# International Design Engineering Technical Conferences & Computers and Information in Engineering Conference

- 2020 -

### **VOLUME 3**

## 17TH INTERNATIONAL CONFERENCE ON DESIGN EDUCATION (DEC 2020)

#### presented at

ASME 2020 INTERNATIONAL DESIGN ENGINEERING TECHNICAL CONFERENCES & COMPUTERS AND INFORMATION IN ENGINEERING CONFERENCE

AUGUST 17-19, 2020

**ONLINE** 

#### sponsored by

DESIGN ENGINEERING DIVISION AND COMPUTERS AND INFORMATION IN ENGINEERING DIVISION, ASME

THE AMERICAN SOCIETY OF MECHANICAL ENGINEERS
Two Park Avenue \* New York, NY. 10016

Printed from e-media with permission by:

Curran Associates, Inc. 57 Morehouse Lane Red Hook, NY 12571



Some format issues inherent in the e-media version may also appear in this print version.

Statement from By-Laws: The Society shall not be responsible for statements or opinions Advanced in papers. . . or printed in its publications (7.1.3)

INFORMATION CONTAINED IN THIS WORK HAS BEEN OBTAINED BY ASME FROM SOURCES BELIEVED TO BE RELIABLE. HOWEVER, NEITHER ASME NOR ITS AUTHORS OR EDITORS GUARANTEE THE ACCURACY OR COMPLETENESS OF ANY INFORMATION PUBLISHED IN THIS WORK. NEITHER ASME NOR ITS AUTHORS AND EDITORS SHALL BE RESPONSIBLE FOR ANY ERRORS, OMISSIONS, OR DAMAGES ARISING OUT OF THE USE OF THIS INFORMATION. THE WORK IS PUBLISHED WITH THE UNDERSTANDING THAT ASME AND ITS AUTHORS AND EDITORS ARE SUPPLYING INFORMATION BUT ARE NOT ATTEMPTING TO RENDER ENGINEERING OR OTHER PROFESSIONAL SERVICES. IF SUCH ENGINEERING OR PROFESSIONAL SERVICES ARE REQUIRED, THE ASSISTANCE OF AN APPROPRIATE PROFESSIONAL SHOULD BE SOUGHT.

For authorization to photocopy material for internal or personal use under circumstances not falling within the fair use provisions of the Copyright Act, contact the Copyright Clearance Center (CCC), 222 Rosewood Drive, Danvers, MA 01923, Tel: 978-750-8400

Requests for special permission or bulk reproduction should be addressed to permissions@asme.org.

ISBN NO. 978-0-7918-8392-1

© 2020 ASME
All rights reserved.
Printed in U.S.A with permission by Curran Associates, Inc. (2020)

#### Additional copies of this publication are available from:

Curran Associates, Inc. 57 Morehouse Lane Red Hook, NY 12571 USA

Phone: 845-758-0400 Fax: 845-758-2633

Email: curran@proceedings.com Web: www.proceedings.com

#### **CONTENTS**

17TH INTERNATIONAL CONFERENCE ON DESIGN EDUCATION (DEC 2020)		
DIVERSITY AND INCLUSION IN DESIGN EDUCATION		
DETC2020-22139	V003T03A001	
DETC2020-22623  Does It Translate? A Case Study of Conceptual Design Outcomes With U.S. and Moroccan Students  Aoran Peng, Jessica Menold, Scarlett R. Miller	V003T03A002	
Broadening Participation: Over Ten Years of Outreach Within the IDETC-DED Community Charlotte de Vries, Kate Fu, Elizabeth Starkey, Christine Toh, Nicole B. Damen, Shraddha Joshi, Brian Sylcott, Kathryn Jacobson	V003T03A003	
IMPLEMENTATION, ASSESSMENT, AND RESEARCH METHODS ACROSS THE CURRICULUM		
DETC2020-22027		
DETC2020-22054  Comparison of Exams and Design Practica for Assessment in First Year Engineering Design Courses  Hannah Nolte, Catherine Berdanier, Jessica Menold, Christopher McComb	V003T03A005	
DETC2020-22077	V003T03A006	
DETC2020-22099  Comparing Student and Sponsor Perceptions of Interdisciplinary Teams' Capstone Performance Sandeep Krishnakumar, Catherine Berdanier, Christopher McComb, Matthew Parkinson,	V003T03A007	

Jessica Menold

DETC2020-22250  Creativity and Engineering Education: Assessing the Impact of a Multidisciplinary Project Course on Engineering Students' Creativity Saurabh Deo, Katja Holtta-Otto, Gunther H. Filz	V003T03A008
DETC2020-22267	V003T03A009
DETC2020-22376	V003T03A010
DETC2020-22405	
DETC2020-22449  Fresh in My Mind! Investigating the Effects of the Order of Presenting Opportunistic and Restrictive Design for Additive Manufacturing Content on Creativity Rohan Prabhu, Scarlett R. Miller, Timothy W. Simpson, Nicholas A. Meisel	V003T03A012
DETC2020-22477  Exploration of the Timing of Introduction of Design Heuristic Cards to Early Design Brainstorming Sessions by Interdisciplinary Student Teams  Abimelec Mercado Rivera, Jose E. Lugo	V003T03A013
DETC2020-22613  Quantifying Individuals' Theory-Based Knowledge Using Probabilistic Causal Graphs: A Bayesian Hierarchical Approach Atharva Hans, Ashish M. Chaudhari, Ilias Bilionis, Jitesh H. Panchal	
DETC2020-22773  Digitizing Dissection: A Case Study on Augmented Reality and Animation in Engineering Education  Kevin G. Kearney, Elizabeth M. Starkey, Scarlett R. Miller	V003T03A015
OTHER TOPICS	
DETC2020-22345  A Power Analysis to Determine Appropriate Sample Size for the Study of Student Design-Team Effectiveness  Shun Takai, Thomas J. Smith, Marcos Esterman	V003T03A016
DETC2020-22577  Towards an Understanding of Semantic Memory During Idea Generation  Attakias T. Mertens, Christopher McComb, Christine A. Toh	V003T03A017

DETC2020-22589  Best Fits and Dark Horses: Can Design Teams Tell the Difference?  Daniel Henderson, Thomas Booth, Kathryn Jablokow, Neeraj Sonalkar	V003T03A018
DETC2020-22614  Pilot Study: Investigating EEG Based Neuro-Responses of Engineers via a Modified Alternative Uses Task to Understand Creativity  Tess Hartog, Megan Marshall, Md Tanvir Ahad, Amin G. Alhashim, Gul Okudan Kremer, Janet van Hell, Zahed Siddique	V003T03A019
DETC2020-22667  Dichotomy of Design Experience: A Case Study of One Student's Experience With Problem Typology and His Perceptions of Design  Andrew Olewnik, Randy Yerrick, Amanda Simmons, Yonghee Lee	V003T03A020
DETC2020-22754  A Methodological Framework for Making the Transition From Traditional Innovation Teaching Towards Serious Games  Yiming Ma, Flore Vallet, Francois Cluzel, Bernard Yannou	V003T03A021
SHORT PAPERS: WORK IN PROGRESS	
DETC2020-22403  Exploratory Assessment of Design Entrepreneurial Program New Venture Design Experience to Prune Program Activities  Jose E. Lugo, Adriana M. Munoz-Soto, Manuel O. Rios-Torres	V003T03A022
DETC2020-22459  An Initial Analysis of Undergraduate Student Mental Models of Product Design  Jessica R. Driscoll, Steven Hoffenson, Nicole Pitterson	V003T03A023