

MARCH
13-15
2022



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PROGRAM
OF THE
**INTERNATIONAL
CONFERENCE ON
INDUSTRY,
ENGINEERING &
MANAGEMENT
SYSTEMS**

DEAR FRIENDS AND COLLEAGUES...



MARCH
13-15
2022



INDUSTRY ENGINEERING &
MANAGEMENT SYSTEMS CONFERENCE

On behalf of the IEMS Executive Board, it is our pleasure to welcome all of you to the IEMS Conference. We are proud that the IEMS Conference continues to provide a forum for the exchange of knowledge and research during these challenging times.

The annual IEMS Conference is directed at those who strive to continuously improve management systems and processes in their business and engineering environments. This covers a broad range of areas in both of these fields. We believe that engineering and management professionals will benefit greatly by sharing and exchanging their ideas and issues in the same forum. Engineering and business are the igniting components for innovation and creativity, and we are grateful and delighted that many of you have chosen our conference to be the venue for the sharing of those ideas.

Our Program Chair, Dr. Hesham Mahgoub, has done an extraordinary job organizing this year's conference. We are pleased with the quality of papers published in both the *Journal for Management and Engineering Integration* (JMEI) and our *Conference Proceedings*. We greatly appreciate the efforts made by Dr. Ed Sawan and his editorial team in assembling such distinguished top-quality publications. If you have any questions about these publications or wish to serve as a reviewer, please let us know. Last, but not least, we'd like to thank Dalia Mahgoub, who puts together all the pieces behind the scenes.

We hope that you will leave this conference having learned and shared many new ideas. In the spirit of constant improvement, if you have any ideas to improve the conference, or if you are interested in taking a leadership role in the conference, please let us know. Thank you for participating and we look forward to seeing you next year!



GAMAL WEHEBA, PH.D.
IEMS 2022 CONFERENCE CHAIR

KEYNOTE SPEAKER

NICOLE M. RADZIWILL, PHD, MBA

SVP ULTRANAUTS
FELLOW, AMERICAN SOCIETY FOR QUALITY

IEMS
MARCH 14
12:45 PM



DIGITAL QUALITY LEADERSHIP FOR THE 2030S

ABOUT

Nicole Radziwill is SVP of Quality & Strategy at **Ultranaughts**, a professional services firm specializing in quality assurance and quality engineering for software, data science, digital transformation, and cognitive diversity. She is the former VP of the Quality and Supply Chain Practice at Intellex Technologies in Toronto, and a tenured Associate Professor of Data Science and Production Systems.

She is an Academician with the International Academy of Quality (IAQ), a Fellow of the American Society for Quality (ASQ) and a past Chair of the ASQ Software Division. She has a PhD in Quality Systems and is the author of *Connected, Intelligent, Automated: The Definitive Guide to Digital Transformation and Quality 4.0* from ASQ Quality Press (2020).

Digital transformation attracts funding because companies are anxious to capture competitive advantage through new technologies like IoT, AI, and ML. But because excitement runs ahead of results, between 70-90% of digital transformation initiatives to date have failed. Although Industry 4.0 only emerged as a theme over the past decade, digital transformation started in the early 1970s, when PLCs were first introduced to industrial environments. Stories of digital transformation in each decade that span the boundaries between business models, quality management, software, and systems reveal actionable patterns we can use to dominate with digital - even new innovations like NFTs, DAOs, web3, and the metaverse. In this session, you'll learn how to lead in the emerging discipline of digital quality and find out what's really being transformed.



GUEST SPEAKERS



RACHEL BAIRD
TONY BRADFORD
RYAN CHAMBERLAIN
& STEVE RAKAR

MARCH 15
12:45 PM

REMOTE, RIGHT-SIZED, AND JUST-IN-TIME: HOW TOOLING U-SME KEEPS ADDITIVE E-LEARNING AGILE



Creating training materials for manufacturing is always a challenge, given its highly technical and precise nature. That challenge increases when training on advanced and emerging topics such as additive and smart manufacturing.

To maintain the Tooling U-SME content development team's high standards for clarity and accuracy, additive manufacturing training content requires not only rigorous research and collaboration with subject matter experts, but also a high level of agility to adapt to changing technologies and trends. Unlike more established subjects like machining and welding, additive's rapid innovations and developments require Tooling U-SME to be a thought leader both to those new to the field, and to industry as a whole.

Through our classes in additive and the surrounding smart ecosystem, we have a responsibility to both train new users and to educate industry professionals on the benefits of additive. Four members of our content development team will provide case studies and examples of how we have created, adapted, updated, and continue to update our additive manufacturing curriculum.





2022 CONFERENCE AGENDA

DAY 1

PLEASE NOTE THAT THE FOLLOWING SCHEDULE IS IN EASTERN TIME (ET)

MONDAY MARCH 14TH, 2022			
	ISLAND 2 ROOM	COASTAL ROOM	PALM ROOM
8:45 AM – 9:45 AM	PROJECT MANAGEMENT	SUPPLY CHAIN MANAGEMENT & LOGISTICS	SUSTAINABILITY & INDUSTRY 4.0
10:00 AM – 12:00 PM	ARTIFICIAL INTELLIGENCE & MACHINE LEARNING	QUALITY PLANNING & PROCESS IMPROVEMENT (A)	MANAGEMENT OF TECHNOLOGY
12:00 PM – 1:45 PM SKYVIEW ROOM 9 TH FLOOR	LUNCH & LEARN KEYNOTE SPEAKER: NICOLE M. RADZIWILL, PHD, MBA DIGITAL QUALITY LEADERSHIP FOR THE 2030S		
2:00 PM – 3:30 PM	NANOMATERIALS & NANOENGINEERING (A)	LEAN SYSTEMS	HUMAN FACTORS & COGNITIVE ENGINEERING (A)
3:45 PM – 5:15 PM	CASE STUDIES (A)	EDUCATION LEADERSHIP & TRAINING (A)	MARKETING & HEALTHCARE SYSTEMS



2022 CONFERENCE AGENDA

DAY 2

TUESDAY MARCH 15 TH , 2022			
	ISLAND 2 ROOM	COASTAL ROOM	PALM ROOM
8:45 AM – 9:45 AM	HUMAN FACTORS & COGNITIVE ENGINEERING (B)	ADDITIVE MANUFACTURING	AUTOMATION, MODELING, AND SIMULATION + COMPLEX SYSTEMS PERFORMANCE & IMPROVEMENT
10:00 AM – 12:00 PM	NANOMATERIALS & NANOENGINEERING (B)	QUALITY PLANNING & PROCESS IMPROVEMENT (B)	CASE STUDIES (B)
10:00 AM – 12:00 PM	SPECIAL VIRTUAL SESSION: WHAT ABOUT QUALITY 4.0!?! EUROPEAN ORGANIZATION FOR QUALITY AND SWEDISH ASSOCIATION FOR QUALITY WELCOMES YOU TO LISTEN AND DISCUSS WITH INTERNATIONAL EXPERTS HOW DIGITAL TECHNOLOGY, “QUALITY 4.0”, CAN IMPROVE YOUR QUALITY WORK. *FREE REGISTRATION REQUIRED: https://www.eventbrite.be/e/what-about-quality-40-registration-264383015717*		
12:00 PM – 1:45 PM SKYVIEW ROOM 9TH FLOOR	LUNCH & LEARN (VIRTUAL PRESENTATION) GUEST SPEAKERS: RACHEL BAIRD, TONY BRADFORD, RYAN CHAMBERLAIN & STEVE RAKAR REMOTE, RIGHT – SIZED, AND JUST -IN – TIME: HOW TOOLING U-SME KEEPS ADDITIVE E-LEARNING AGILE		
2:00 PM – 3:30 PM	INNOVATION MANAGEMENT	EDUCATION LEADERSHIP & TRAINING (B)	ENGINEERING INNOVATIONS
3:45 PM – 5:00 PM	BUSINESS ANALYTICS	SID TALK	

MONDAY 8:45 AM SESSIONS

PROJECT MANAGEMENT

SESSION CHAIR: PHILIP APPIAH-KUBI, UNIVERSITY OF DAYTON

MONDAY

8:45 AM – 9:45 AM

Multidisciplinary Experiential Learning: A Review of The Stitt Scholars Program

Philip Appiah-Kubi

The importance of collaboration in higher education has been well researched. Through team works, students gain and enhance their collaboration skills. This paper reviews the Stitt Scholars Program, a multidisciplinary experiential learning program that allows engineering and business majors to collaborate deeply with startup companies.

Construction Estimating Challenges After COVID 19 - The Effect of Price Escalation and Material Shortages on Construction Cost and Contract Management

Bashar Haddad

The cost of building materials is imperative for determining the profitability of construction projects. The paper focuses on the effect of COVID 19 pandemic on material prices and the availability of material. The pandemic caused some factories operate on part capacity due to issues with raw material availability, factory laborers not showing to work and cargo ships waiting extended time at sea prior to being able to dock at ports to unload. Consequently, material prices have risen significantly.

SUPPLY CHAIN MANAGEMENT & LOGISTICS

SESSION CHAIR: EWA RUDNICKA, UNIVERSITY OF PITTSBURGH

MONDAY

8:45 AM – 9:45 AM

The Covid-19 Impact on the Computer Chip Supply Chain

Ewa Rudnicka & A. Gapinski

The Covid-19 pandemic has caused a years-long disruption of everything electronic. Product shortages are causing problems for the American holiday shopping season. The chip shortage is leading the tech industry and politicians to try to reverse the US' reliance on foreign suppliers in the microprocessor business. The US government isn't happy with how reliant the country's economy and military are on mainly Asian high-tech manufacturing while the chipmakers, are happy receiving government subsidies to underwrite research and new factories in efforts to reclaim the leadership position. No one expects supply chains without links overseas, but the chip shortage response certainly exhibits some nationalist focus. This paper examines the Covid-19 impact in the computer chip supply chain.

Assessing Supplier Readiness for Digitalization

Abirami Radhakrishnan, Gregory Ramsey, Sanjay Bapna & David Burton

In this project we assessed suppliers' readiness for digitalization and extent of adoption of digitalization practices via surveys. Additionally, we developed a use case to help suppliers formulate actionable strategies to assist them in their digitalization journey. We included both Small- and Medium-sized Enterprises (SME) and Multi-National Enterprises (MNE) suppliers in the study.

Decision Framework for Supply Chain Network using Game Theory

Vatsal Maru, Krishna Krishnan, Saideep Nannapaneni & Ali Arishi

Supply chain network is one of the problems businesses come across when they are dealing with finished goods. From making the goods to providing them to the consumer is part of the supply chain. Considering the market size and 21st-century population demands, it is crucial to have the optimal design of the supply chain network. This research aims to optimize the supply chain network design in external dealings and provides insight into the decision-making framework.

SUSTAINABILITY & INDUSTRY 4.0

SESSION CHAIR: MEHMET YILDIRIM, WICHITA STATE UNIVERSITY

MONDAY

8:45 AM – 9:45 AM

Asset Prioritization Model for Electric Generation and Transmission Network

Ashfaqe A. Mohib, Al Tamimi, Ehsan Salari & Mehmet B. Yildirim

Asset management requires a prioritization scheme as an essential part of long-term business strategies for many electrical utility companies, as they embark on balancing the competing goals of network reliability, economics, risk, and infrastructure and environmental sustainability. The purpose of this paper is to propose an asset prioritization model which would aid in electric generation and transmission planning process by assessing a set of planning criteria leading to a prioritized set of alternative actions.

Resilience in Supply Chain During a Pandemic

Subarna Haque, Mehmet B. Yildirim & Mehmet Barut

Supply chain disruption is the combination of unintended, abnormal triggering event that threatens the normal business operations of the supply chain significantly. Supply chain disruptions are unavoidable because all supply chains at some point will experience some disruption of normal flow of goods and materials. In this study we have utilized the structural equation modeling with PLS to find out (1) The impact of proactive risk mitigation strategies on supply chain operational efficiency (2) The impact of supply chain operational efficiency on the supply chain resilience, and (3) The moderating impact of post risk mitigation strategies on the relationship between supply chain operational efficiency and supply chain resilience.

Asset Management Optimization Model with Sustainable Renewable Energy Goals for Electric Generation and Transmission Expansion Planning

Ashfaqe A. Mohib, Ahmet Akgun, Al Tamimi & Mehmet B. Yildirim

Asset management strategy, an important part of long-term business strategies for many utility companies, is enabling them to address economical, operational, and reliable electricity network requirements for a sustainable and yet uncertain future. The paper proposes an optimization model for the least-cost configuration of an electricity generation and transmission network, taking into considerations the aging of asset with various generation technologies, increasing electricity demand, and sustainable energy growth projection.

MONDAY 10:00 AM SESSIONS

ARTIFICIAL INTELLIGENCE & MACHINE LEARNING

SESSION CHAIR: HONGSHENG HE, WICHITA STATE UNIVERSITY

MONDAY

10:00 AM – 12:00 PM

Modeling The Aggregation of Bidirectional EV Chargers to Perform as Static Synchronous Compensator

Ikechukwu Ugwu & Chengzong Pang

The future power systems are comprising mainly of distributed energy resources from renewable energy sources. A lot of coal-fired generators are planning to be retired in the future grid due to their impacts to the environment, which are going to be replaced with renewable sustainable energy sources like solar panels, wind farm with battery storage facilities. This paper's perspective of bidirectional EV charger is as any other voltage source converter like STATCOM.

Continuous Human Pose Estimation by Machine Learning and Computer Vision

Xiaoli Huan & Hong Zhou

Human pose estimation in an image or a video has recently drawn significant attention with technological advances and interests in areas such as human-machine interaction, sports performance coaching, film animation, etc. In this paper, we use the combination of machine learning and computer vision techniques to detect and analyze human posture in real-time videos. First, a skeleton-based model is used to identify and track the human body's joints. The number of the human body's movements and angles of arms and legs are then calculated. The method is straightforward to implement and can run on a CPU that does not require sophisticated GPU or TPU hardware.

Augmented Omni-Surface for Human-Robot Collaboration Through Visualization and Touching

Fujian Yan, Edgar Chavez, Yimesker Yihun & Hongsheng He

With the development of the technologies such as touching screen devices, interacting with robots has changed dramatically. The efficiency and effectiveness of directly touching functions have been proved with an increasing number of touching-screen devices in the market. This paper proposes an architecture that can augment surfaces into an inter actively touching interface. The proposed system can detect the number of touching fingertips of human operators by firstly detecting and recognizing the fingertips with a convolutional neural network (CNN).

Integration of instance-based learning and Computed Torque Control for an effective Assist-as-Needed support in Human-Exoskeleton Interaction

Pablo Delgado, Yimesker Yihun, Lisa Vangness, & Hongsheng He

A physical human-robot interaction may result in a change in physiological responses which varies in magnitude and rate from subject-to-subject. Such individual-based variations may require instance-based learning over model-based learning algorithms. In this study, an instance-based learning algorithm is developed and integrated with a computed torque control system for an effective human-exoskeleton synergy.

A Machine Learning Approach for Truck-Drone Last-mile Delivery using Constrained Clustering and Reinforcement Learning

Ali Arishi, K Krishnan & V Maru

Covid-19 pandemic has shifted the way people buy and receive goods. Considering the rise of e-commerce and use of clean energy, drones have the potential to play a significant role in the field of last-mile delivery. Leaders in logistics and transportation such as Amazon, UPS, and Uber are investigating the use of drones to solve the last-mile problem. Finding an optimal routing strategy for a truck with a limited number of drones is an NP-hard problem. Traditional methods suffer from a long computation time and scalability issues. This paper proposes a two-level machine learning approach to tackle truck-drone last-mile delivery with a limited fleet.

QUALITY PLANNING & PROCESS IMPROVEMENT (A)

SESSION CHAIR: ROGER MERRIMAN, WICHITA STATE UNIVERSITY

MONDAY

10:00 AM – 12:00 PM

Using Weibull Analysis to Set Calibration Intervals

Ronald F. Reimer & Sampson Gholston

Instrumentation is a vital part of a manufacturing process. These instruments drift out of calibration on some basis and need to have their calibration tolerances checked at an appropriate time interval. The chosen time intervals are often based upon a combination of past practice and perceived risk of an out of tolerance condition. Calibration intervals are rarely given by the instrument manufacturers. This presentation will cover a large corporate project which used existing calibration results with a Weibull statistical analysis to determine optimum calibration intervals based on risk classifications. The completed project saved the company over \$2 million dollars in annual calibration costs and gained other non-monetary benefits.

Total Quality Management: 30 Years later

Venetta Bridges, Nael Aly & Ahmad Elshennawy

A little over thirty years ago, Aly, Maytubby and Elshennawy (1990), published an article in Computer and Industrial Engineering Journal titled "Total Quality Management: An Approach and A case Study." They stated that their paper examines the TQM process, philosophy, concepts, attributes and how it can be used to develop a "quality-based" culture. They also stated that the paper the introduction and implementation of the TQM process at an electronics' manufacturer.

Thirty years ago, the paper has been one of the early attempts to introduce the concepts of TQM. Today, the same authors present an attempt to explore the TQM 4.0 concept and how establishing such a framework is an emerging research concept.

Statistical Performance of Group Control Charts with Modified Limits

Abdulaziz G. Abdulaziz & Gamal Weheba

Group control charts (GCC) are used for the statistical monitoring of multiple stream processes. In this paper, we examine the impact of utilizing limits that account for both the number of streams and the level of correlation between them. Monte Carlo simulation studies are used to quantify the effect of cross correlation on the average run length under varying shift magnitudes. The results indicated that there is a significant effect of the level of correlation on the shift detection capability of these charts.

Applying the Design for Six Sigma Approach to the UAH Center for Systems Studies

Amelia K. Falcon, Sampson Gholston & Bryan L. Mesmer

To continue in the pursuit of cross disciplinary research, the UAH Center for System Studies (CSS) aims to be an epicenter of interdisciplinary and transdisciplinary research on campus. The objective of this research is to use a Design for Six Sigma Strategy to develop the operation strategy for the center.

MANAGEMENT OF TECHNOLOGY

SESSION CHAIR: GORDON ARBOGAST, JACKSONVILLE UNIVERSITY

MONDAY

10:00 AM – 12:00 PM

The Engineering Tag-Up Meeting: An Ethnographic Analysis

Paul D. Nugent

This study analyzes ethnographic data gathered from dozens of weekly engineering “tag-up” meetings. Grounded theory methods are being applied to the data to reveal patterns in the ways in which engineers express their social, political, and technical status and communications. This will help to balance research on workplace meetings that has tended to ignore these kinds of open-ended meetings and their functions.

Construction Cost Estimation by Utilizing the Integration of Waterfall-Prototype-COCOMOII Models

Mohammed Khouj, Ahmed Mazyad, Omar Elyas & Mohammad Kanan

The construction sector is considered one of the essential sectors responsible for improving and developing nations. However, cost estimation is one of the most critical constraints in construction projects which could lead to a fatal impact on the projects in case of wrong or inaccurate identifying customer requirements. In this research, an integrated development model is proposed to utilize the advantage of both waterfall and prototype models. Moreover, the cost estimation model has been introduced to confirm the integrated model's benefit by using the COCOMO II model.

Does a Municipality’s Wellness affect its Business Growth?

Gordon W. Arbogast & David Rich

This study focuses on the health of a given population to determine if health indicators can be used as a predictor of Business Growth in a geographic region, specifically in a major Metropolitan Statistical Area of the United States. Gubler et.al. in Management Science (2018) produced a study that concluded “that firms can increase operational productivity through socially responsible health policies that improve both workers’ wellness and economic value, and provided a template for future large-scale studies of health and productivity”. That paper investigated the impact of a corporate wellness program on worker productivity using a panel of objective health and productivity data from 111 workers in five laundry plants.

CEO Technology Innovation in The Private Sector: A Case Study

Gordon W. Arbogast & Arpita Jadav

This is a case study about the major technological and cultural innovations of several CEOs in the private sector of the United States. In the last twenty-five years, there has been an exponential increase in technological innovation led mainly by the United States. Much has been written about the entrepreneurs that have pioneered these innovations in such areas as cell phones, the Internet, Web Sites, non-fungible tokens and advances in artificial intelligence. This paper discusses how a number of CEOs have driven technological innovation from the top in major firms. Most notable were Stephen Jobs in computers, Ed Whitacre in Telecommunications and E. Hunter Harrison in Railroads.

Improving Budgeting in the U.S. Department of Defense

Gordon W. Arbogast, Jamie Sein, Lynsey Sein & Arpita Jadav

The Department of Defense (DOD) is charged with the security of this nation as it concerns our adversaries abroad. As such it is dependent upon a significant portion of the US federal budget for its funding. The study identified four variables that appear to affect the DOD budget. The four variables in order are: (a) House Majority Political Party, (b) Doomsday Clock Value, (c) US President's Political Party Affiliation, and (d) US Gross Domestic Product Growth Rate. The DOD budget was represented by a ratio that compared the DOD annual budget to the total US federal budget. The study employed a model that ultimately explained 82.14% of the variation in the target ratio at a 0.05 level of significance.

A more efficient way to forecast DOD budget levels would have multiple advantages. DOD would be able to provide earlier and much better guidance to the various services (Army, Navy, Air Force etc.) as they play an important role also in the PPBS process. Lastly it would provide outside stakeholders such as defense contractors and other supporting firms with a tool to forecast potential business opportunities and capital expenses.

MONDAY 2:00 PM SESSIONS

NANOMATERIALS & NANOENGINEERING (A)

SESSION CHAIR: EYLEM ASMATULU, WICHITA STATE UNIVERSITY

MONDAY

2:00 PM – 3:30 PM

Investigating the Salt Spray Corrosion Effects on Steel Sheets of HVAC Heat Pumps with Varying Galvanic Coatings and Paint Finishes

Tyler P. McCune, Waseem S. Khan & Ramazan Asmatulu

Steel sheet samples with varying levels of protective zinc coating thicknesses were tested individually as well as in conjunction with common polymeric-based paint coatings through equal exposure times in a salt spray chamber. It was discovered that duplex coating systems that involve a metallic zinc coating with an organic polymer-based powder coat or pre-painted finish showed little or no sign of corrosion degradation over time, and therefore experience no substantial decrease in mechanical properties.

Poly (Caprolactone) Fibers Incorporated with Calcium Hydroxyapatite particles in Dentistry Applications

H. Hughes, Waseem. S. Khan, Altaf Khan & Ramazan Asmatulu

Nanotechnology is rapidly expanding into all scientific areas as it presents alternative ways to solve scientific and medical questions and problems. There is an urgent need to develop a new procedure that can generate human teeth and repair the damaged area since the existing procedure is expensive and temporary. This research explores the possibility of employing a new methodology to generate damaged and decaying teeth. This research investigates infusing calcium-hydroxyapatite (C-HAp) and gentamicin in different weight percentages into polycaprolactone (PCL) solution to fabricate PCL fibers via electrospinning.

Nanofiltration for Potable Water Supply in Remote and Water-Scarce Areas

Kiran Nepal, Waseem S. Khan, Altaf Khan & Ramzan Asmatulu

The water crisis has become a paramount issue being faced by a large population in this world. Water pollution and shortage of usable water constitute a substantial aspect of the water crisis. More than 10% of the world's population has exiguous access to potable water. In this research, nanofibers were produced from two polymers i.e., polyacrylonitrile (PAN) and polyethylene glycol (PEG), while Dimethylformamide (DMF) was used as a solvent. The electrospun nanofibrous membranes (ENMs) thus produced via electrospinning possess superhydrophobic features and can be used for water filtration.

Multifunctional Electrospun Nanofibers for Enhanced Chronic Wound Healing

Ahmed Ijaola, Anh Pham, Md. Nizam Uddin & Eylem Asmatulu

Chronic wounds have been a worldwide health risk, requiring urgent medical and research attention over the past many decades. Some examples of chronic wounds are diabetic foot ulcers, venous leg ulcers, and pressure ulcers. Lately, several new wound healing treatments have been used: innovative nano therapy, ozone treatment, ulcer, and acute care surgery, and high-dose antibiotics. Among these therapies, nano therapy has gained much interest in the medical field. This paper explains the development of electrospun nanofibrous scaffolds for wound healing application.

LEAN SYSTEMS

SESSION CHAIR: DEEPAK GUPTA, WICHITA STATE UNIVERSITY

MONDAY

2:00 PM – 3:30 PM

Improving the Outcome of Lean and Six Sigma Projects Using a Cost Management System
Dennis Tribby & Ahmad Elshennawy

Lean Six Sigma projects are quickly moving into the age of Industry 4.0 digitalization creating faster paths to reducing waste, improving quality, optimizing processes all while providing more insight to continuous improvement methods while benefiting from reduced costs. The benefits of embracing digital technologies allows organizations to apply classic Lean Six Sigma methodologies to use simulation to test processes and practices before committing to a recommended solution. This paper is the result of an extensive literature review of peer reviewed journal articles that have been published in journals related to how cost data is developed, maintained, and then used in Lean Six Sigma projects.

Challenges to the Implementation Lean Practices in Higher Education: Is the Culture in Higher Education Conducive to the Lean Philosophy?

Christopher Kluse & Chris Shannon

Lean in higher education (LHE) has grown in interest over the past 20 years. The literature relative to lean initiatives in HE indicates both success and failure, with failure estimated between 50 – 95%. This paper explores the cultural differences between higher education and the automotive sector along with barriers that may lead to failure of lean initiatives in HE.

The Impact of 5S on the Production Planning Minimum Order Quantity (MOQ)

Mohammad Kanan, Abdulhadi Hawsawi & Salem Aljazzar

Nowadays, the competition between the FMCGs (Fast Moving Consumer Goods) organizations is at its peak. One of the main factors in which an organization could gain or maintain its market share is being agile and flexible in response to the market needs for specific SKUs (Stock Keeping Unit). By being more resilient to the market demand, the supply side (production representing manufacturing) will produce the required SKUs in terms of the variety of the SKUs or quantities ordered by the demand side (marketing representing supply chain).. When both demand and supply sides agree on the production plan, the demand side seeks a mix of SKUs with low quantities.

HUMAN FACTORS & COGNITIVE ENGINEERING (A)

SESSION CHAIR: DEBORAH CARSTENS, FLORIDA INSTITUTE OF TECH

MONDAY

2:00 PM – 3:30 PM

Examining Monthly and Annual Laser Strike Reports from 2010-2021

Brooke Wheeler, David Craig, Oliver Bride & Kathleen King

Laser strikes are becoming an increasing problem for the aviation industry, where the lives of both crews and passengers are at risk. The purpose of this project was to determine if there was a statistically significant difference in laser strike frequency by month and identify the trend in annual laser strike reports. This study examined the number of laser strikes reported to the FAA from January 2010 to September 2021.

The Usage of Smart Glass Technology in Airports to Reduce the Carbon Footprint of Aviation Facilities

Onur Abdullallah Tunc & Deborah Carstens

This study aims to increase awareness of a new solution for reducing the carbon footprint of airports. The use of Smart Glass technology in airports and other architectural design choices across the world mitigates the use of fossil fuels to help combat the transfer of heat and cold in buildings while bringing in a natural source of lighting in the infrastructure of buildings. Every human in the world in some way or form resides inside buildings that continue to use fossil fuels to provide comfort for people.

Passengers' Willingness to Fly with Commercial Airline COVID-19 Safety Measures

Jordan D'Albert, Khalid Alqarni, Brooke Wheeler & Andrew Magness

In the commercial aviation industry, safety is always a primary concern, with a central focus on the well-being of passengers and crew members. Given the significance of safety in the aviation industry, the COVID-19 pandemic has resulted in drastic changes to the way commercial airlines operate. Since the beginning of the pandemic, the commercial airline industry has had to adopt new safety measures to help ensure safety by minimizing the risk of transmission for both passengers and airline employees. In light of the pandemic, we examined passengers' willingness to fly with different commercial airline COVID-19 safety precaution scenarios: control (none), masks, PCR test, boarding/deplaning five rows at a time, and paired combinations of these precautions.

MONDAY 3:45 PM SESSIONS

CASE STUDIES (A)

SESSION CHAIR: B. ANDREW CUDMORE, FLORIDA INSTITUTE OF TECHNOLOGY

MONDAY

3:45 AM – 5:15 PM

21st Century Higher Education Business Marketing: Translatability and Effectiveness

Sarah A. Ayers & B. Andrew Cudmore

The scope and nature of higher education marketing operations have changed over time due to competition. Though operations are characterized by governmental appropriations and regulations, private-sector marketing methods are being increasingly utilized for institutional sustainability. This exploratory paper examines the translatability and effectiveness of these methods for higher education's benefit.

An Exploratory Study That Measures a Military Recruiter's Efficacy in Mitigating Consumer Cognitive Dissonance via Virtual Recruiting

Gabriel A Ruiz & B. Andrew Cudmore

Virtual recruiting (VR) is currently employed to recruit officer and enlisted recruits for the US Navy. No primary data exists on how VR impacts the contract attrition rate. This study evaluates antecedents of political and customer relationship-building skills to mitigate consumer cognitive dissonance in the consumer post-purchasing stage.

The Effect of Agile Methodology Fit on Software Development Team Outcomes

Keith D. Holloway & B. Andrew Cudmore

Studies have shown that software development methodology choice is influenced by industry normative and mimetic pressures. This presentation proposes a study to explore the effects of an alternate method of choosing methodologies that is based on best method-to-team "fit" and how that will lead to improved software development team outcomes.

Exploration of Implementing an Internal Marketing Strategy to Influence Intrapreneurial Behavior in Business Organizations

Melissa Schumann & B. Andrew Cudmore

Intrapreneurial employees utilizing and optimizing existing resources, while embracing innovation are critical for lasting growth and profitability. This exploratory study will examine how an internal marketing (IM) strategy can motivate employees to create profitable internal innovation.

EDUCATION LEADERSHIP & TRAINING (A)

SESSION CHAIR: JACOB CRESS, UNIVERSITY OF DAYTON

MONDAY

3:45 PM – 5:15 PM

Teaching Trends in Data, Technology, and Society – Finding a new balance

Judson Stryker

In the Fall of 2020, a First-Year Seminar that discussed various trends in the applications of data and technology to society was taught at Stetson University for the first time. It covered interesting trends in data analytics in the fields of identity theft, marketing, fraud detection, and accounting. This talk will briefly discuss some of the topics covered in those classes. Additionally, the ongoing process of developing the course, along with lessons learned, related to student engagement, an “overcorrection” between the first and second time teaching the classes, along with a plan to attempt a “flipped classroom” structure next Fall to attempt to improve student engagement will be discussed.

Solar Decathlon Design Challenge: A Collaborative Student-Community Engagement Project

Nirajan Mani & D. Keith Chenot

To prepare our students for their chosen careers, it is important to provide opportunities that integrate their past studies and apply these through civic engagement. The Solar Decathlon competition sponsored by the U.S. Department of Energy can be such a platform that challenges student teams to become involved with their community and apply their knowledge and design highly efficient and innovative buildings. This paper presents the importance and challenges of this type of collaborative community engaged project to enhance the learning opportunities for undergraduate students. Moreover, it highlights the benefits of this type of real-world project in capstone course curricula.

Teacher Externship Program: An Opportunity for Educators to Build a Relationship with Industries

Nirajan Mani

It is a tremendous responsibility of teachers to prepare students for the future workforce by exposing them and providing necessary skills as per current demand of industry. It can be challenging for teachers who receive licensure through a traditional teacher preparation program and have not been exposed to the skills used in the industry. Considering this fact, the Massachusetts Department of Elementary and Secondary Education (MA-DESE) allocated funding for the Perkins teacher externship program that offers a common platform for the professional development of high school teachers by connecting the classroom to the workplace. This paper reports the challenges, benefits, and the outcomes of the Perkins teacher summer externship program managed by a team of faculty members of Fitchburg State University.

MARKETING & HEALTHCARE SYSTEMS

SESSION CO-CHAIR: SCOTT SWAIN, CLEMSON UNIVERSITY

SESSION CO-CHAIR: SAMPSON GHOLSTAN, UNIVERSITY OF ALABAMA

MONDAY

3:45 PM – 5:15 PM

The Impact of Automation Technology on Consumers' Animal Welfare Perceptions

Scott D. Swain & Danny Weathers

Prior research indicates that consumers' attitudes towards animal welfare practices impact their purchase decisions for animal-based goods such as meat, eggs, and dairy. However, it is unclear whether consumers' attitudes vary depending on the use of automation technology in different aspects of animal farming. The present research examines this issue in the context of poultry production. In a nationally representative sample of more than 1,000 consumers, we find that welfare perceptions are enhanced by automation of animal monitoring but diminished by automation of animal handling.

The Risks of Overcompensation in Service Recovery Strategies

Scott D. Swain & B. Andrew Cudmore

Services are intangible, perishable, produced in real time, experienced in a highly subjective manner, and often consumed at the same time as purchase. Thus, it is virtually impossible to ensure that service processes and outcomes are completely free of error. Additionally, consumers often perceive failure even when there is none. Prior research finds that such service failures, whether real or imagined, are a significant driver of customer dissatisfaction, switching behaviors, and negative word-of-mouth. In an effort to mitigate these kinds of negative outcomes, service providers often attempt to compensate consumers with a tangible benefit (e.g., reimbursements, refunds, replacements, repairs, credit).

A Pathway to an Academic Lean Healthcare Course

Nicholas Loyd, Joseph Paxton, Brian Tucker, & Sampson E. Gholston

The purpose of this study is to demonstrate a way to develop a lean healthcare course that can be taken by a wide range of students from engineering, business, and healthcare. Recommendations will be provided on how to make the course successful based on the experiences of the researchers.

Data Science use in High Performing Healthcare Organizations

Sampson E. Gholston & Nadia Wright

The purpose of this research is to research high performing healthcare organizations and analyze their use of data science and data analytics. The conclusion of this research will help leaders determine the role of data science and data analytics in healthcare organizations. Also, some recommendations will be made based on the findings.

TUESDAY 8:45 AM SESSIONS

HUMAN FACTORS & COGNITIVE ENGINEERING (B)

SESSION CHAIR: DEBORAH CARSTENS, FLORIDA INSTITUTE OF TECH

TUESDAY

8:45 AM – 9:45 AM

Assessing the Usability of a Desktop Simulator for Training Instrument Flight Rules (IFR) Procedures

Molly Blackford, Katelynn Ramp, Steffen Jackobsen & Deborah Carstens

For decades, the aviation industry has used simulator training devices as an inexpensive and safe alternative to flight training. Many different simulation types have been developed, with varying quality levels in fidelity and realism. This study focuses on the usability of the RedBird JAY desktop simulator for training Instrument Flight Rules (IFR) procedures. Twelve pilots, holding an FAA private pilot certificate and instrument rating as a minimum and with mixed prior simulator experience, operated a Redbird JAY flight simulator configured with the Cessna 172 using standard analog instruments with a separate horizontal situation indicator (HSI) and Garmin G1000 integrated flight instrument system. Each participant was given three scenarios, consisting of approximately five minutes of flying in identical conditions for all survey respondents. The results and future research areas are discussed in this paper.

Incorporating Theory into Practice: A Theoretical Assessment of Layout Design and Bürolandschaft With Practical Applications to Modern Office Landscapes Using Performance Metrics

Andrew Couch & Sherri Messimer

The historical upbringing of the theoretical foundations pertaining to layout planning and optimization provided a number of core principles from which other theories have been derived. Naturally, the development and transformation of layouts in accordance with modern tastes has unlocked new types of capabilities, but these benefits are not exempt from drawbacks. This study critically examines layout characterization and performance from both the theoretical and practical application perspectives.

Contextualized Information Adaptation for Marketing with Augmented Reality Displays

B. Andrew Cudmore & Christian Sonnenberg

The introduction of Augmented Reality (AR) into the field of marketing has presented a wealth of opportunities. AR has the potential to enhance the business/customer relationship through increased brand awareness, comparison shopping, increased satisfaction, and even possibly eliminating physical products through simulated actions. However, with many items and services vying for user's attention and field of view, there is a risk of AR overloading the consumer with too much information, thus reducing or eliminating any benefits. The following research presents a conceptual framework for contextualizing the scenario of usage between a product/service and the customer. This framework may then therefore be used to adjust the information density and presentation in an AR marketing scenario to most benefit both parties.

ADDITIVE MANUFACTURING

SESSION CHAIR: KRISHNA KRISHNAN, WICHITA STATE UNIVERSITY

TUESDAY

8:45 AM – 9:45 AM

Topology Optimization for Additive Manufacturing: A Case Study

Ali Issa & Gamal Weheba

This paper provides an overview of the additive manufacturing processes, types, and design rules. It includes a review of the challenges and opportunities associated with using topology optimization methods in additive manufacturing (AM). The main issues discussed include methods for achieving maximum geometric resolution to represent fine features easily manufacturable by AM in the optimization model, manufacturing constraints to consider, and workflow modifications required to handle geometric complexity in the post-optimization stages.

Success Factors and Key Barriers to Industry 4.0 in Construction Industry

Abdelhakim A. Al Turk & Gamal S. Weheba

The term Industry 4.0 includes a range of technologies used to develop a digital value chain and enable automated manufacturing. Additive Manufacturing (AM) is one of these technologies. The Application of AM in the construction industry is rapidly growing. The primary objective of this paper is to determine the status of industry 4.0 and its implementation in the construction industry. Using content analysis methods, this study analyzed 300 peer-reviewed articles published from January 2015 to December 2021, to reveal the most important success factors and key barriers to successful implementation of Industry 4.0 technologies in the construction sector. The results shed light on some real challenges that can affect AM applications and suggest directions for further research.

AUTOMATION, MODELING, AND SIMULATION

COMPLEX SYSTEMS PERFORMANCE & IMPROVEMENT

SESSION CO -CHAIR: ANDRZEJ GAPINSKI, PENN STATE UNIVERSITY

SESSION CO -CHAIR: CHRISTIAN SALMON, WESTERN NEW ENGLAND UNIVERSITY

TUESDAY

8:45 AM – 9:45 AM

PID Control: Practical Set-ups for EE/EMET Programs

Andrzej Gapinski

The author shares his experiences with various PID control systems implemented using rather inexpensive hardware. The PID control in closed-loop systems is an essential part of control system education in any electrical engineering or electro-mechanical engineering program. To cover the subject of closed-loop systems with PID control and to come up with implementable laboratory set-up have been a challenging issue for control systems instructors. Instructors were often facing the prohibitively expensive educational set-ups offered by various companies that focus on educational laboratory equipment. Thus, the paper offers inexpensive, workable solutions composed of widely available hardware, allowing to offer practical laboratory set-ups for PID control instructions.

Research in Human-Computer Interaction as Problem-Solving

Kaveh Sheikhrzaei, Sampson Gholston & L. Dale Thomas

The objective of this paper is to offer a meta-scientific presentation of human-computer interaction (HCI) research as an approach to problem solving. Our philosophy is based on Larry Laudan's philosophy of problem and solution as the foundation of science. The main focus of most HCI research is on three types of endeavors: conceptual, empirical, and constructive. Our goal is to develop a universal success criterion (outcome) that incorporates Laudan's concept of problem-solving ability: instead of analyzing whether research is working or following the correct method, it challenges us to investigate how the solution space is impacted.

Comparative cyclic finite element analysis of TI-6Al-4V titanium specimen

Omar Lee, Alexandra Schonning & Jutima Simsiriwong

In this paper we compare finite element simulations of coated and uncoated TI-6Al-4V Titanium cylindrical dogbone specimens subject to sinusoidal loading mimicking specimens loaded in an MTS axial fatigue testing machine. The geometry was modeled according to ASTM E466 standards and the specimens were modeled using second order tetrahedral elements and the coating is modeled using second order triangular shell elements. Boundary conditions were applied to the cylindrical gripping surfaces. Degrees of freedom perpendicular to the cylindrical axis were removed.

TUESDAY 10:00 AM SESSIONS

NANOMATERIALS & NANOENGINEERING (B)

SESSION CHAIR: EYLEM ASMATULU, WICHITA STATE UNIVERSITY

TUESDAY

10:00 AM – 12:00 PM

Effects of Functional Nanomaterials for Reduction of Carbon Monoxide Levels in Workplace and Homes

Anh K. Pham & Eylem Asmatulu

Carbon monoxide (CO) at high concentrations is extremely poisonous to humans and other invertebrates. CO is one of the leading causes of unintentional deaths in the United States. Furthermore, people with heart diseases are more vulnerable to high CO levels since they already have a reduced ability to get oxygenated blood to their hearts. Functional nanomaterials (nanoporous materials, nanofibers, nanotubes and nanoparticles) offer high surface area, low weight-to-volume ratio, flexibility, and high porosity, which have perfect properties for gas absorption. Many nanomaterials are currently playing an essential role in CO capturing technologies. Thus, this paper focuses on nanomaterials usage for CO absorption and their absorption mechanisms. Also, this paper discusses about CO adsorption on nano-adsorbents such as nano-activated carbon, zeolites, metal oxides, copper, and metal-organic framework. Due to high surface area and porosity, these materials have been widely used to absorb pollutants, including toxic gas like CO. Fabrications, morphologies, characterizations, and CO absorption mechanisms of some of the nanomaterials will be discussed.

3D Printed Superhydrophobic Structures for Sustainable Manufacturing Benefits

Rajakaruna A. D. N. Vishma Rajakaruna, Balakrishnan Subeshan, Md. Nizam Uddin, & Eylem Asmatulu

Superhydrophobic properties have been present in the nature for many millennia before human beings discovered their true capabilities and utilized them to revolutionize the modern societies. One cost-effective method of manufacturing superhydrophobic materials that have been gaining popularity in the recent past is 3D printing (Additive Manufacturing). A 3D printing design is initially created using a computer-aided design (CAD) software during this process. Later, the design information is transferred to a 3D printer through digital slicing of the CAD design. The 3D printing method allows printing objects with various functionalities at pre-designed locations in the object, so it is important to investigate these phenomena. This paper is a compilation of studies investigating appropriate 3D printable compositions that will enable forming the proper topography and micro and nanostructures of the surface to make it superhydrophobic.

Design, Manufacturability, and Sustainability Analysis of an HCCI Combustion Engine utilizing Gasoline and Renewable Fuels

Sina Davani & Ramazan Asmatulu

The global quest for new forms of energy is constantly growing. Extensive research is conducted to test and analyze new blends of fuels to meet these requirements. Due to the concern about the continued availability of fossil fuels, such as crude oil and natural gas, it has become a worldwide quest to face these challenges with renewable forms of fuels and new approaches to IC engine designs. This paper will explore the superiority of the HCCI engines over the traditional spark ignition, direct injection, and compression engines. These HCCI engines have successfully passed testing on different fuels such as gasoline, rubbing alcohol, and blended E10 gasoline. Because of the high engine performance and efficient burning, low particulate emissions (micro and nanoparticles) are expected from these studies.

QUALITY PLANNING & PROCESS IMPROVEMENT (B)

SESSION CHAIR: ROGER MERRIMAN, WICHITA STATE UNIVERSITY

A Process Improvement Pathway to Mitigate Variability and Strengthen Process Uptime at A Copper Rod factory in Egypt

Ahmed M. Radwan

The objective of this study is to mitigate variability of processes' performance and hence improving quality, decrease downtime as well as strengthening process uptime for a Copper Rod Factory in Egypt. The author aims to establish quality planning function within the company by following quality planning procedures to establish preventive action plans and achieve improvements within processes in terms of decreased downgrades and downtime.

Statistical Process Control Implementations within the Aviation Supplier Industry

Roger Merriman

Organizations struggle with implementations of statistical process control (SPC). Survey data from an aviation supply base were paired with a review of existing literature to identify barriers to deployment. Challenges to implementing SPC were recognized as leadership commitment, cultural behaviors, benefits of SPC, and a lack of knowledge.

Self-starting Q-chart for controlling a multi-stream process - a case study

Clovis S. Ribas & Gamal Weheba

In many manufacturing processes, it is desirable to produce identical products delivered by multiple streams. In this case, group control charts (GCC) are utilized to monitor its performance. In addition, when using small batches, it is essential to have a consistent self-start scheme for proper process control. This research utilizes the Q-charts as a self-start technique in a multi-stream environment. Simulation results show that the proposed approach offers a good solution for group control charts when compared with alternative procedures available in the literature. The chart can also be adapted to take into consideration the number of streams in a particular process and the level of correlation among them. Finally, we explore the performance of the proposed approach using an application of a manufactured component.

Exploring Service Quality and Satisfaction in Hajj Pilgrims in Compliance with Vision 2030 Objectives

Majid Alshaibi, Haitham Bahitham & Ahmad Elshennawy

Religious tourism is the oldest form of tourism and represents a distinct segment of tourism industry. Hajj event is one of the world's largest annual massive gatherings and it has already received increased attention from researchers. The aim of this study assesses Hajj service quality and pilgrims' satisfaction. To attain this aim, a systematic and narrative literature review was conducted to develop a framework with standardize relative dimensions of Hajj with the consideration of Vision 2030 objectives. The conducted literature review considered a total of 157 sources following PRISMA review protocol in the analysis. The contribution of the study includes a map to develop a framework with comprehensive dimensions that will impact the event service quality and satisfaction that will aid Hajj service providers to improve quality of service and gain participants' satisfaction.

TUESDAY

10:00 AM – 12:00 PM

**Statistical Analysis on Design Parameters of Refill-Friction-Stir-Spot-Welded Panels for
*Aerospace Applications***

*Guruvignesh Lakshmi Balasubramaniam, Enkhsaikhan Boldsaikhan, Shintaro Fukada,
Mitsuo Fujimoto & Kenichi Kamimuki*

Currently, aerospace industries use riveting to join the primary structures of the aircraft, as it bears well-established standards and specifications. Refill Friction Stir Spot Welding (RFSSW) is an emerging solid-state spot-welding technology that thermo-mechanically produces a molecular level bond between workpieces. As aerospace applications require rigorous standards and specifications, the results from this research would provide critical data to the aerospace industry for developing standards and specifications for RFSSW.

CASE STUDIES (B)

SESSION CHAIR: B. ANDREW CUDMORE, FLORIDA INSTITUTE OF TECHNOLOGY

TUESDAY

10:00 AM – 12:00 PM

Patient Retention Strategies in Clinical Trials: The Value of Patient Feedback on Protocol Design

Kristen Gillan & B. Andrew Cudmore

Patient retention in clinical trials supports drug development and allows pharmaceutical companies to file new applications to market faster than competitors. This study explores whether patients are more likely to remain in clinical trials with a patient-reported feedback survey during the clinical trial protocol design.

Marketing Challenges for the Next Generation of Nuclear Power: Has Deregulation Eliminated the Nuclear Option?

Stephen Dansky & B. Andrew Cudmore

The proposed study will investigate the linkage between electricity market deregulation and the change in credit support that underpins the financing of nuclear plants. If linked, the previous B2B marketing model used by nuclear reactor manufacturers is no longer valid and exposes a potentially fatal flaw to market viability.

Enhancing Cardiac Care and Recovery through Biomedical Engineering of Artificial Patches

Justin Ramsaran & B. Andrew Cudmore

In the efforts of enhancing the regeneration of heart cells, patches manufactured from polyester-based thermoplastic polymers have always come in handy. However, the effectiveness of these patches has not been significant, and this has necessitated the invention of a material that seamlessly stretches and relaxes in pattern with the heart muscles.

How to facilitate the Adoption of Artificial Intelligence (AI) in Middle-Market Businesses

Robert Chicvak & B. Andrew Cudmore

AI is strategic for organizations and viewed as an essential technology and foundational capability; however, adoption has been uneven across industries and business size. This article focuses on increasing AI's acceptance in the middle-market for U.S.-based companies. Middle market is defined as firms with annual sales of fifty million dollars to one billion. We will discuss the barriers to adoption and practical examples explaining how other companies have overcome them. There are studies of AI adoption; however, they are based on specific countries that miss the local market's nuances. This article will supplement the literature by focusing specifically on the U.S. middle market.

TUESDAY 2:00 PM SESSIONS

INNOVATION MANAGEMENT

SESSION CHAIR: ABRAM WALTON & DARREL SANDALL, FLORIDA INSTITUTE OF TECHNOLOGY

TUESDAY

2:00 PM – 3:30 PM

Exploring the Feedback Environment Relationship

Natalie Shah, Abram Walton & James Gallo

Organizations are investing billions of dollars trying to find the right performance management system to propel their employees to higher levels of achievement and foster the environment necessary for innovation and its successful management. This review seeks to validate the organizational importance of creating a favorable feedback environment, especially for those with a low feedback orientation, who may benefit more than those who already have a high feedback orientation.

Mobility Score among Product Development Team Members: A Grounded Theory Study of Team Behavior while Facing Significant Extrinsic Events

Pawel Kazanowski & Abram Walton

Product development teams working on long-term projects are exposed to various extrinsic and intrinsic events. This study focuses on how extrinsic events like companies' merger or rapid technological changes impact the product development team members' behavior. The study uses Corbin and Strauss's evolved version of grounded theory. The study sample included product development professionals representing the light metal forming industry in the USA. The semi-structured interviews were coded using essential grounded theory methods. The resultant grounded theory consists of four categories: (a) tenure, (b) transparency, (c) swiftness of communication, and (d) ability to integrate. Findings suggest that significant extrinsic events impact the intercompany and intracompany mobility of the product development team members. The proposed Mobility Score can potentially support the human resources and managerial decisions during the extrinsic events significantly impacting the company performance.

Improving the Feedback Environment: Do planned interventions work?

Shellie Halstead, Abram Walton & James Gallo

Historically, organizations have focused their attention on the annual performance review as the vehicle to communicate performance feedback, but there is a great deal of controversy over the effectiveness of these reviews, which tend to be universally disliked and add little to no value. This discontent is the fuel that fires the debate to eliminate or keep performance review systems, however a better approach may be addressing the individual complexities of feedback itself and the contexts in which it exists. This study examined effects of the use of a planned change intervention to create the institutionalized group norms often prevalent in a favorable feedback environment. Supervisors and employees were trained on seven dimensions of the feedback environment and how to promote a favorable context for feedback within the work unit. The results suggest that a feedback environment training intervention can help improve the feedback environment when it is needed most, i.e., where the initial environment perceptions were unfavorable. There was no improvement when the environment was already viewed as favorable.

Efficient Strategies for Assessment of an Individuals Acquired Knowledge and Skills

Charles Bryant, Abram Walton, and Joseph Nadan

Research indicates that properly constructed formative assessments, primarily when quantitative and done at the right time and frequency, may provide valuable just-in-time guidance for faculty to consider and provide pre-and mid-course instructional modifications. In comparison, summative assessments, by their nature, are lagging indicators. Additionally, formative assessments provide valuable real-time diagnostics to the student to measure their progress in acquiring skills and knowledge during the course and their eventual mastery of the material, enhancing their self-confidence and customer satisfaction. Rapidly assessing a learner's knowledge and skills based on short, easily created, multiple-choice tests is innovative and transforms the linear approach of formative assessments to a dynamic, non-linear, and evolutionary evaluation.

EDUCATION LEADERSHIP & TRAINING (B)

SESSION CHAIR: ABDELNASSER HUSSEIN, UNIVERSITY OF HOUSTON-DOWNTOWN

TUESDAY

2:00 PM – 3:30 PM

School Vouchers for Greater Educational Leadership

Abdelnasser Hussein

Providing public funding to parents to pay children's tuition at private and religious schools has been a matter of debate for the last three decades based on claims such as the lack of accountability in private schools, segregation increase, and the contradiction with the separation between church and the state principle. Such concerns are legitimate, but they need to be discussed considering the new literature that proves the efficacy of private schools, both religious and non-religious, in terms of student achievement, test results, and graduation rates. Additionally, preventing students from their right of school choice when it comes to private schools, especially the religiously affiliated ones, is a real threat to American values, in general, and the educational equity, in particular. Legislators should support the students attending private schools to protect their right in school choice by enacting a fair public funding policy to the educational private sector. So, policymakers need to consider that the current policies which prevent 10% or more of the United States (US) children, who attend private schools, of public funding are against the concepts of equity and the equal opportunity of education.

Assessing The Level of Students' Emotional Intelligence In Higher Education

AbdulKader Sami Hanbazazah

Knowledge is no longer the main focus in preparing university students. The employers' emphasis now shifts to organizational behavior and social intelligence, measurement of which includes personal interviews and annual employee evaluations. This study is a continuation of the previous study that measures the social intelligence of industrial engineering students. The assessment of social intelligence was done by measuring the effect of electronic devices and social media through extended surveys that include all collages, engineering, and non-engineering students.

EMET - Teaching in Time of Pandemic

Andrzej J. Gapinski

Instructor shares his experiences with preparing and delivering courses with heavy laboratory component in an electro-mechanical engineering technology bachelor's degree program. The modes of course delivering included hybrid and completely online formats. The paper discusses the learning/teaching environment and technology necessary to deliver at satisfactory level to meet assessment criteria. Shortcomings and unexpected positives are shared and discussed.

Implementing Crisis Management Modules in Business Core Courses

Robert S. Fleming & Michelle Kowalsky

The contemporary world in which we live, work, and travel has significantly changed over the past two years, as have the numerous challenges that contemporary businesses and their leaders have faced during the current Pandemic. The mission-critical importance of having proactive crisis management plans and personnel prepared to enact their respective roles and responsibilities in times of crisis has been clearly demonstrated as has been the role of a robust crisis management plan in continued organizational success and survival.

In this session we will share the mission-driven approach that our business school has implemented to prepare our graduates to effectively, efficiently, and safely manage and lead in times of crisis.

TUESDAY

2:00 PM – 3:30 PM

Home, Smart Home

Zhao Zhang

A smart home system is investigated. The center piece of this solution is open-source Home Assistant (HA), which will integrate thousands of smart devices, and create automations, scenes, and scripts intuitively. Sonoff smart switches and a Sonoff Zigbee-to-Wifi bridge (zbbbridge) are reprogrammed with open source Tasmota systems, and integrated with HA. The HA smart home system can be a simple, powerful and safe alternative to other solutions provided by big tech company such as Apple, Google and Amazon.

Inclusions-Based Fatigue Resistance Estimation of 17-4 PH Stainless Steel

Jade Welsh & Jutima Simsiriwong

17-4 precipitation hardened (PH) stainless steel (SS) has been widely used in many applications, including automotive, aerospace, and biomedical, due to its high strength and corrosive resistance. Therefore, the mechanical behavior of 17-4 PH SS should be thoroughly investigated, especially up to a very long-life regime, to ensure that its required durability is met. In this study, the fatigue behavior (i.e., mechanical behavior under cyclic loading) of 17-4PH SS specimens in two heat treatment conditions (H900 and H1250) are experimentally investigated. The specimens are subjected to uniaxial fully reversed cyclic loading at 20kHz. Preliminary observation indicates that sub-surface inclusions are the leading cause of failure in these specimens. Fatigue failure mechanisms, inducing crack initiation and crack growth, will be examined. The location and size of the inclusions responsible for crack initiation will be obtained and utilized in the Murakami approach to estimate the fatigue resistance of the material.

TUESDAY 3:45 PM SESSIONS

BUSINESS ANALYTICS

SESSION CHAIR: JOHN WANG, MONTCLAIR STATE UNIVERSITY

TUESDAY

3:45 PM – 5:00 PM

Confronting Current and Critical Climate Change Crises and Challenges

John Wang & Jeffrey Hsu

The United Nations issued a glowering warning on climate change on August 9, 2021 with a call for an extremely urgent worldwide large-scale action on cutting emissions. Climate change heightens global warming and brings about impending risks for both human society and natural systems. This article scrutinizes the newest developments in this paramount important research area and provides the future research directions.

Business Analytics at Florida Commuter Colleges: The Impact and Effectiveness of Implementing a Business Analytics Program.

Joachim Gooden, Rakeem Ford & Jason T. Black

Only forty of Florida's one hundred seventy-one colleges and universities are public, meaning the vast majority are privately run. Many of these schools provide associate degrees or certificates (Community College Review, 2021). Commuter colleges hold the distinction of providing off-campus student living, with the majority offering two-year degrees. Despite the growing need in industry for individuals who can manage large amounts of data, commuter colleges rarely offer business analytics courses, causing many students to miss out on such employment opportunities. The goal of this research is to investigate whether commuter colleges would indeed benefit from business analytics programs, and to determine the appropriate analytics degree curricula most optimal for these types of institutions.

A Prescriptive Analysis of Homeownership and Buying Power of Black and Latinx Communities in the Covid-19 Era

Taquasha Freeman & Jason T. Black

The world is changing exponentially with the advances and growth in technology. As such, data science and analytics, Big Data, machine learning and artificial intelligence are technological innovations leading to major disruptions in businesses, the economy, and society. Minority groups, such as Black and Latinx Americans must prepare for the future of technologies evolving worldwide by enrolling in college and majoring in STEM careers to compete. This research will examine the past landscape of the access to homeownership for Black and Latinx Americans, as well as the current environment for homeownership during the current Covid-19 pandemic and determine how predictive analytics can be applied to develop recommendations to improve Black and Latinx homeownership. The goal is to present a set of best practices and recommendations for improving this situation.

SID TALK

SESSION CHAIR: FARAH WEHEBA, PEOPLE ROCKET

TUESDAY

3:45 PM – 5:00 PM

ThreshNet: A Novel Machine Learning Technique to Optimize Sensitivity and Specificity Performance

Shirley Xu

In image classification applications for medical diagnosis, sensitivity and specificity are important performance metrics that are often inversely related. Both high sensitivity and high specificity are not always achievable for a given neural network; trade-off and balance between them is not easily controllable. This project proposes “ThreshNet”, a novel method to address this dilemma.

Clean, safe, and affordable drinking water produced by ultraviolet radiation generated using a household microwave oven

Sudhish Swain

Ultraviolet (UV) radiation has been used for decades to purify water from biological impurities. UV light can be generated by many sources, such as, arc lamps, LEDs, and electrode-less lamps. Electrode-less lamps are the only type of lamps that can produce UV using a household microwave oven. 60 million people in the US and 884 million people in the world don't drink tap water due to fear of contamination. This research investigates a method for purifying water using UV light generated by household microwave ovens. Leveraging the synergetic effect of heat and UV to purify water, microwave energy was used to simultaneously heat water and generate UV.

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