

**Proceedings of ASME 2024
International Design Engineering
Technical Conferences and
Computers and Information in
Engineering Conference
(IDETC-CIE2024)**

Volume 4

**21st International Conference
on Design Education (DEC)**

**August 25-28, 2024
Washington, DC**

Conference Sponsors
Design Engineering Division

Computers and Information
in Engineering Division

THE AMERICAN SOCIETY OF MECHANICAL ENGINEERS

© 2024, The American Society of Mechanical Engineers, 150 Clove Road, Little Falls, NJ 07424, USA
(www.asme.org)

All rights reserved. “ASME” and the above ASME symbols are registered trademarks of the American Society of Mechanical Engineers. No part of this document may be copied, modified, distributed, published, displayed, or otherwise reproduced in any form or by any means, electronic, digital, or mechanical, now known or hereafter invented, without the express written permission of ASME. No works derived from this document or any content therein may be created without the express written permission of ASME. Using this document or any content therein to train, create, or improve any artificial intelligence and/or machine learning platform, system, application, model, or algorithm is strictly prohibited.

INFORMATION CONTAINED IN THIS WORK HAS BEEN OBTAINED BY THE AMERICAN SOCIETY OF MECHANICAL ENGINEERS 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.

ASME shall not be responsible for statements or opinions advanced in papers or . . . printed in its publications (B7.1.3).
Statement from the Bylaws.

For authorization to photocopy material for internal or personal use under those 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, www.copyright.com.

Requests for special permission or bulk reproduction should be addressed to the ASME Publishing Department, or submitted online at: <https://www.asme.org/publications-submissions/journals/information-for-authors/journalguidelines/rights-and-permissions>

ISBN: 978-0-7918-8838-4

TABLE OF CONTENTS

Student Understanding of Prototyping in Capstone Projects.....	1
<i>Oredola Adebayo, Pavan Kumar, Vipul Malik, Joshua D. Summers</i>	
Sustaining Creatively? Investigating the Effects of Creativity and Sustainability-Focused Evaluation Criteria in Design Tasks	13
<i>Mohammad Alsager Alzayed, Elizabeth M. Starkey, Sarah C. Ritter, Rohan Prabhu</i>	
Refining Engineering Identity Framework for Implementation In Engineering Education - A Literature-Based Analysis	23
<i>Pavan Kumar, Joshua D. Summers</i>	
Evaluating the Effectiveness of Heuristic Cards With Varying Example Specificity in Design for Additive Manufacturing Education	40
<i>Seth Pearl, Nicholas Meisel</i>	
Exploring the Impact on Neurocognitive Process and Motivation Caused by Problem Modality	54
<i>Corey Kado, Elisabeth Kames</i>	
Engineering Design Education: Assessing Student Learning in Cornerstone Through Capstone Programs.....	63
<i>Mohammad Fazelpour, Shraddha Joshi, Gregory Mocko, Alexander R. Murphy, Satchit Ramnath, Rahul S. Renu, James A. Righter, Chiradeep Sen, Joshua D. Summers, Apurva Patel</i>	
Exploring the Effects of a Problem Typology Framework on Student Engagement in a Selection Problem	80
<i>Lisa Retzlaff, Sama Ghoreyshi, Andrew Olewnik, Scott Ferguson</i>	
The Effects of Incubation, Fixation Stimuli, and Working Memory Capacity on Design Fixation.....	94
<i>Amanda Brundage, Nicolas F. Soria Zurita, Elizabeth Starkey, Jessica Menold, Kathryn Jablokow</i>	
The Impact of Undergraduate Experience on Mental Model Component and Function Identification.....	105
<i>Mikala Y. Furiato, Corey J. Kado, Alexander R. Murphy</i>	
Assessing the Prevalence of Artificial Intelligence in Mechanical Engineering and Design Curricula	114
<i>Pranav Milind Khanolkar, Jerry Lu, Ada Hurst, Alison Olechowski</i>	

Author Index