Improving Teaching and Student Learning Effectiveness
Case Study : Engineering Software Simulation

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Abstract

On-hand practicing in laboratories are very important and normally considered as the integral part of any engineering course in any field. They provide students with exposure to real engineering instruments and devices. They can also provide opportunities for students to learn to work together in groups. This paper describes the various simulation tools that can be used in virtual engineering laboratories. The type of simulation environments and their advantages and disadvantages are described briefly together with examples of some commercially available simulator programs.

Introduction

Computer simulation has been successfully used in several disciplines, such as Engineering, Economics, Biology, and in the Social Sciences, for many distinct aims (1)-(5). The development of models is also diversified as regards the models' purposes and application domains in Software Engineering (SE), including the use of simulation as a mean of experimentation for models and processes. So, simulation models are used as instruments in experimental studies.

Software Simulation Example
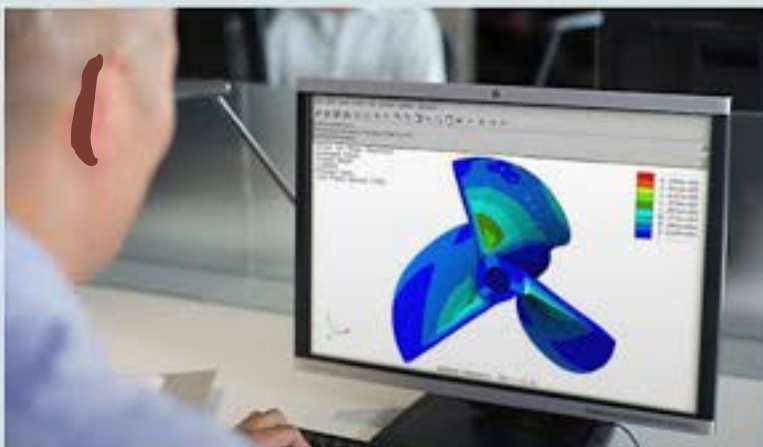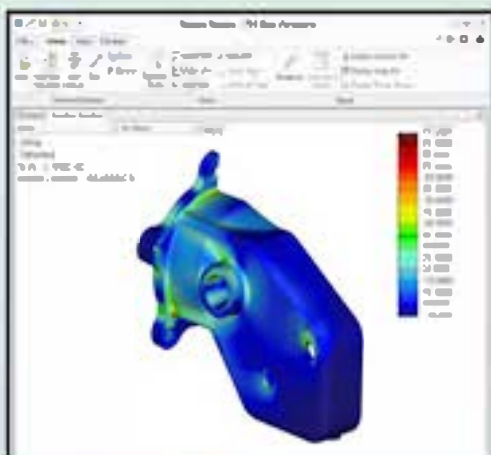
Results

A results show that students gain a competitive advantage by using simulation technology. According to research;

- 21% more likely to use simulation in the class when determining optimal system architectures.
- 55% more likely to use simulation tools that look at behavior at a system level, which offers better visibility into how the components will interact with each other.
- 42% more likely to evaluate multiple physical forces simultaneously.
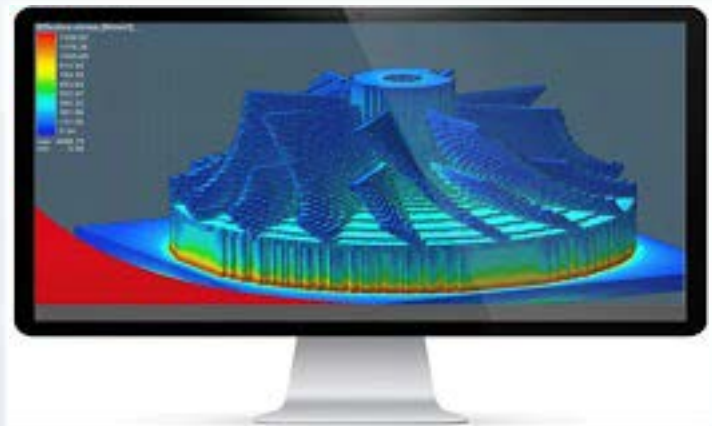
Conclusion

- Engineering simulation is one of the most important tools in engineering education.
- Although simulators do not replace real physical laboratories they can be very useful in teaching the working principles of various engineering instruments and devices.
- The importance of engineering simulation is shown in this paper with an example of simulation package.

Acknowledgements

1. "QuickCircuits User Guide", web site:
http://www.quickcircuits.com [Accessed on: 2nd June, 2010]
2. "CarSim Simulator", web site:
http://www.carsim.com/products/index.php [Accessed on 2nd May, 2010]
3. "SIMPACK User Guide", web site:
http://www.simpack.com/industrial_sectors.html [Accessed on: 3rd July 2010]
4. "CHEMCAD Chemical Engineering Simulator", web site:
http://www.chemstations.com [Accessed on: 2nd July 2010]/
5. "OPNET Network Simulator User Guide", web site:
http://www.opnet.com/ [Accessed on 1st June 2010]