Using virtual reality technology as an educational tool

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ABSTRACT
Virtual reality, simulation, mastery learning, gamification, virtual learning environment

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

Practical experience in the workshop is an important part of the mechanical engineering education. Knowledge of machining capabilities, and especially limitations, is essential when designing new hardware. The industry often requests engineers with more practical experience and better workshop skills. Aarhus School of Engineering faces the problem of facilitating practical workshop training for the growing number of students. Due to a lack of the required capacity of workstations and staff, only about 15% of students are able to participate in the workshop class.

Immersive virtual reality lets a user experience a virtual world via a head mounted display. The user is able to interact with the environment using controllers and receive feedback via visuals, sounds and haptics. This allows students to handle virtual object and work with expensive and dangerous machinery unsupervised, and even at home. As an additional benefit, the virtual world facilitates a framework for immediate and customized feedback for each student. Each individual controls the amount of repetitions, the pace and difficulty of the exercises.

The simulation aims to address the need for additional workshop experience by simulating a complete workshop virtually. By integrating the virtual workshop as a part of the course Production-technology all students will get a better understanding of the machining trade. Research shows multiple indications of how VR can be a powerful educational tool (Dinis, 2017), and gamification can serve as a compelling motivator (Eleftheria, 2013). The project will also serve to increase the interest in the practical skills among youths, and function as an appetizer for the technical educations.

The method for learning outcome evaluation will be *efficient learning desing* and *mixed methods research design* (Cresswell 2017). This purpose of this evaluation is both a) to enhance the program as well as b) form a general study of the specific potential for learning using VR.

This workshop will contain information on the general state and use of VR. Afterwards the short presentation, you have the opportunity to try our demo for *Craftio* and form your own opinion about the opportunities using this technology for learning.
Join us to experience and discuss the opportunities of VR learning:

- Highly controllable environment
- Gamification as a means for motivation.
- Mastery learning, flipped learning and experiential learning with VR

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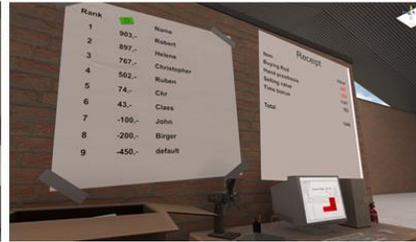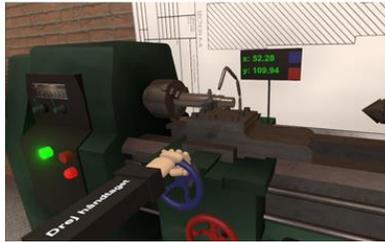
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