The application of Information and Communication Technology (ICT) in construction supports business as well as project processes by providing integrated systems for communication, administration, quantity takeoff, time scheduling, cost estimating, progress control among other things. The rapid technological development of ICT systems and the increased application of ICT in industry significantly influence the management and organisation of construction projects, and consequently, ICT has implications for the education of engineers and the preparation of students for their future professional careers. In engineering education there is an obvious aim to provide students with sufficient disciplinary knowledge in science and engineering principles. The implementation of ICT in engineering education requires, however, that valuable time and teaching efforts are spent on adequate software training needed to operate the ICT systems properly. This study takes on the challenge of using ICT in engineering education without diminishing the body of technical disciplinary knowledge and the understanding of the engineering context in which it is taught, practiced, and learned. The objective of the study is to describe and review an extensive role play simulation where students interact with real professional engineers. The role play simulation aims at providing a realistic learning context for the students in order to facilitate the learning objectives of the disciplinary knowledge of the course, which in this case is represented by adopting Building Information Modelling, BIM, for construction management purposes. Course evaluations, a questionnaire and discussions with students confirm a genuinely positive attitude towards the role-play simulation and interaction with industry professionals. The students engage in the role-play and express an increased understanding of the requirements and implicit rules of real-life engineering. The interaction between students and the professional engineers acts as a prime mover for the students to perform their best, which in turn strengthens the learning of the disciplinary subjects.