

Applications of Virtual Reality (VR) as Teaching Tool to Enrich Students Learning

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Abstract

Instruction in higher education institutions continues to proceed along the traditional path. Exposure to real-life experiences relevant to the discipline of study could greatly enhance students' understanding of how their study relates to the real world. This is particularly important for engineering students where the focus is on finding practical solutions to real-life problems. Offering such experiences, however, is restricted by many limiting factors. Recent technological advancements in the fields of simulation and virtual/augmented reality present a viable solution to offer semi-real experiences that avoid many of the limiting factors. An important consideration for this approach is that students won't have to physically leave campus to gain the intended experience.

In this presentation, authors present the applications of the virtual reality as a teaching medium for providing students with realistic experiences in relation to manufacturing processes. This presentation is also intended to demonstrate how:

- Complex systems utilizing simulation tools that support virtual reality and allow the students to walk through and interact with the virtual surroundings could be developed.
- Students could utilize the virtual environment to further improve real systems.
- Students could create and experiment with their own models and to optimize their proposed systems output by 3D virtual systems.

Keywords

Virtual reality, engineering education, manufacturing, simulation

Biographies

Dr. Mohamed Y. Ismail received his MS. and Ph.D. in Electrical and Computer Engineering from University of Florida. He progressed through several leadership positions at Verizon Communications. Dr. Ismail joined Texas A&M University at Qatar as a Senior IT Consultant and created several pioneering initiatives for promoting the use of digital technologies in the classroom. He has widely presented papers in national and international conferences and symposia and worked closely with engineering faculty at Texas A&M University at Qatar to develop and introduce new technologies to assist students' learning. His research interests include application of Virtual and Augmented Reality to engineering instruction and the design of innovative instructional methods for engineering education.

Dr. Hamid R. Parsaei is a Professor of Mechanical Engineering at Texas A&M University at Qatar (TAMUQ). Additionally, he holds the rank of professor in the Department of Industrial and Systems Engineering and Department of Mechanical Engineering at Texas A&M University in College Station, Texas. Dr. Parsaei is a fellow of the Institute of Industrial and Systems Engineers (IISE) and the American Society for Engineering Education (ASEE). He is a leader in advancing teaching and learning by developing new initiatives for using technology in the classroom and enhancing excellence through diversity in educational programs. He has been a frequent speaker at national and international conferences on engineering education and the use of technology to further improve teaching and learning. His research currently focuses on application of optimization techniques to emergency evacuations and disaster mitigation. He has published over 280 articles in the peer reviewed journals and conference proceedings. He has authored and edited 24 text and referenced books including those in progress. He has served as an ABET Program Evaluator (PEV) for the Engineering Accreditation Commission representing the Institute of Industrial and Systems Engineers since 2006. He has served as the college wide ABET Coordinator at Texas A&M University at Qatar. Dr. Parsaei served as professor and chair of the Department of Industrial Engineering at the University of Houston (January 2001- August 2010) and Associate Dean for Academic Affairs at Texas A&M University at Qatar (September 2010-August 2014). Dr. Parsaei is a registered professional engineer in Texas.

Boback Parsaei holds B.S. and M. Engr. in Civil Engineering from Texas Tech University and Texas A&M University, respectively. He has served as a senior consultant with Integrated Technology Systems, Inc. He is co-editor of the CRC Press book series on Technology Guides: Advancing Capacity Building in Contemporary Organizations and co-author of an upcoming CRC Press book, Leadership Excellence in Dynamic Organizations: The Art of Developing Leaders. Mr. Parsaei has presented several papers at international conferences on leadership, project management, and engineering education. He is currently a doctoral candidate in the Department of Civil and Environmental Engineering at Texas A&M University.