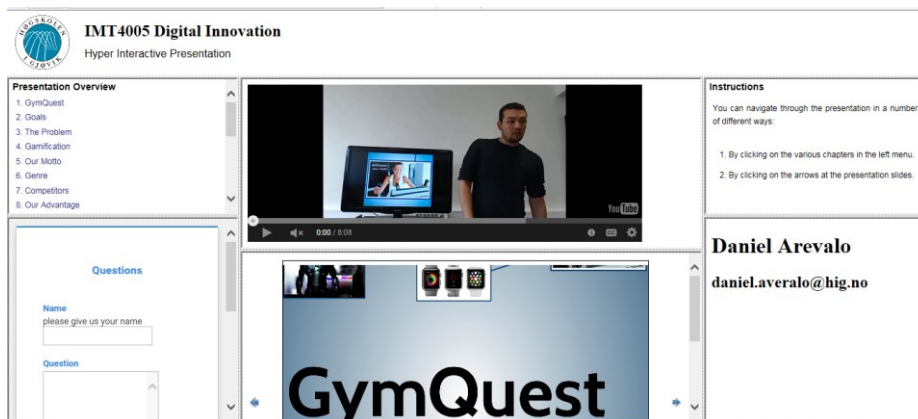

Fig. 2. Platform (HIP) for students, http://gtl.hig.no/hip-platform/index.html

Future Research

Based on our experiences with the exercise from 2014 and 2015 we are planning to engage students earlier in making use of video technologies and our HIP platform. We also plan to integrate this platform with a socio-technical concept model of adoption and to see how the introduction socio-technical concepts through this platform will affect the teams learning performance and use of socio-technical concepts in their design. This will help in making the necessary connection and communication between various cross-disciplinary teams easier, and more effective. We also hope that this technology will allow the students to engage with the wider audience and receive feedback from the market that their innovation targets.

One of the elements that we want to explore further is the better assessment of the students' ability to contribute to the innovation process in real world, or close to real-world circumstances. We hope that HIP platform will enable this.

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