ICON BITS
Best Innovative Teaching Strategies

ICON-BITS 2023
2nd International Conference on Best Innovative Teaching Strategies

9-11 February, 2023

BITS Pilani
Pilani Campus

BOOK OF ABSTRACTS

2nd INTERNATIONAL CONFERENCE ON BEST INNOVATIVE TEACHING STRATEGIES

Editors

Prof. Shibani Khanra Jha

Dr. Tamali Bhattacharya

Prof. Padmanabhan Seshaiyer

Dr. Meetha. V. Shenoy

Organised by:

TEACHING LEARNING CENTRE
BITS Pilani, Pilani Campus

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2nd International Conference on Best Innovative Teaching Strategies

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Editors

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Table of Contents

Cultural and Gender Studies in Higher Education

STEM Education

- "Think-Feel-Do"- A new model for sustained learning and growth in Science Technology Engineering and Mathematics (STEM) Education
- The shift to outcome based assessment – teachers' perception
- Using Science-Fiction Prototyping to Improve Cognitive and Problem-solving Skills in Indian University Students
- Academic Outcomes of Female Students in STEM Education in the United Arab Emirates
- Leveraging the First Year Learning Community to Enhance STEM-Sector Career Readiness and Student Success
- A new Reflective Thinking framework to improve Project-Based Learning of undergraduate engineering students
- Redesigning the Content in line with STEAM Education and Achievement in Mathematics: Creative Pedagogical Approach at school level
- Preparing Future Educators through Multidisciplinary Collaboration in STEM Education: An Analysis from Students of Different Major in a Public University in Malaysia
- Health Humanities: An Integrative Approach for Holistic Education and Wellbeing

Environmental Education for Sustainable Social Engineering

- IT- enabled Application related to Agri-Supply Chain: A farmer learning perspectives
- Evaluating Building Bye-Laws for Solar Access: A case of Madhya Pradesh, India
- Displacement, Migration and Resettlement: Reading the Mahabharata as a Palimpsest of DIDR Model
- Exploring LGBTQI+ Spaces in Indian Higher Education for Sustainable Development: Students' Perspectives
- Climate School: A Capacity Building Strategy
- Significance of Feminist Advocacy Practices for SDG 4
- Geopolymerization: A novel technique for the development of new class cementitious materials

Technology, Society and Industry in Higher Education

- Education Policy and Assessment Reformation: A Review and Survey Based Analytical Study
- Kickstart LIFE through Technology
- Art and Science of Storytelling with Data
- Impact of Globalization on Technology & Higher Education
- Exploring Tech-Spatiality and its Practices in Education
- Study of students' satisfaction in online education system- PLS SEM approach
- Democratizing Technological KnowledgeConnecting Campus and Community for a Post COVID Reset
- Revamping Learning Environment with ICT Tools in Higher Education
- An Exploratory Study for Identification of Components in Holistic Report Card for Elementary Teacher Trainees
- Analysis and Prediction of Students' Performance using Machine Learning
- Technology based education-Perception of Teachers and Students in Higher Education

- Inculcating Collaborative Skills in Architecture Students through a Design-build Studio
- Future Readiness Through Capstone Project
- Impact of Technology, Society and Industry on Higher Education in India
- Enhancing the Student Engagement in the executive education programs: An empirical study from teaching of Supply Chain Management in Work Integrated Learning Programs
- Effect of Facilitating Conditions on the Use of Social Networks as Pedagogical Tool in Higher Education
- An outcome-based online educational framework (E-Shikhshan) for quality accreditation
- Innovative Practices in Vocabulary Acquisition for L2 Learners with the aid of Computer Assisted Language Learning and TBLT– An analysis

Innovative Pedagogical Practices for Technology Enhanced learning

- Impact of Student Teacher Time on Student Engagement
- Inclusive Education: An Application of ICT to overcome the Functional Limitations of Visually Impaired Students
- Spiralling of knowledge creation using the SECI- "Ba" Model in International Business courses among Post Graduate MBA Students
- A Relationship Study on Teacher Trainees' Perceived Use of Gamification of Learning and Gamification User Types
- Use of Digital Randomizer for Assessment of Team-based Storytelling: An Empirical Study
- An Interdisciplinary Approach to Analyse the Awareness of ICT in Pedagogy among Teacher Trainees with Reference to Thanjavur District, South India
- Application of "AR/VR+" Education based on Artificial Intelligence for Specially Abled
- Effect of Personal Innovativeness and Self-Image on Language Learners' Acceptance of Mobile Assisted Language Learning in India
- Pedagogical Implication of Environmental Studies – a Case Study
- Gamification in the Digital Classroom for Student Engagement and Learning: An Empirical Study of Higher Education Learners
- Analyzing student engagement to enhance online teaching learning
- Team-Based Learning (TBL): Exploring an Active Learning Strategy for Two Undergraduate Courses in Biology
- Design and Development of Smart Wearable-Technology Enhanced Learning for Specially Abled Students
- Flipped Classroom- An Effective Instructional Approach for teaching Management Science to the Engineering Students
- Analysis and Prediction of Students' Performance using Machine Learning
- Programming and Machine learning in the chemistry classroom
- Intelligent Tutoring Systems for Multidisciplinary Education
- Virtual Digital Electronics Laboratory Anytime Anywhere Using a Python-Based Digital Kit
- Integration of Social Media in Teaching Learning Process – Challenges and its Solutions
- Constructive Learning Strategy integrated AR-Technology in enhancing Learner Motivation towards the learning of Science

- Enhancing Academic Achievement of Underachievers through game-based teaching
- 360° Teaching and learning Assessment model for Tier-3 city students: An Experimental Analysis.
- Metaverse based Teaching Technology to Develop the Neuroplasticity for Autism Spectrum Disorder – A Pedagogical Framework
- Experiential Learning using Virtual Reality in Infrastructure and Construction Engineering Education
- Promoting Learner Autonomy using Twitter as an Instructional Platform among ESL Learners
- Effect of Integration of Modules Based onTPACK Framework on Academic Achievement in Relation to ICT Skills of Student Teachers at Secondary Leve
- A holistic study of technology enhanced learning platform for continuous assessment and evaluation

Education in Sustainable Development Goals (SDGs)

- Inequality in Education between the Powerful and the Powerless : A Study of Education in Sustainable Development Goals (SDGs)
- Career and Academic Disparity: The Importance of Skill Based Education
- A Systematic Literature Review on Sustainable Competitive Advantage among Collegiate Education. A Step towards Attainment of Sustainable Development Goals.
- Examining the Coping Styles of Teachers and Students to gain insights into their Well-being
- Environmental Education for Sustainable Development in Engineering Education: Current and Now Hither To
- Impact of Emotional Intelligence on the Well-being of Teachers and Students
- State of the Art of Environmental Socioscientific issues enhancing Scientific Literacy : A systematic literature review approach
- Revisiting Vocational Education and Training in India

Conference Schedule

Message from the Vice Chancellor, BITS Pilani

I am delighted to note that the Teaching Learning Center (TLC), Pilani Campus, BITS Pilani is organising the International Conference on Best Innovative Teaching Strategies - ICON BITS - 2023 during 9-11 February, 2023.

I understand that there are six tracks, namely, Cultural and Gender Studies in Higher Education, STEM Education, Environmental Education for Sustainable Social Engineering, Technology, Society and Industry in Higher Education, Innovative Pedagogical Practices for Technology Enhanced Learning and Education in Sustainable Development Goals.

I am glad to note that selected papers from these tracks would be published in a Scopus-indexed Proceeding volume published by Springer. I firmly believe that the discussions during the conference will lead to actionable insights on innovative teaching strategies for better student engagement as we experience a changing landscape in higher education disrupted by emerging technologies.

I wish the conference a grand success and my best wishes for all the distinguished delegates of the conference.

Dr. Souvik Bhattacharyya
Vice Chancellor
BITS Pilani

Message from the Director, BITS Pilani, Pilani Campus

It gives me immense pleasure and pride that the Teaching Learning Centre, BITS Pilani, Pilani campus, is organizing the **International Conference on Best Innovative Teaching Strategies (ICON-BITS 2023)** from 9th to 11th February 2023.

In the 21st century, you have to use technology as one of the tools in the toolkit to bring about social change.

~ Beth Simone Noveck

At this event, it is essential to acknowledge the classroom as a potential space for social change motivated by critical thinking. Teachers and educators play a crucial role. They, along with their innovative pedagogical styles, create the classroom space for developing discursive ideas and arguments. In that regard, the Teaching and Learning Centre at the Pilani campus has created a dynamic platform by organizing this conference as an avenue for diverse voices and stakeholders to address social change through the transformative praxis of innovative education and teaching.

The conference's key themes address various dimensions of teaching and learning, such as Intersectional Identities in Higher education, diverse ways of addressing STEM education, Environment, and Sustainability in Higher Education Crossroads of Technology, Society, and Industry in Higher Education, to name a few.

It is indeed an absolute pleasure to see well-established and renowned scholars from around the globe like Prof. Hargrave of Iowa State University, Prof. Padmanabhan Seshaiyer of George Mason University, and Prof. Adrian Lee of the University of Singapore, Dr.-Ing. Carsten S. Schröder, CEO and Co-Founder of DADB German Academy for Digital Education Berlin, Dr. Rwitajit Majumdar of Kyoto University, Prof Roger West of Trinity College University Dublin, and Prof. Jandhyala B G Tilak, ICSSR National Fellow & Distinguished Professor Council for Social Development, who will be enlightening us with their expertise and knowledge.

I firmly believe that every aspect of this conference, including the keynote addresses, panel presentations, and workshops, will evoke some critical questions in critically challenging existing pedagogical practices, transforming education silos through interdisciplinarity and addressing diversity issues and equality through a sustainable model of inclusive education policies. Needless to say, this abstract booklet complied by the organizers will prove to be a valuable resource for a varied group of stakeholders, result in some effective institutional changes, and create avenues for meaningful dialogue.

I warmly welcome you all to this international platform and take this opportunity to congratulate the Teaching Learning Centre for this stimulating undertaking.

I wish the ICON-BITS 2023 the very best, and may this platform be the point of departure for vital conversations toward creating social change through teaching and learning!

Dr. Sudhirkumar Barai
Director
BITS Pilani, Pilani Campus

Message from Conference Conveners

I begin with a cordial welcome to you to this second edition of the International Conference on Best Innovative Teaching Strategies (ICON-BITS 2023). I express my gratitude to all the contributing and participating researchers, the chief guest Prof. Thakur S. Powdyel, former education Minister from Bhutan, Prof. Souvik Bhattacharyya, Vice Chancellor, BITS Pilani, Prof. Sudhirkumar Barai, Director BITS Pilani, Pilani Campus, Keynote speakers Prof. Padmanabhan Seshaiyer, George Mason University, Dr.-Ing. Carsten S. Schröder, German Academy for Digital Education Berlin, Prof. Constance P. Hargrave Iowa State University, Prof. Jandhyala B G Tilak, Former Vice-Chancellor, National University of Educational Planning and Administration, Dr. Rwitajit Majumdar, Kyoto University, Japan, Prof Roger West, Trinity College University, Prof. Adrian Lee, National University of Singapore, distinguished resource persons, Session chairs, Track coordinators, organizing committee, the sponsoring partner's - Thought Solution-HP, LinkedIn, EMIDS, and others, publishing partner - springer, media alert partners and last but not the least our beloved student committee members for their continued support.

The teaching Learning Centre established across the institute, in all four campuses in 2015, is mandated to promote the learner-centric vision, innovations in teaching learning and assessment methodologies, new age technologies, research and innovations in the teaching-learning process, an outreach program in teaching-learning, and creating a platform for holistic development of the teaching-learning community. The second edition of the ICON-BITS 2023 looks forward to bringing the visions of TLC to the larger teaching-learning community across the globe. We have received an overwhelming response through the initial 197 abstract submissions on the easy chair portal. This time TLC BITS Pilani, Pilani campus brings ICON BITS 2023 aiming to provide a global platform of networking and knowledge sharing for academicians, professionals, and the EduTech industry through 7 keynote talks, 85 research presentations, 3 industry talks during these three vibrant days of ICON BITS 2023. I believe that this interdisciplinary conference catering to various domains via six tracks of Cultural and Gender Studies in Higher Education, STEM Education, Environmental Education for Sustainable Social Engineering, Technology, Society and Industry in Higher Education, Innovative Pedagogical Practices for Technology Enhanced Learning, Education in Sustainable Development Goals (SDGs) would provide brainstorming sessions to our participants with many takeaways reflecting outcome-based learning at the end of the conference. We are also happy to announce that selected full-length papers after peer review would be published in the Scopus-indexed springer proceeding. As we proposed this conference initially, we decided to be completely offline, however, with many requests, we could finally accommodate and arrange for online presentations well to cater to those participants who could not attend in person due to various inconveniences. I hope our participants will have the maximum possible benefits in terms of knowledge sharing, networking, and collaboration opportunities and finally carry the beautiful memories from BITS Pilani, Pilani campus. We understand that all the participants in the conference are stakeholders of the teaching-learning community in one or another way and certainly culture their own thoughts. Hence, as I close my address I would like to refer to one of my own thoughts below

"Teaching is to create steps and open the doors of knowledge and wisdom whereas learning is to explore and establish one's own horizon behind the chosen door"

I welcome you all to ICON BITS 2023!

Dr. Shibani Khanra Jha
Faculty In-Charge Teaching Learning Centre,
Associate Professor, Department of Civil Engineering,
BITS Pilani, Pilani Campus

Message from Conference Conveners

Following the success of ICON-BITS 2021, the Teaching Learning Centre (TLC) of Pilani Campus, BITS Pilani is organizing the second International Conference on Best Innovative Teaching Strategies (ICON-BITS 2023) in hybrid mode. On behalf of the Organizing Committee, I welcome you all to ICON-BITS 2023.

We believe that the conference will provide a good platform for all the academicians, researchers, administrators, technocrats, and developers who are actively engaged in the field of education technology to showcase and share their experiences, research results, innovative ideas, and new-age tools and technologies, and discuss the practical challenges encountered and the solutions adopted in various eco-systems. This book of abstracts bears testimony to the scholarly work carried out by the participants of ICON-BITS 2023.

There are six interesting tracks in the conference: Cultural and Gender Studies in Higher Education, STEM Education, Environmental Education for Sustainable Social Engineering, Technology, Society and Industry in Higher Education, Innovative Pedagogical Practices for Technology Enhanced Learning, and Education in Sustainable Development Goals (SDGs). Each track has two coordinators, who took the entire responsibility of scrutinizing the papers. We received an overwhelming response to our call for papers, in the form of 197 submissions, out of which 85 papers were accepted for presentation. We have carefully selected only the submissions aligned with the theme of the Conference.

We are indebted to our distinguished invited speakers— stalwarts in their fields— for kindly agreeing to share their insights with all of us during the conference. We are indebted to the Advisory Committee, comprising eminent academicians and administrators from India and abroad, for extending valuable guidance toward successful organization of the Conference. We are grateful to Springer, our publication partner, and sponsor for supporting ICON-BITS 2023.

Dr Tamali Bhattacharyya
Research Consultant
BITS Pilani, Pilani Campus

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Dr. Madhurima Das

Track 2: STEM Education

Dr. Rita Sharma

Dr. Paritosh Shukla

Track 3: Environmental Education for Sustainable Social Engineering

Dr. Sailaja Nandigama

Dr. Kumar Sankar Bhattacharya

Conference Coordinators

Track 4: Technology, Society and Industry in Higher Education

Dr. Shibani Khanra Jha

Dr. Tamali Bhattacharyya

Track 5: Innovative Pedagogical Practices for Technology Enhanced learning

Dr. Meetha.V.Shenoy

Dr. Ashutosh Bhatia

Track 6: Education in Sustainable Development Goals (SDGs)

Dr. Balakrushna Padhi

Dr. G Muthukumar

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Dr. NVM. Rao

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INVITED SPEAKERS

Chief Guest

Prof.Thakur S Powdyel

Former Minister of Education,
Royal Government of Bhutan,
Bhutan

Teaching: Facing the Moment of Truth

You may not always know or realise it, but this is what you do – all the time. Your work is meant to transform the world. And you do it on a daily basis. Every time you teach a child how to produce a sound, you make a difference. The moment you enable a child to join letters and form words, the world becomes different. By the time your pupil is able to give a shape to the sound and create a symbol, you have invested the learner with untold new-found power.

When you came to school this morning and led your class to discover a new idea and gain new knowledge, you already made the world that much different. By the time you leave school today, you will have made our world a little more beautiful, a little more knowledgeable, a little wiser. You build this universe every moment.

Never mind the work that never seems to end. Do not regret the many sacrifices that you must make. Never mind too the public glare that you have to stand. You confessed at that moment of truth and knew that this is what teaching would take. Somebody has to do this difficult job – and you chose the space inside the Triangle Noble and have stayed on.

As you engage with your field, you discover the grace of the great ideas inherent in the sciences, in language and literature, humanities and mathematics, fine art and technology, and bring the universe to

your students. You not only teach what is in the curriculum, but you are the curriculum. You teach what you know, but more importantly you teach who you are. Looking at teaching any other way diminishes the teacher and impoverishes teaching.

This is a crucial time in the history of our nations and you are its heroes and heroines. In the course of my many travels across my beautiful country and beyond, I have been greatly humbled by the incredible dedication and uplifting motivation of my fellow-educators, lighting other lamps by burning away their own lamp.

My dear fellow-educators, near and far, you face many challenges in the course of your engagement, but you turn them into opportunities. I have seen that in many remote locations of my own country and far away, you are the only link between our children and the world outside.

This is the joy of this mission – teaching. When you discover the soul behind your role, teaching is transformed – it is fun, it is joy, it is celebration. This joy, this confidence, this spirit, you release to the children and youth in your charge, to the society at large. You make your life, your students' life, this nation's life that much more beautiful.

You hold the torch up to all and show the way forward. It matters little at what level you teach, where you teach, or who you teach. You write your autobiography every day…

Teaching is an act of faith, a testament of hope and of possibility. That is the reason why Education is called the Noble Sector of public service. Welcome to the Sector Noble…

Keynote Speaker

Prof. Padmanabhan Seshaiyer (Professor)
Mathematical Sciences ,
George Mason University,
Virginia,US.

Title of Keynote Speech:

Transforming institutional practices through pedagogical innovations in STEM education

Abstract:

The recent unexpected impact of the global pandemic on higher education has caused universities, students, and teachers to reexamine the effectiveness of their own curriculum, teaching, and learning. In this talk, the participants will be introduced to innovative educational frameworks, inclusive instructional strategies, and integrated curricular redesign for STEM education. These can help transform institutional practices by not only enhancing pedagogical practices for educators but also engaging students to become lifelong learners and creative problem solvers armed with tools, technologies, and a mindset to apply STEM, to develop innovative solutions for real-world challenges..

Keynote Speaker

Dr.-Ing. Carsten S. Schröder
CEO and Co-Founder of DADB
German Academy for Digital Education
Berlin

Title of Keynote Speech:
Higher Education in the era of digitalisation: Transformation in pedagogical approach

Abstract:

In tech-savvy world, where reforms are required in every sector, the education sector can't remain untouched. New technologies require new approaches, so is the requirement of the education sector as well. In the era of digitalization, the biggest challenge in teaching is to attract students to learn and engage them with relevant content. Digitalization has not only helped to break the boundaries of learning but also made experts think to present the content in a more engaging and sustainable form.

As everybody knows, Germany trains outstanding engineers with worldwide recognition. The success of 'Made in Germany' is essentially based on the capabilities of German engineers, which is the result of the underlying education and training system. To participate in this - in the case of higher education -, you usually have to study at a local German university – until now. We, the German Academy of Digital Education (DADB), address this problem of " access and engagement " to provide access to high-quality content coming from Professors of German universities to all interested students from institutions across the globe by establishing formal academic collaboration with home institutions.

With the help of innovative technologies in high-quality video production in a digital campus environment, we facilitate the German University and industrial experts' content accessible to students by breaking the physical boundaries, but presenting it in an engaging way is where technology comes in.

These academic collaborations are from offering our content in the form of elective or specialized courses in home university's degree/certificate programs, delivering/co-creating content, to setting up digital learning centers and Virtual labs digitalization.

Our presentation will focus on:

- the innovative methodology and tools for the higher education edutainment courses.
- current formats in providing access to this learning content.
- collaboration modes for further connecting Germany and foreign institutions.

Keynote Speaker

Prof. Hargrave
Professor of Educational Technology and Critical Multicultural
Iowa State University (ISU) College of Engineering
United State

Title of Keynote Speech:
Same Principles New Contexts: Counter Space as Emancipating Pedagogy

Abstract:

Education, at its core, is a social process marked by a series of mutual interactions: student – student, instructor – student, instructor – content, student – content. While characteristics of effective instruction are well-documented, their effectiveness often varies based on the social identities of students. The engagement and subsequent performance of students with marginalized social identities is not consistent with students from dominant groups. Students who identify as women or female are marginalized in higher education; and as a result, often do not thrive in the same manner as their male counterparts. In this paper, I present counterspace as an emancipating pedagogy to enhance learning equity in higher education. Anchored in a critical theory framework, counter space provides adjacent locales for the educational empowerment of marginalized students. In the paper, I discuss the need for emancipation, the components required to create counter space, and provide counter space examples.

Keynote Speaker

Prof. Jandhyala B G Tilak
ICSSR National Fellow & Distinguished Professor
Council for Social Development,
New Delhi

Title of Keynote Speech:
Higher Education for Sustainable Development and Sustainable Development of Higher Education

Abstract:

For a long period, higher education has been neglected in the discourses on the role of education in development. It has been widely felt that it is literacy, primary and secondary education that are important in contributing to the reduction in poverty and inequalities, and improvement in economic growth, human development and social and political development. This view is slowly changing, albeit slowly. But this perception still dominated the formulation of EFA (education for all) targets, millennium development goals (MDGs), and also to some extent the goals relating to sustainable development (SDGs). Apart from commenting on the relationship between higher education and other SDGs, based on some of the most recent evidence, the paper shows that higher education has an important role in every aspect of development and argues that neglect of higher education will harm the fulfillment of not only development goals in general, but also the goals relating to elementary and secondary education.

For higher education to contribute to development, the development of higher education itself should be sustainable. The paper briefly reviews the policies and approaches for the development of higher education in India, and focuses on the rapid and massive expansion of higher education that is taking place, and the alarming rate of expansion of private higher education, it comments on whether the quantum and nature of expansion is sustainable. It argues that we may have to revisit some of the policies and approaches toward the development of higher education in India.

Keynote Speaker

Dr. Rwitajit Majumdar
Program-specific Senior Lecturer,
Kyoto University,
Japan.

Title of Keynote Speech:
Supporting Reflective Teaching Strategies in an Analytics-driven Learning Ecosystem.

Abstract:

Learning Analytics (LA) is a growing field focusing on capturing, analyzing, and utilizing data from teaching-learning contexts. It aims to facilitate a better understanding of the learning experiences and thereby enhance it. In this talk, I shall share the research findings from a sustained collaboration between researchers and educators from India and Japan over the last 4 years. The LA-enhanced system, designed and developed in Japan, was utilized in different university classroom teaching contexts in Japan and India. With the research case studies, I would highlight a model of how to support reflective practices in an analytics-driven learning ecosystem.

Keynote Speaker

Prof Roger West
Trinity College University
Dublin, Ireland.

Title of Keynote Speech: To Teach is Human

Abstract:

Through decades of teaching under and postgraduate engineering students, the author has had the opportunity to engage students inside and outside the lecture theatre through imaginative innovations in his interactions with them. For example, in first year engineering, in weekly Covid-19 compliant laboratories with more than 250 students attending per week, the fundamentals of sustainable concrete were introduced (using slag concrete with recycled aggregate and bamboo as reinforcement). At sequential test stations a single student, working collaboratively within a group of five, undertook a test following the prior guidance given in on-line technical videos. The performance of the student who conducted the test in front of and supported by his/her peers (through verbal interventions when needed) was marked by a demonstrator based on errors made in the procedures. This group effort, in addition to sharing responsibilities for the subsequent report writing, enhanced the team dynamics where all shared in the successes or failures of each student. The bamboo beams were designed to fail by tension or bond of the bamboo in the concrete depending on the cement paste strength, as determined by the temperature of the curing regime. At Master's level, mathematical pre-requisites were identified at the start of an advanced structural analysis module so that students can focus on understanding the various pheneomena in elasticity, plates, dynamics and finite elements, and not on the mathematics involved. This is underlined by allowing the students to bring to the examination a single A4 page of closely packed key module equations, developed by them individually in a learning process, which enhances their awareness of how the maths delivers on expectations of behaviour shown to exist in the accompanying laboratories/tutorials. And, finally, the paper will describe how to motivate reluctant Masters students to embrace relevant statistical techniques used in their research projects by exposing them to the author's observations on the commonplace misuse and abuse of such techniques in student theses and peer-reviewed publications. By inviting students to explain such techniques and show simple examples of their use and abuse, a depository of knowledge in a compiled booklet issued to the class based on their individual research provides one of a number of such assessment outputs which includes fact sheets on concrete chemistry, types, properties, processes,and statistics. By keeping a master booklet over the years, students compete with their predecessors to get their article published instead in the rolled-over annual compilation. In conclusion this keynote address will demonstrate these and other examples of how regular imaginative approaches to the privilege of teaching can illuminate, motivate and creatively enhance the learning experience of students at all levels, a process that is uniquely human.

Keynote Speaker

Prof. Adrian Lee
Associate Professor,Department of Chemistry
National University of Singapore
Singapore

Title of Keynote Speech:
Interdisciplinary Education in a Digital World

Abstract:

In the early stages of the pandemic, NUS President, Prof Tan Eng Chye, saw the pandemic as a clarion call for tertiary education to take an interdisciplinary approach. Writing in the Times Higher Education Supplement, Prof Tan argued that “the challenges of the future won’t respect disciplinary boundaries”. Since this call for change was sounded, NUS has responded by rolling out a suite of changes, both curricular and structural. These changes seek to tear down the disciplinary silos of a traditional university. The first significant change brought the Faculty of Arts and Social Sciences and the Faculty of Science together under the aegis of the College of Humanities and Sciences, other Colleges uniting similarly disparate Faculties and Schools has soon followed. Contemporary with these structural changes was the introduction of a common curriculum that emphasised interdisciplinary education. This major reorganisation took place alongside a separate, but equally important, drive towards blended learning and technology-enhanced learning in general. This second thread of major change recognised the profound change in our relationship with technology forced upon us by the pandemic. In this talk, I will discuss how NUS is negotiating these changes. I will describe the approach taken by NUS in developing an interdisciplinary education curriculum. I will also discuss how NUS is embracing technology to realise the goal of an interdisciplinary education.

I was a little unsure after the change in the title of the track, but this seemed to fit most closely with the objectives of the track. If you had imagined something different and this isn’t appropriate, please let me know.

Industry Speaker

Anchal Chopra,
Regional head– Academic & Govt. vertical at LinkedIn

Title of the Talk:
The Evolution of skills - Bridging Education to employment gap in India

Abstract:

There is a shift of skills in the industry-. Skills sets for Jobs have changed since 2015 and are expected to change drastically by 2025 making continuous learning more important than ever. That means HEI needs to work with real-time data technology to predict this change and empower students for the future. LinkedIn's vision is to create economic opportunities for every member of this global workforce. In Higher education, it's about empowering students with the latest trends, technologies, and digital skills that are required to stay agile. All this is achieved with the power and AI technology of LinkedIn platform data that connects all the dots in one place.

Industry Speaker

Dr. Karthik Ramesh
emids
VP - International Markets, Innovation
Client Partner Provider & Lifesciences

Title of the Talk:
Role of Hackathons as crowd-sourced learning pedagogy involving Technology, Society and Innovation in Higher Education.

Abstract:

Dr Karthik Ramesh's talk covers how global companies, non profits and even governments are leveraging the power of innovation. Sharing from his experience of mentoring global and national hackathons during COVID-19 across 5 continents and recently running India's largest Healthcare Hackathon; he will cover how disruptive as well as incremental innovation ideas are generated in a short span of time while also micro learning is enabled to boot strap students of higher education using innovative pedagogy.

Industry Speaker

Satvinder Kaur,
Springer Senior Publishing Editor for Humanities
and Social Sciences
South Asia and West Asia region at Springer

Title of the Talk:
Best Practices in Book Publishing

Abstract:

The workshop will familiarise the scholars with Springer's academic book publishing programme to enrich prospective authors' and editors' understanding of best practices in book publishing. The editor will cover the various book types, available book series, and publishing models. It will be an interactive session, including a Q&A component for all.

Industry Speaker

M.F. Febin
Business Head- CollegeConnect,
L&T EduTech (Larsen & Toubro)

Title of the Talk: Title of the Talk: Industry-oriented upskilling of future talents
Best Practices in Book Publishing

Abstract:

L&T EduTech, the education arm & business vertical of Larsen & Toubro aims to bridge the gap between Industry and Academia by delivering digital learning content powered by decades of L&T's expertise. L&T EduTech enables globally employable, industry-ready talent through state-of-the-art, application-oriented learning, skilling, assessment, and certification programs. It partners with universities, corporates, NGOs and government to expand access to world-class technical and skill driven education. With the NEP 2020 guidelines already in place to revolutionise & restructure the higher education ecosystem with emphasis on holistic & multidisciplinary learning, the education system is gradually undergoing a transition from rote learning to skill acquisition. In this era of new beginnings in education system, L&T EduTech is all poised with a vision to empower the youth with right skill set to meet the rapidly changing needs of the employers

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Track 1

Cultural and Gender Studies in Higher Education

Confronting your Own Biases- Addressing Gender Equity in Teacher Education

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Abstract. Diversity, equity and inclusion in the classrooms is more important now than ever before. Creating inclusive learning spaces while making classrooms equitable beyond the gender binary is a daunting task for educators. The fulcrum of which lies on the pivotal role played by the teacher educator as an agent of change. But a revelation by a newly inducted colleague, followed by a student, about their personal identities of being gay, queer and transgender, set the wheel of introspection in motion- "Are we really prepared to address gender issues in teacher education?". This acid test prompted the researcher to not only confront her own biases but also led to a fruitful reflection on ways in which the inclusive pedagogies could be infused into teacher education classes. The present study analyses, pre service teacher's sense of self efficacy in working with and working for gender creative youth, followed by a discussion on constructive ways of equipping teachers with tools to assess and improve gender inclusivity of their own practices.

Keywords: Gender equity· Inclusive spaces· Gender creative·Transgender· Teacher education

Language, Culture and Accessibility in Higher Education: The Semiotic Pedagogy of Gandhian Education Against Disciplinary Dualism

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Abstract. Our academic space is marked by specialization, which segregates different components of knowledge due to the habitual dualism in educational philosophy. This duality often overlooks the relational structure and impedes the necessary mutual understanding within the components of education. The paper identifies this lack of relationality in terms of language and culture pedagogy and their presence determines the network aspect within the social capital framework. In academic space, accessibility is determined by these factors that shape pedagogy and form disciplinary opposition. The semiotic approach in study allows pedagogy of experiential learning through the signs, which not only defies narrow arguments of rationality, but also presents a defiance against the prerequisites of lingual and cultural networking. The semiotic turn in pedagogy makes education inclusive, enabling the knowledge sharing which ensures the holistic development. The paper assesses Gandhian ideals on education and its semiotic perspectives in preparing values through mutual collaboration, where unlike the dyadic sophistication language and cultural pedagogy don't impede the process of self-formation of individuals, but compliments it. Under these conditions, language and cultural education overcome the disciplinary dualism and education is not restricted to rigid frameworks or centralized spaces. The paper recognizes Gandhian educational tropes of practical and experiential learning as a semiotic transition and through it presents an alternative pedagogy and educational philosophy that envision universal accessibility of education, where the aspirations even from the periphery are addressed.

Keywords: Social capital· Language· Culture pedagogy· Semiotic approach· Accessibility. Experiential learning· Gandhi

Division across boundaries: The downside of Cultural migration in the form of Caste

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Abstract. Education has become one of the leading factors in providing opportunities for people from marginalised communities to seek better life elsewhere. The prime area of destination for such people are urban spaces where they prefer to hide their identities. The migration of huge number of people to other countries has been subject to both education and social capital. There are various cultural elements that Indians carry after migration. Where there remain huge cultural exchanges such as cuisine, art and music, there also are instances of existing social divides that are carried over to other countries despite most people migrating seeking better livelihood, education and jobs. Caste, as noted by few MNCs and activist organisations abroad, has been seen being practised in foreign countries. The allegation on Caste based discrimination by an employee of Cisco in Silicon Valley has been brought to media attention worldwide. This paper intends to explore how Caste has been practised in migrated places and is at times viewed as an Indian cultural entity. The cancellation of talk by Dalit activist Thenmozhi Soundarajan that was to take place at Google corporation in the United States has added to allegations on Caste system being practised by the Indian diaspora. This was following a retaliation by a section of employees from Google stating that the talk would propagate 'anti-Indian' sentiments in the company. The question arises why Caste based discrimination is denied by upper echelons of Indian diaspora but is continually practised overseas. Caste has always been viewed as an internal issue by the nation and any effort to address it globally has been met with wide-spread criticism from people holding socio-political power.

Keywords: Caste· Diaspora· Migration

Dealing with Cultural Diversity while Teaching Diverse Learners: A Systematic Literature Review

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Abstract. Embracing cultural differences is the need of today's virtual, globalized world. The strong foundation is building value oriented and responsible citizens with the society. As people, thoughts, ideas, creativity, knowledge, goods and services can easily move around the world, understanding the culture and practices of the place is really very important to survive sustainably. The phrase "Vasudhaiva Kutumbakam" is becoming more relevant as people go across their national boundaries for education, employment, trading and travel purposes. The role of culture brings a collaborative power within the society that has a common goal towards humanity and sense of self. Thus, dealing with cultural diversity while teaching diverse learners to overcome the dissension. The objective of this study is to apply the systematic literature review approach to explore how the teaching community across the world is dealing with cultural diversity while teaching diverse learners. The key phrase cultural diversity in education was searched with the help of advanced search in metadata of scholarly literature presented in Google Scholar. This systematic literature review is limited to a selection of journal articles published in English between the tenure 2012-2022 and published through Elsevier, Springer and Taylor and Francis. The research example provided in this paper provides a glimpse into the global collaborative efforts of the teaching community to address students' cultural diversity in the teaching-learning process.

Keywords: Cultural diversity in education· Diverse learners· Teaching-Learning

Strategies to improve Linguistic, Cultural and Social Capital Triumvirate in Tertiary Students: A Study among Undergraduate Teacher Trainees in South India

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Abstract. Learning English is more skill than a subject. In language classrooms, it is discussed predominantly as a subject that paves for a lack of competence among the learners. The present century demands linguistic, cultural, and social capital from the learners to be successful in society. This capital triumvirate is crucial for a student to be successful in their career. Unfortunately, in some cases; a student's vernacular language gets infused with their English language use and affects their social and cultural capital. Students from a rural background, who are academically sound, possess low self-confidence because of their lack of fluency in English. English linguistic capital helps the student to get acquainted with the socio-cultural community at the global level and helps the student navigate the socio-cultural matrix with ease and confidence. It is the duty of the language (L1 and L2) teachers to impart cultural, social, and linguistic capital to the students from the vernacular background. The present paper focuses on the role of cultural, social, and linguistic competence in the academic and socio-cultural context of an Under Graduate student. The present study uses a structured questionnaire along with a demographic profile, a pre-test, and a post-test to measure the developments in the various competencies of the selected students. The study designs, train the students through various innovative classroom activities in both L1 and L2 classes, tests them on the identified set of students, and presents the result. The study also presents the linguistic, cultural, and social skills to be developed in a tertiary level student, to be successful at the global level. The research highlights the role of teachers in developing the three Capital Triumvirates (Linguistic, Social, and Cultural) in a learner through designing activities from the syllabus content.

Keywords: Linguistic· Cultural· Social capital· Vernacular focus· Higher education· Capital triumvirate· L1 and L2· Activity based pedagogy

Understanding Diversity and the Need for Inclusivity in Indian Higher Educational Universities : A Study

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Abstract. Diversity and Inclusivity are the major factors that encompass higher education to the forefront in higher educational institutions in the realm of equality. Higher educational institutions play a crucial role in the country's Human Resource Development by attracting creative minds to academia through research and development. Multiple studies have demonstrated that the majority of higher educational institutions lack inclusivity, resulting in injustice to the students. Diversities, such as race, territory, religion, caste, and gender, fascinate humans. This research paper seeks to comprehend the aforementioned diversity in Indian universities of higher education. In addition, the researcher attempts to statistically analyse the violence and discrimination related to intolerance in the propaganda of higher educational institutions in the past ten years (2012-2022), such as declining admissions, bullying, hazing and alienating students based on their race, territory, religion, caste, and gender (LGBTQIA^{+}). The intolerance of diversity emphasises the need for inclusivity in educational institutions in order to maintain equality and humanity among students in order for them to respect and accept differences. Thus, the researcher employs sociological theories – systems theory and social construction theory – to conduct a critical analysis of the stems for inclusivity in order to find plausible solutions to the problems with regard to all diversities in Indian universities.

Keywords: Diversity· Inclusivity· Higher education· LGBTQIA^{+}· Sociology

Towards Structured Social Inclusion in Early Childhood Care and Education: A Case Study

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Abstract. The paper is based on a case-study of a private school in India that seeks to observe and document social inclusion practices specifically in early childhood education. Being the foundation of a child's development into adulthood, the study focuses on ECCE as the core temporal phase during which socio-cultural perceptual structures emerge and reinforce themselves throughout the child's lifetime. By focusing on social inclusion practices in this fundamental point of a child's life, the study seeks to reach the heart of the institutional bias and structural disrimination that is a part of educational frameworks today. The methodology involves the use of qualitative methods such as interviews and more importantly, case study based direct observation of classroom environments in order to develop episodes where the interactions between actors and institutional processes result in intended and unintended exclusion and inclusion moments. The findings of the study indicate the immense importance and need for structured inclusion practices in ECCE which include modifications to curriculum, pedagogy, as well as teacher perceptions towards students from minority communities and disadvantaged backgrounds. Moreover, the study also outlines the fundamental necessity of the independent agency of actors such as the teachers in inculcating this structured inclusion framework by going beyond the bounds of institutionally-derived stereotypes in order to ensure a holistic and cohesive integration of children from economically weaker sections (EWS) into mainstream education.

Keywords: social inclusion· social exclusion· early childhood education· economically weaker sections· teacher-child interaction· learning environment· perceptual structures. socio-cultural dynamics

The Neoliberalisation of Education: An Approach to Prepare the Global Workforce

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Abstract. With the initiation of neoliberal globalisation commencing in the 21st century, the prerequisite to preparing learners for mobility education has become a significant social and educational phenomenon. To establish a rapport between the work culture and neoliberal society, it is important to understand what neoliberalism is, why it came, and how it affects the lives of learners. In the increasing magnitude of the workflow and workforce, how neoliberal education prepares learners holistically for the challenges of globalisation also needs to be focused on. Given the focus on exploration, meanings, and understandings, an interpretive approach and qualitative case study strategy were utilised to highlight the emergent themes from the data. The qualitative case study of graduated students presents preliminary reflections on the effect of neoliberalisation in preparing learners for global work culture. The approach that is taken in this issue is to scrutinise neoliberalism at work through a close examination of the previous research and real-life experiences through which neoliberal subjects and their learning have been constituted in the learners.

Keywords: Neoliberalisation· Competence· Education· Learners· Globalisation

Track 2

STEM Education

From Learning-to-Write to Writing-to-Learn: Incorporating Writing Across the Curriculum in Indian Engineering Pedagogy

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Abstract. Writing Across the Curriculum (WAC) is a pedagogical practice incorporating writing elements in curriculum design. McLeod and Soven (1992) define it as a "comprehensive program that transforms the curriculum, encouraging writing-to-learn and learning-to-write in all disciplines." Using writing as a learning medium, students can build their narrative of knowledge. This paper showcases the successful design and implementation of WAC in undergraduate and postgraduate engineering courses practiced from 2019 to 2022 at the Indian Institute of Technology Gandhinagar. India has more than 2,500 engineering colleges. As English is the primary language of communication in engineering and technology, students require training in language and communication to improve their career prospects in industry and academia. Through the two aspects of WAC—learning-to-write and writing-to-learn—Indian engineering pedagogy can equip students as learning-to-write enhances their written communication skills in English, and writing-to-learn aids their learning capacities through writing. This paper first discusses the theoretical background of WAC as a critical component of the curriculum design of science and engineering courses. Secondly, it elaborates on the ideation, design, development, and execution of various pedagogical practices in WAC. It offers illustrative examples of modules and exercises designed for interventions in specific courses at an Indian engineering institute. It places WAC in the existing discourse of writing pedagogy in science and technology. It discusses its effect on improving the students' capacities to learn and communicate through writing.

Keywords: WAC· Engineering Education· Writing· Learning-to-write· Writing to-learn

Developing 'industry Ready' Graduates in Partnership/collaboration with Industry and Other Stakeholders

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Abstract. STEM education has been one of the key enablers of economies across the globe. Meaningful learning experiences based on the industry expectations and industry roles during higher education is still missing in majority of Indian institutions. This evidence-based practice paper discusses design, implementation, and assessment of an undergraduate engineering program in India developed in collaboration between an industry and institute. This collaborative effort used systems approach, ADDIE (Analyse, Design, Develop, Implement and Evaluate) instructional design methodology and OBE (Outcome Based Education) model. Proactive engagement of the industry with educational institution from selection of candidates, design of curriculum, development of courses, scrutiny of assessments, organizing of internships, guiding of projects etc. were some of the key aspects of the program. A deep understanding of technical and professional skills for development of industry relevant competencies by subject matter experts not only from industry and academia but other walks of life such as sports, languages, psychology, etc. was deployed in the design and review of the program. The academic performance of the students of the program in comparison with industry expectations expressed through performance tasks is a key metric for reporting the impact of the program. The program revealed that a collaborative effort between industry and institute produces high quality industry ready graduates who demonstrate not only technical skills but professional skills as well. Such efforts are highly resource intensive but for which the gap between the industry and institutions in the country will keep growing.

Keywords: Systems approach· ADDIE· OBE· Collaborative Education Program· Product and System Based Learning

STEM education for students with low income families

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Abstract. STEM education can reduce poverty by helping poor children in rural areas , as millions of STEM jobs are opening up in developing countries. But STEM education is still very expensive in India and not accessible by lower middle class students. Even though many schools are aware of STEM, but they are mostly English Medium, urban schools. However, a vast majority of small-town, rural and vernacular schools are not aware about it. As STEM needs more practical hands-on over theoretical education, it needs more funds and research shows that still instead of building solutions, educational institutes are buying costly prototypes or solutions from technology companies, which is making program expensive. As technology is changing, using advance technology in education we can reduce STEM education cost significantly - example : build your own micro-controller and start programming, in this field we can collaborate with local small supply chain partners, who can help in building PCB also in negligible cost. Instead of buying costly electronic models, young children's should build them. Same researches are happening in China and in many African countries, those are making poor but talented resources to become entrepreneurs. My paper will show low cost mechanism and techniques to cascade STEM in grass root level in systematic way that can help India to eliminate poverty and generate more young talents. My paper will try to address what should be the right educational kit or tool box for poor students based on their age band and based on their interests. I will try to highlight also researches those are going on in other developing countries in the same field. Swami Vivekananda believed that "Education is the manifestation of the perfection already in man" , and with proper planning and governance we can enable STEM to grass root of our society.

Keywords: Stem· Framework· Poor students· Build models· Research programs

Writing Mathematics in the Sciences: A Case Study for Discipline-specific Writing in Science and Engineering

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Abstract. In the competitive "publish or perish" environment, young scholars are required to be equipped with not only research but also writing skills. This raises a need for discipline-specific writing training, which cannot be catered to by traditional English composition curricula. To meet this need in Mathematics and Engineering, the Writing Studio at the Indian Institute of Technology Gandhinagar designed and offered the short course 'Writing Mathematics in the Sciences.' This paper demonstrates the journey of developing the course under the theoretical framework of Writing in the Disciplines (WiD). The curriculum was designed by a successful collaboration between Writing Studio instructors and professors in Mathematics. Through the collaboration, essential materials for writing in Mathematics were calibrated for the use of formulas and common errors in writing. In addition to the homogenization of the Mathematics department and Writing Studio, need analysis was instrumental in overcoming the challenges and framing a curriculum. The paper elaborates on how to overcome some barriers in implementing the course and selecting the instructor. Additionally, it discusses in-session discussions, tasks, and the role of feedback. Despite the solid application of the Writing Across the Curriculum (WAC) in other areas of STEM, Mathematics has been rarely involved. So, the paper illustrates the need for integration with discipline and the encountered hurdles in the practice of integrating writing and mathematics.

Keywords: Writing across the curriculum (WAC) ·Writing in the Disciplines (WiD)· Writing Mathematics in the Sciences · Higher education· STEM education

A Self-Ethnographic Study of Cognitive Impairments in Learning-Teaching – Recommendations for Effective Instruction Delivery in STEM Education

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ABSTRACT. Learning is a process of assimilation of facts or knowledge, inferences from observations, experiments or experiences of the real-world and reflecting on them to build a coherent mental model of understanding of the subject. Ability to abstract from specific knowledge to form insights and also the expertise to realize practical implementations from abstracted models are the essential traits of a learned engineer or scientist. I have had nearly 30 years of experience of working in technology organizations as well as a Learner-Teacher in a university teaching working professionals for the past 12 years. Starting afresh as a student to learn new subjects which are different from my earlier academic credentials or past profession and teaching the same to students, I have accumulated several insights on the way I learnt along with the roadblocks to my understanding of the subjects.While a Teacher can afford to be a specialist or expert in one discipline of knowledge or the other, a Student on the other hand, would have to assimilate different courses being delivered in a disjointed manner by individual instructors in their own scheduled periods. Being empathetic to student's cognitive barriers and delivering instruction as a symphony or synergistic portfolio of courses aligned to their mental bandwidth in a progressive bite-sized chunks of instruction is the key to effective assimilation of knowledge.By listening to the noises in my head and analyzing my subject notes and diaries over the last 12 years of Learning-Teaching of electrical engineering and computer science courses, this paper highlights key observations and recommendations for effective instruction in STEM education based on my proposed SLATE (Structured Learning and Thinking Enablement) framework.

Keywords:Cognitive Constructs· Meta Learning·Teaching-Learning·Structured Learning ·STEM Education

Demystifying Effective Strategies for Delivering Professional Ethics in Engineering Education - A Metacognitive Approach

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Abstract: Ethics is a way of living, and it helps applying ethical principles in real-life situations, bringing peace and harmony in the world we live in, thereby helping in attaining Sustainable Development Goals (SDGs). Professional ethics
is an indispensable course for any professional program like Engineering education, where the graduates self-regulate themselves and work towards contributing to a sustainable society while closely interacting with people and nature.
The challenging questions that arise while including professional ethics as a mandatory course in the Engineering curriculum are, what and how to teach? What pedagogical approaches to use for an impactful learning experience? What
kind of understanding a teaching professional should possess to be able to appreciate, apply and disseminate ethical principles to the student community? Firstly, the paper studies the conventionally taught modules under the curriculum and suggests the submodules and pedagogical practices/tools to be included to enhance the teaching-learning experience. Also, the paper tries to provide alternatives to unrealistic/ hypothetical case studies cited conventionally. Secondly, the paper reasons why Engineering faculty should be the primary instructor for ethics rather than offering it through faculty from other disciplines. The presented methods prove to be impactful, based on the survey and questionnaire responses collected from the students.

Keywords: Sustainable Development· Professional Ethics· Engineering Education· Metacognition· Pedagogical tools.

Research and Swings in STEM education:A systematic Review

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Abstract: In Recent years, there is a very rapid increment in the number of research scholars in the field of STEM Education. It is important to know and understand the status and trends in STEM Education for the development .For the Review, we conducted a critical analysis of 500research articles in STEM Education which published between 2012 and the end of 2021 in 36 journals to get an idea about the development in the field of STEM Education. We scrutinized the journals, publication in both the manner i.e. quantitatively. We included the authorship, national research topic, method and methodology over all the years. The findings revealed that there are continuously increasing in number of Researchers in the field of STEM Education and continuously its important increase internationally and nationally both day by day.

Keywords: Journal publication· Literature review· Status· STEM education research· trends

Role of STEM-Academic Disciplines and ICAQT for Progressing in Sustainable Development Goals: Qualitative Perspectives and Quantitative Insights

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Abstract: In 2015, the united nations proposed seventeen interlinked global goals known as the sustainable development goals (SDGs). The rationale in setting up these goals is to ensure peace and prosperity for the humans and other species on the planet mother earth, now and into the future. The three essential pillars of sustainable development are Environment, Society, and Economy. State-of-the-art science, technology, engineering, and mathematics (STEM)-education could play a major role in contributing to rapid progress toward achieving the SDGs. After laying the foundation for the SDGs and STEM courses, the authors briefly discuss information, communication, automation, and quantum technologies (ICAQT) for the progress of SDGs. Specifically, the authors present
their qualitative perspectives on the Internet of Things (IoT), cloud computing, quantum engineering, and neurosciences playing key roles in dealing with SDGs. Furthermore, the authors explore the use of big data analytics in obtaining useful quantitative insights better understand the trends in the progress of SDGs.

Keywords: SDGs· STEM education· ICAQT, Big Data· Analytics

“Think-Feel-Do”- A new model for sustained learning and growth in Science Technology Engineering and Mathematics (STEM) Education

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Abstract: The formal STEM education is based on the principles of a “Think-Do” model within the boundaries of classroom interactions. It has helped the STEM students to choose careers for building successful projects for progress around the world. But of late, significant changes are taking place in the needs and wants of the people and the society at large. The delicate balance between availability and usage of natural resources, is upset with over-consumption of these resources. It is also of great concern that even after the apparent success of the projects, the needs of people are not met effectively. The need of the hour is to restore the said balance with more sustainable and efficient projects. Working this backwards, it calls for a re-thinking and re-designing of the learning process for STEM students. In this paper, a new model of pedagogy called “Think-Feel-Do” is proposed to be included in curriculum and it includes component of “feeling” and “experiencing,” is based contemplative practices. Contemplation actually means, ‘thinking deeply of an idea to fully understand its nuances.’ It trains the young minds in an effective way of using their faculties of head, heart, and hands, in problem solving and decision making. It helps them to visualize the outcomes of the projects using the best possible resources and means and to adopt a life of sustained learning and growth all-round.
In this paper it is endeavored to present the workings, the challenges, and the way-forward with the “Think-Feel-Do” model for its effective implementation in STEM education. An attempt is made in this paper, to take a critical look at how this pedagogy has been faring in achieving its goals in Universities, where it is implemented.

Keywords: STEM Education· Think-Do model· Think-Feel-Do Model· Contemplative Practices in Education· Sustained learning

The shift to outcome based assessment – teachers' perception

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Abstract: Outcome based education is being much discussed in higher education in India at present. There is a focus in the process of assessment with a growing importance in recognition and attainment of learning outcomes. This study aims at determining teachers' understanding of outcome based assessment (OBA). The teachers under consideration are the technical teachers. Opinions of about 100 technical teachers were sought to find out the understanding of teachers on aspects related to OBA, which is the primary objective of this work. The method used is the survey method. Google forms were primarily used for the survey apart from interviewing a part of the sample. The findings reveal that as the respondents are now preparing for accreditation, they are getting much aware of outcome based education. The terms like learning outcome, objective, vision, mission are invariably being used without much clear understanding among the staff members. The members of faculty who are involved with the process, mainly those who are coordinating such programmes, are quite clear with the concept, though, the number of such teachers in the concerned colleges is not much. Teachers are majorly found to make use of the revised Bloom's taxonomy. In context of outcome based assessment, the teachers are found to be struggling with the decision making process regarding choice of the assessment tool, one of the primary reasons being, not able to link all the components of the teaching-learning system. It is inferred that the need to realise the constructive alignment of these components is foremost for the teaching fraternity so as to ensure learning. As more than 75% of the teachers reported about an urgent need to be trained in the areas of assessment and evaluation, the awareness of teachers, in general, about OBA needs to be reinforced with customised training programmes.

Keywords: Technical teachers· Learning outcomes· Outcome based assessment (OBA)· Bloom's taxonomy· Constructive alignment

Using Science-Fiction Prototyping to Improve Cognitive and Problem-solving Skills in Indian University Students

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Abstract: This paper discusses the outcomes of a task-based learning workshop conducted at Kirori Mal College, a constituent college of University of Delhi, and whose impetus was provided by phasing out of the Ability Enhancement Compulsory Course (AECC) from graduate academic curriculum in the recently-implemented New Education Policy (NEP). The paper locates NEP's thrust on STEM courses within a larger historical debate referred to as 'Two Cultures Debate', coined and elucidated by C. P. Snow in a work bearing the same name, and in which an argument was made for more investment into STEM courses, even if it came at the cost of Humanities and Social Science disciplines. Thus, with the intention to highlight that Humanities and Social Sciences are still relevant, the workshop engaged students from various Science-courses to a week-long workshop on study, critical analysis and writing of Science Fiction Prototyping, a literary method of creative thinking and problem-solving heralded by Intel futurist Brian Johnson. The paper would discuss the challenges encountered while transplanting SFP (and Science-fiction, in general) in the Indian context, and the impact of using SFP on the cognitive and creative ability of students. It would finally evaluate the prospect of introducing an SFP-based full semester course that would help students develop critical soft skills such as cognitive capability, lateral thinking and problem-solving, bringing them at par with their international peers.

Keywords: Science-fiction Prototyping· STEM· Science in Popular Culture· Soft Skills· Two Cultures debate

Academic Outcomes of Female Students in STEM Education in the United Arab Emirates

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Abstract: The last decade has witnessed a significant policy change in the economic diversification of the UAE. A substantial change has been the move from an oil-based economy to a knowledge-based economy with the intention of promoting sustainability. The integration of the fundamental pillars of innovation, research, science, and technology is the cornerstone of creating a knowledge-based economy. STEM (Science, Technology, Engineering, and Mathematics) education has played a very important role in the United Arab Emirates (UAE) in achieving its national goals. The country's vision to promote STEM education for the economic growth of the country gave impetus to STEM education. The 2020 launch of the Hope Probe was a historical accomplishment that boosted the science and technology sector of the UAE. Gender equality in the workplace indicates that the nation's vision to boost STEM education in women is yielding results. The leadership role played by the UAE in encouraging more women to pursue technical careers led to the contribution of women to the growth of the UAE's space industry. The science team behind the Mars mission comprised 80% of talented young women, and the entire mission included 34% of female personnel. In the UAE at present, female students outnumber male students in STEM fields. This paper aims to do a mathematical study of female students who have studied in the UAE at different levels of STEM education and their academic outcomes.

Keywords: STEM Education · UAE · Female Students · Academic outcomes

Leveraging the First Year Learning Community to Enhance STEM-Sector Career Readiness and Student Success

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Abstract: *"What do our first-year students know about today's STEM career pathways and how to prepare for them, and how are they getting their information?"* The authors explore the impact of the development and launch of a novel First-Year Learning Community by a major US public research university to enhance STEM equity and student success.
This innovative learning community model was designed in response to data and industry feedback identifying equity gaps among our first-year student population in accessing undergraduate career development experiences critical to STEM professional readiness and graduate school attainment. An overview of the call to action, internal evaluation process, and program design phases that led to the launch of the Learning Community will be discussed. Delve into the program model that includes cohort meetings, webinars, and a newly-designed learning community course: College of Science 100 - Introduction to Science as a Profession. The authors will further share strategies to connect first-year students to High Impact Educational Practices, including faculty and peer mentoring, and facilitating connections to undergraduate research opportunities. Key data and insights will be shared on STEM sector-based active learning sessions, as well as an overview of preliminary outcomes, lessons learned over the course of the two-year pilot, and our vision for the future.

Keywords: First-year experience· Learning Community· STEM Careers

A new Reflective Thinking framework to improve Project-Based Learning of undergraduate engineering students

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Abstract: Many students in India's schools reach only surface-level cognition by rote learning methods instead of making deeper cognitive connections through meaningful learning. Meaningful learning can be developed through metacognition. Critical to developing metacognition is ability to reflect on one's own learning, that goes beyond domain specific knowledge or knowing only about specific subject area. Many existing frameworks for self-reflection may not be relevant to Indian educational culture. For e.g. Indian students are not exposed in school to ideas of evaluation of individual feelings in a project and inferring from one's own experiences. Many existing reflection frameworks also cater primarily to theoretical teaching despite the project-based learning adopted in universities in recent years. Lack of encouragement for students to think reflectively in Indian engineering classrooms motivated us to device a reflective thinking framework as a part of the PBL curriculum ILGC at Plaksha University. The framework developed has multiple individual and team activities and is inspired by Flavell's model. After administering the framework in the classroom, its effectiveness in imbibing reflective thinking was analyzed as part of this study. Findings indicate that the framework is successful in bringing about reflective thinking. It also highlights that students face resistance in reflecting individually which can be overcome by engaging them in team reflection activities.

Keywords: Metacognition· Self-Reflection· Project-based learning· Engineering

Redesigning the Content in line with STEAM Education and Achievement in Mathematics: Creative Pedagogical Approach at school level

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Abstract: The STEAM education emerged as an alternative pedagogical approach for holistic education in line with NEP 2020. The study redesigned the content of mathematics of class 9 of the CBSE curriculum for STEAM education and examined the creative pedagogical approach at the secondary level through true experimental research. The study experimented through three groups namely a control group (CG) and two experimental groups (EG). The
existing content of mathematics in the CBSE curriculum of class 9 were taught through a traditional pedagogical approach to the students of control group (CG) while as experimental group - I (EG1) was intervened with redesigned content of mathematics in line with STEAM education through traditional pedagogical approach and experimental group – II (EG2) with redesigned content of mathematics in line with STEAM education through the creative pedagogical approach. The investigation found that there is no significant mean difference in mathematics achievement between CG and EG2 and also between EG1 and EG2. The study recommends that similar experimental studies may be conducted to arrive at comprehensive understanding of redesigning the content of mathematics in line with STEAM education and creative pedagogical approach to fulfill the needs of the learner at secondary level.

Keywords: Creative Pedagogical Approach· Mathematics· Redesigning the Content· Secondary Level· STEAM Education.

Preparing Future Educators through Multidisciplinary Collaboration in STEM Education: An Analysis fromStudents of Different Major in a Public University in Malaysia

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Abstract: Implementing effective STEM education in educational institutions in Malaysia may help prepare future teachers to think critically, as STEM education is one of the ways to acquire 21st Century skills. In preparing future teachers, introducing STEM courses in the curriculum with collaboration with industries hoped to empower them with the skills to succeed and adapt to this increasingly changing technological world. In line with the changes, the objective of this study is to measure future science and mathematics educators' preparation for STEM education. The study aspects include trainee teachers' personal teaching efficacy and beliefs, teaching outcome and expectancy beliefs, and 21st Century learning attitudes measured between the two programs. This study involved 140 respondents consisting of Science and Mathematics trainee teachers from a public higher institution in Malaysia. The respondents have attended courses like the Internet of Things (IoT), hands-on educational tools, and Solar Energy conducted collaboratively with STEM experts. The results showed that the level of science and mathematics trainee teachers' personal teaching efficacy and belief (M = 4.03, SD= 0.68), teaching outcome and expectancy beliefs (M = 4.18, SD= 0.72), and their 21st Century learning attitudes (M = 4.40, SD= 0.63) were at a high level. Additionally, the study found that the trainee teachers perceived their 21st Century learning attitude at the highest level compared to the other two aspects. Thus, the involvement of STEM experts and the multidisciplinary teaching approach adopted in the STEM courses can increase trainee teachers' perceptions of their competencies and understanding of STEM teaching.

Keywords: STEM Education· Collaborative Teaching· Trainee Teachers· Multidisciplinary Education

Health Humanities: An Integrative Approach for Holistic Education and Wellbeing

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ABSTRACT: Objective: To integrate Health Humanities course as an innovative pedagogical practice for holistic development of thestudents in Higher Education.

Methodology: Health Humanities was introduced as an elective credit course to the students of age group 21 - 36 years. It was designed based on the Bloom's taxonomy. 51 students opted. Feedback was taken about the course and faculty on coursecompletion.

Summary: The National Education Policy 2020 (NEP 2020) of India proposes holistic and multidisciplinary education withcmore inclusive curriculum to develop all the capacities - intellectual, aesthetic, social, physical, emotional, and moral in an integrated manner. According to NEP 2020, integration of humanities and arts with Science, Technology, Engineering, and Mathematics (STEM) has consistently shown positive learning outcomes, increase in creativity and innovation, critical and higher order thinking, social and moral awareness. The United States Department of Education has supported the progression to STEAM Education integrating Arts. The Committee on Integrating Higher Education in the Arts, Humanities, Sciences, Engineering, and Medicine of National Academies of Sciences, Engineering, and Medicine (US) opines that Colleges and Universities should consider supporting courses that integrate humanities and arts with STEMM (STEM and Medicine). It may foster empathy and promote inclusion, cultivating respect for the rich diversity of human identity through personal expression and meaning making. We propose the STEAMM (STEMM and Arts) model based on our observation and experience with the course on Health Humanities.

Conclusion: The students reported that the course contributed towards self-care, emotional wellbeing, resilience, meaning making, and enhancement of reflective capacity, moral and ethical imagination. They wanted it to be made a part of the regular curriculum.

Keywords: Health Humanities· Art· Holistic Education· Wellbeing· Mental Health· Health Management· Hospital Management· Self-care

Track 3

Environmental Education for Sustainable Social Engineering

IT- enabled Application related to Agri-Supply Chain: A farmer learning perspectives

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Abstract: The Teaching and Learning Centre (TLC) is a familiar name in every institute of higher learning in India to enhance the standard of teaching and learning eco-system. The aim is to integrate students; learning with business requirements in specific and societal expectations in general. For the successful implementation of such integration, the IT-enabled platform along with the traditional system has been researched, developed, and implemented in several areas of the academic curriculum. The hybrid system will definitely take the learning environment to excellence not only in academic institutions but also in different fields. However, such a learning eco-system related to both upstream and downstream operations of the agri-supply chain is hardly in place for farmers although agriculture and related businesses provide a living for about 55% of the country's population. With this backdrop, it is essential that farmers should be well versed in the use of IT-based systems to know various aspects of agri-supply chain operations such as input materials availability, resource sharing and marketing of the agriculture produces. Therefore, there is an urgent need to establish a platform to provide appropriate training related to the usage of IT enabled services for effective farmer learning in this regard. Such a system will create a path for doubling farmer income. To explain the salient features of the concept, an IT-enabled application has been developed to facilitate farmers regarding input materials availability such as seeds, fertilizers, and pesticides on real-time basis across different stakeholders with various related details.

Keywords: Information Flow· Knowledge Transfer· Doubling Farmer Income· Logistics· Market· Technology Adoption

Evaluating Building Bye-Laws for Solar Access: A case of Madhya Pradesh, India

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Abstract: Access to sunlight may be viewed as a fundamental right of every individual. The sun being the primary source of energy directly or indirectly to the cyclic flows in all ecosystems. The buildings and surroundings along with natural conditions governed by sun, wind, and light constitute the physical environment for people to live and work. In urban environments, the form of buildings and its surroundings are regulated by building bye-laws such as Minimum Open Space(MOS), Floor Area Ratio(FAR), Height Restriction(HR) and Ground Coverage(GC) that define the largest permitted envelope for a building.This paper presents a review of Madhya Pradesh Bhumi Vikas Niyam (Building bye-laws of Madhya Pradesh) in view of solar access permitted by various regulations outlined above. Bye-Laws for three housing typology, namely Row Housing, Multi-storied Apartments and High Density Housing for Economically Weaker Section (EWS) in Bhopal, the capital of Madhya Pradesh has been analyzed. The largest building Envelopes permitted by bye-laws have been compared with the largest envelopes that ensure solar access to all buildings in housing. On the basis of this comparison, existing regulations have been evaluated for their efficacy in ensuring solar access. This paper also shares the observations on the student's work in a 16 week micro-studio(1 hr/week) 'Solar Envelope for Design of Group Housing' conducted by the author at School of Planning and Architecture, Bhopal to corroborate the discussion presented herein.

Keywords: **Teaching Sustainability in Building Design· Building Bye-Laws· Solar Envelope Sustainability in Urban Built Environments**

Displacement, Migration and Resettlement: Reading the Mahabharata as a Palimpsest of DIDR Model

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Abstract: Development-induced displacement and re-settlement (DIDR) has been a topic of discussion since times immemorial. The *Mahabharata* registers grave environmental concerns which portend mass destruction due to rampant human intervention and over-exploitation of the earth. The text informs, advises, and cautions us against our utilitarian, abusive and anthropocentric way of life, which privileges man over other 'animals'. When the *Khandava Vana* was burnt by Arjuna to clear land for re-settlement, thousands of animals met with a brutal end while trying
to escape the blaze. All the denizens of the forest - the snakes, the elephants, the lions, the deer, the birds, and the tribal communities - were mercilessly dispatched to the other world. The *Adi Parva* describes how the hunger of Agnideva was satiated by the "nectar-like stream of animal fat". This conflict between the settled communities trying to extend their boundaries at the cost of the lives of the aborigines is a recurring theme in the saga of the so-called 'development'. This study seeks to analyze the displacement of communities by juxtaposing the politics of development in the alibi of Dharma to find common vistas that have remained unaltered for centuries.
The multiple layers that form the epic embed messages that are figurative and deeply metaphorical. This paper utilizes the narrative research methods and the postmodern theory of deconstruction to examine selected accounts of displacement from The Mahabharata, to decipher the real meaning of development apropos this ancient narrative.

Keywords: **The Mahabharata· Development-induced displacement· anthropocentric, metaphorical· Deconstruction**

Exploring LGBTQI+ Spaces in Indian Higher Education for Sustainable Development: Students' Perspectives

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Abstract: Education is the key to the sustainable development of society because it opens numerous possibilities and opportunities for the growth and development of all students including the marginalized, the backward, or the underprivileged classes. Recent research has established that gender-based discrimination in education is the major cause of the deep-rooted differences in society. Challenging heteronormativity is gradually making inroads in academic spaces, resulting in a shift in gender roles, requiring addressing, supporting, and upholding LGBTQI+ matters. However, in India, the educational spaces are not yet gender sensitive as aimed by the government in the NEP 2020 for Sustainable Development Goals (SDGs). It becomes imperative to identify the reasons for discrimination and apathy towards non-binary genders and non-heterosexual groups in Indian educational spaces. The present study, hence, aims to understand, examine, and analyze teachers' and students' perspectives regarding attitudes, awareness, experience, and readiness to include LGBTQI+ matters in higher education classrooms in India. The study was conducted at Birla Institute of Technology and Science, Pilani campus, India. The data was collected via google forms and was further analyzed using the quantitative data analysis method. The results suggest that students are aware of LGBTQI+ identities and strongly favour their inclusion in higher education. However, in reality, this ideology is not in practice in the classroom pedagogy and educational spaces at large. Thus, the study sets the pathways for further research concerning non-heteronormative matters in classrooms and curricula to build a trusting culture of acceptance for these communities, promoting their inclusion in the overall sustainable development of society.

Keywords: sustainable development· non-binary genders· heteronormativity· LGBTQ2I+· inclusive education· higher education· classroom pedagogy· NEP 2020

Climate School: A Capacity Building Strategy

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Abstract: Climate Change has emerged as one of the most important environmental dimensions leading to increase in number of complex natural disasters. Complex disasters are a major problem in hilly areas and a serious threat to sustainable development. Their impacts are diverse and affect all sectors of lifestyle.Complex disasters can be identified as a series of manmade or natural disasters taking place one after the other or simultaneously. One type of hazard triggers or spawns a secondary disaster which in turn triggers another disaster and thus enhancing the cascading overall impact. Thus, generating awareness and educating the locals about this phenomenon is an essential step in preparing them to adapt to the effects of climate change. As an initiative of the project 'Capacity Building strategies for managing Complex Disasters in the face on Climate Change' sponsored by NMHS- MoEF&CC, a "Climate School" is established in Government Junior High School, Upper Syari, Deorali, Gangtok. The climate school is yet in its inception. The aim of setting up of the Climate school is to generate/ sensitize the school children about the effects of climatic parameters and to instill a curiosity in the young minds to know about the various facets of climate science. As a pilot project the Government Junior High School, Gangtok was provided with instruments to measure climatic parameters. The identified Climate School records the daily weather data. The measuring and recording of the data, is carried out by the school students who have been trained by IIPA and SEEDS to take readings and maintain the instruments under the mentorship of a nodal teacher. This endeavour is intended to ignite a spark in the young minds which can be a fertile scientific ground and can probably transform them into green ambassadors of future.

Keywords: Climate School· Temperature· Humidity· Rainfall· Atmospheric Pressure· Maximum and Minimum Thermometer· Barometer· Hygrometer· Wind vane· Anemometer· Rain Gauge

Significance of Feminist Advocacy Practices for SDG 4

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Abstract: The cherished goals of SDG 4 of ensuring inclusive and equitable quality education and promotion of life-long learning opportunities point to enfranchising the epistemically marginalized. Advocacy of representing, arguing or recommending a disadvantaged epistemic position is to envisage change in social and epistemic contexts. The normative ethos within which we internalize, affirm and challenge knowledge is an instituted social imaginary of coercive nature. Thus, taking into account the situatedness of the knower and critically engaging with imaginative possibilities is to shift the focus from the dominant instituted narratives to democratically negotiating knowledge-claims. The feminist advocacy of the subjugated knowledges also emphasises ecological thinking of co-habitation in bringing about social transformation. The sustainable goals of inclusive and equitable education and promotion of life-long learning need to be analysed from a critical understanding of the power-nexused undercurrents of knowledge and learning processes and reinforcing the newer methods and possibilities of change. The paper argues that adopting feminist advocacy practices as educational methodologies are concomitant to SDG 4.

Keywords: Advocacy· critiquing social imaginary· ecological thinking· SDG 4

Geopolymerization: A novel technique for the development of new class cementitious materials

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Abstract: Geopolymerization, or in broader terminology, the alkali-activation technique in its current state, is emerging as cutting-edge technology with applications in many fields. The word "geopolymer" was initially coined by French scientist and engineer Prof. Joseph Davidovits in the 1970s to describe solid materials containing aluminosilicate developed by combining them with alkaline activators to generate a three-dimensional gel-like microstructure. This process is known as geopolymerization. The geopolymers are inorganic polymers initially created as alternatives to fire-resistant materials. Since then, the application of geopolymers has shifted to the construction sector due to their superior mechanical and physical properties and, most importantly, low greenhouse gas emissions compared to ordinary Portland cement (OPC). Despite these advantages, it is still not recognized. The main reasons behind this are (1) The absence of standardized frameworks/codes and lack of technical personnel; and (2) Inadequate knowledge of geopolymers among the general population. This article aims to provide an overview of geopolymer technology and its use in the actual world to broaden our understanding of this novel method. The information is supplied with particular emphasis on the process involved in geopolymer production, factors affecting geopolymer chemistry, and barriers to its adoption and commercialization.

Keywords: Geopolymer· Alkali-activation· Stone waste· Building material· Recativity

Track 4

Technology, Society and Industry in Higher Education

Education Policy and Assessment Reformation: A Review and Survey Based Analytical Study

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Abstract: Assessment is an integral part of teaching learning system. Hence assessment approaches of pre-independence era and education policies are revisited with further education commissions and their assessment approaches which guide towards the revamping of student's assessments in current situation. This paper would discuss the various National Education Policies (NEPs) and their respective assessment reforms. The work would also discuss various qualitative improvement brought by national curriculum framework to establish the competency based assessment. The features of NEP 2020 in transforming the culture of assessment would be brought in focus where the domains of regular, formative and competency-based; promoting learning and development of students; focuses on 'assessment for learning'; tests higher-order skills (analysis, critical thinking and conceptual clarity etc.); promotes in revising continuously teaching learning processes to optimize learning etc. would be the prime considerations. Transformation in the culture of assessment would be discussed through various alternative-criteria analysis. A questionnaire based survey would be conducted and the outcome would be analyzed qualitatively and quantitatively. The study discusses how to achieve the validity, reliability, objectivity, comprehensiveness, diagnosticity and practibility of assessment and evaluation, especially in the context of education policy where the holistic development of each student is given a priority. The study also establishes a correlation between the reformation in education policy and assessment practices.

Keywords: Education Policy· Assessment· Reformation

Kickstart LIFE through Technology

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Abstract: Higher education should include industry readiness and society's well-being so that higher education cannot be restricted to just theoretical courses but should ensure the sustainable development of industry and society through continuous improvement in technology. This can be obtained through interaction with the industry and society at the grass root level and understanding the need for improvement in the existing technology. Industry and higher education focus on the multifaceted and complex relationships between higher education institutions, business and industry. It looks in detail about academia-business cooperation which leads to regional development, entrepreneurship and innovation ecosystems. To transform this into active learning, here technology can play a vital role. As per the Community of Practice (COP) 26, Glasgow in November 2021, several targets for SDGs (Sustainable Development Goals) have been proposed by our Indian PM, in which one of this was to start movement 'LIFE' which means Lifestyle for Environment urging mindful and deliberate utilization instead of mindless and destructive consumption. The purpose of this paper is to start this movement by showing the importance of technology, society's wellbeing and industry readiness, which can be added to the traditional education system to make it more student friendly to promote student engagement and at the same time success in entrepreneurship with the use of digital infrastructure.

Keywords: LIFE · Digital Infrastructure · Sustainable Development Goals · Higher education · Technology

Art and Science of Storytelling with Data

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Abstract: Data supports decision making but to come to a stage where the data could make sense takes some time and process.With people involved in the complex process sometimes tend to forget the vision with which the program was created and by the end of the process the outcome isn't good enough for the business to understand and act upon or isn't communicated well to the business because of the engrossment in the process. Art and Science of Storytelling with data is a blend of Psychology,Technology and Communication where my work would touch upon the parameters which would make the outcome of data business friendly and conclusive so that business can act upon, psychology behind people/persona and how they perceive data and how to communicate the insights categorically, self awareness, social styles and cognitive behaviour with data. The work will also discuss Do's and Dont's in data engineering for building the outcome, bridging the gap between humans and data, visualization and translating art of storytelling for technology inclined people involved in the process of building the outcome using data.

Keywords: Storytelling· Psychology· Technology·Data Engineering· Data Visualization·Mass Communication. Python

Impact of Globalization on Technology & Higher Education

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Abstract: The Historic shift has majorly transformed people's life in the developing and developed countries. National Cultures, economies and technologies are globalizing. Globalization states that nation's innovation, investment, and production is not limited by the national geographical borders. The long distance or the various cultures are no more barriers for companies in US, Europe, Japan, etc. as they sell, invest, and outsource clerical work to various companies in Mexico, Ireland, etc. Globalization combined with innovative technology is driving a revolution in production of goods, organization of work, services, and relations among nations. Industries that have fast growing technology and that are internationalized produce massive capital. The answer to why does globalization increase the demand for higher education is to remain economic. It has become necessary for universities to involve global, knowledge and technology-intensive education to get good jobs with high payoffs. This is a true statement because top successful & influential leaders like Sundar Pichai (Google CEO), Tim Cook (CEO of Apple) Satya Nadella (Microsoft CEO) have pursued their higher education internationally. To strengthen their own development, foreign investment activities of British, US and other western countries are expanding higher education industries to rest of the world. This has further led to the growth of Virtual Higher Education, transnational collaboration, distance, and offshore campuses. This movement of academics and students transnationally has increased placements in global market. The introduction of MOOCs (Massive Open Online Courses) by several universities like Harvard, BITS Pilani, Standford, Deakin, has successfully implemented higher education programs globally. Yet, there is another side to this coin. Analysts state that demand for unskilled labour has reduced with increasing Globalization in technology. But the wages can raise if demand of labour increases for exporting work-intensive products. Compensatory measures must be implemented for workforce that are suffering from growing globalization.

Keywords: Internationalized · Technology-intensive education · Collaborative-brainstorming · Virtual Higher Education

Exploring Tech-Spatiality and its Practices in Education

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Abstract: The ubiquitous technology innovation wave in the last decade has transformed the education in a profound manner. If harnessed and directed properly, tech-spatiality has the potential to improve all the aspects of life. The paper argues that tech-spatiality provides fertile ecology to significantly improve performance in educational settings. Technology spatiality embraces artifacts, human contexts, capabilities, culture and vision required for the efficient functioning. Here, the agent embodied in the environment is 'technology'. Educational institutions need to continuously upgrade and evolve in terms of technology interventions in teaching-learning processes. These interventions, consequently, should lead to the exchange of information within and across the institution's environment. The study aims to comprehend the multiple facets of the tech-spatiality which influences learning outcomes in academic contexts. To comprehend the extent, range and nature of research interest in tech-spatiality, a systematic scoping has been employed. The scoping exercise reflected lack of vividness in research on tech-spatiality particularly in Indian context. In order to understand the phenomenon, researchers executed the field visits in schools to understand the practical nature of outcomes. Several stakeholders including teaching and students were engaged in conversation. Consequently, discourse analysis was used to understand the constituents of tech-spatiality in practice. Specifically, narrative discourse analysis was used with the structure, context and functions of their experiences with the technology. The study manifested gap among the constituents which facilitates teaching-learning environment. The study also suggests based on the extensively studied dimensions including artifacts, work, space has significant domain to be studied further in triangulated manner using distinct approaches.

Keywords: Spatiality · Technology · Education · Artifact· Space

Study of students' satisfaction in online education system- PLS SEM approach

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Abstract: The outbreak of coronavirus pandemic triggered the biggest overnight shift in the mode of education in India from classroom teaching to online teaching. Around 250 million Indian students and their teachers were counting on online education for continuation of studies. Several studies have attempted to investigate the impact of online mode of learning on the students' performance and wellbeing. Yet, there is a sparsity of empirical studies which deal with this area in comprehensive way. The theoretical framework and conceptual model explaining the interplay between the predictors is needed to study this domain. Adopting the Technology Acceptance Model, the study presents a predictive model to examine the impact of different factors associated with online education on students' satisfaction. The study applies partial least squares structural equation modelling (PLS-SEM) with the help of SmartPLS (Version 3.3.3) owing to nature of the constructs and complexity of the conceptual model. This model intends to guide the future researchers in the area of online education and direct the policy and practice in devising technological and pedagogical solutions. However, this research paper studies the students' perspective and other stakeholders' perspectives remain unexplored.

Keywords: Online education· Covid-19· e-learning · PLS-SEM· Student's satisfaction· TAM

Democratizing Technological KnowledgeConnecting Campus and Community for a Post COVID Reset

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Abstract: Amidst major global disruptions brought forth by the pandemic coupled with the age of the fourth industrial revolution, communities have looked upon technology to provide solutions to cope with COVID-19. With the increasing imperialistic domination by tech oligopolies on the present technological development and, consequently, on the technological knowledge production, stakeholders have raised concerns about how benefits arising from emerging technological development can percolate the grassroots communities. Hence, this has highlighted the need for sustainable technology development in the community by changing the present epistemology of technological knowledge. The present work, primarily conceptual, proffers new relationships among constructs by systematically reviewing existing literature and providing a conceptual framework for how the TIHE can play a pivotal role in making the market-centric technological advances society-centric. The paper argues that through the institutionalization of community engagement, the campus can foster a culture of transdisciplinary wherein diverse knowledge systems become part of the technological knowledge epistemology. The process of co-creating knowledge by embracing the indigenous and traditional knowledge, wisdom, adroitness, and experiences of the community thus can lead to the democratization of technological knowledge and, therefore, a foster an ecosystem that ensures social justice and sustainable futures. The paper thus suggests that deeper engagements of campus with the community can lead to mutually beneficial goals, wherein the campus will be able to socially validate its scholarship by coming closer to the real-world issues, whereas the community with its increased bargaining power will become not just the beneficiaries but partners in the process of democratization of technological knowledge

Keywords: Community Engagement · Epistemology of knowledge · Higher Education · Science · Technology and Society · STEM · Sustainable Development

Revamping Learning Environment with ICT Tools in Higher Education

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Abstract: The role of Information and Communications Technology (ICT) in education has become inevitable in recent days, especially after the pandemic. The use of ICT tools in education has presupposed the acceptance of educational institutions and teachers. Learners have become more self-directed and they rely more on technology for building their knowledge. Currently, teachers are facing Generation Z students who are born into the era of technology and media. These Gen-Zs have not seen a world without technology. Hence, it is extremely important to acknowledge the role of these tools and use it for the benefit of learning. Despite the criticisms against using them in learning curricula, ICT tools have made the workplace and learning environment hassle-free. Systematic organization of content, easy retrieval of materials, consistency in learning, and tracking the learning process are some of the experienced advantages on an everyday basis. However, various cultural reasons and the digital divide might be a hindrance in implementing ICT tools effectively. This research article aims to examine the role of ICT tools in re-modeling the learning environment and the need to acknowledge it for enhanced higher education learning. A total of 82 undergraduate students from Lady Doak College, Madurai were taken as the participants for the study. The results showed that Generation -Z learners are already diffused with ICT applications and are prepared for an innovative learning environment. A survey was taken among the teachers of the same college and the results are discussed. The Technology Acceptance Model (TAM), The Unified Theory of Acceptance and Use of Technology (UTAUT), the Diffusion of Innovations, the Theory of Planned Behaviour (TPB), and Motivational Models were used as the major theoretical framework to investigate the same.

Keywords: Information and Communications Technology (ICT)· ICT tools· ICT Trends· Generation-Z

An Exploratory Study for Identification of Components in Holistic Report Card for Elementary Teacher Trainees

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Abstract: The Holistic Development of Elementary Teacher Trainees is one of the most important concerns for society. All over the world societies are now becoming global villages and it is crucial to monitor the holistic development of the learner besides reporting the learner's academic growth. In the context of India, it is found that we cannot ignore the cultural as well as the Indian Value Based system, which is required to maintain the identity of India all over the world. The components of the 360-degree report card as mentioned in the National Education Policy (NEP-2020) must-have components of 21st Century skills as well as must-have components of Indian value-based systems. Besides having the various components in the P-21 framework, it is very necessary to identify the Indian Value-Based Skills. The P-21 consists of various components and India have a rich culture of Indian Value-Based system. The Life Skills and Career skills consist of 5 categories, Learning and Innovation skills consist of 3 categories whereas the last component of P-21 named Information, Media, and Technology literacy consists of 3 more subskills. The prominent Indian value-based system has several components. Therefore, to find a holistic report card, a priority scale can be developed based on the learner's feedback. The Holistic Report Card has to be prepared and taken into consideration by both Elementary Teacher Trainees as well through the Teacher, both of which are key part of the teaching-learning process. The development of the Transformative Amalgamated Assessment Approach (TAAA) is the need of the hour, which will incorporate the voice of the various stakeholders in producing the 360-degree holistic report card of the learner.

Keywords: 21st Century Skills·Indian Value System· Holistic Report Card·Elementary Teacher Trainees· Transformative Amalgamated Assessment Approach (TAAA)

Analysis and Prediction of Students' Performance using Machine Learning

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Abstract: Predicting students' performance has drawn attainable interest in education. However, quantifying students' performance is quite challenging as it depends on several factors. This study focuses on using Educational data mining techniques (EDM) to estimate students' final grades based on their social, schoolrelated, and demographic data. Although past evaluations have a major impact on student achievement, however explanatory analysis has identified that there are other important features (e.g., absences, study time, etc.) that can determine the students' performance. So, some efficient feature selection techniques such as Random Forest Importance, ANOVA, Recursive Feature Elimination, and dimensionality reduction methods such as Factor Analysis, PCA, and LDA are applied to the Portuguese and Mathematics lessons dataset. We have highlighted two modules comparison of both binary and Four-level classification; firstly, we analyze the accuracy performance of different classical classifiers using all the dataset features, and secondly comparison with the relevant selected features. As a result of this research, more effective student prediction tools can be created, benefiting both the management of school resources and the quality of education.

Keywords: Classifiers· Feature Selection·Dimensionality Reduction·Binary Classification· Four-level Classification

Technology based education-Perception of Teachers and Students in Higher Education

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Abstract: Though technology-based education has been around for more than a decade, it was the pandemic that forced the education sector to take the huge step in adapting online education in a full-fledged manner. Though the educators and the students were neither prepared nor trained to adapt this new media of learning, they had no other choice. During the year 2020 and 2021, most part of education was online and its impact on the teaching-learning process was far from the desired level. A sample study was conducted with the teachers and students in higher education in Tamil Nadu and the result of the study throws light on the perception of teachers and students about online education. 47.62% of teachers prefer only physical classroom teaching, while 34.9% prefer blended model with more classroom teaching and few online classes. On the other hand, 40.54% of students prefer physical classroom sessions and only 10.81% prefer blended model with more classroom sessions and less online sessions. Interestingly 27.03% of students prefer fully online classes. The perceived effectiveness of the online classes also varies between teachers and students. While 31.48% of students feel that the online classes were effective, only 17.46% of teachers felt online classes were effective. Though the study was done with a sample population, it does give us an indication about the perceptions of teachers and students.The inference of the study is that the higher education segment is not yet fully geared up to take up technology based online education in terms of comfort level and effectiveness. This only suggests that the educators need more training in handling technology and orientation to the emerging pedagogy, to make technology -based education widely accepted and to make it more effective.

Keywords: Technology based Education· Teachers PerceptionvStudents Perception· Effectiveness of online classes

Inculcating Collaborative Skills in Architecture Students through a Design-build Studio

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Abstract: When conducted in real settings, design-build studios facilitate learning through interactions with people, users, clients, regulatory bodies, and so on. As stated in National Education Policy 2020(NEP) -"In particular, languages influence the way people of a given culture speak with others, including with family members, authority figures, peers, and strangers, and influence the tone of the conversation", through the institute and industry collaboration the students' realize the power of language. Often, to document the perspectives and experiences of the actual users, the students in a design-build exercise learn to use the words and tones familiar to the subjects. Since, working in a real-world context can be a herculean task, in addition to communication, teamwork, and developing a rapport with various stakeholders may also be required. Such tasks align with the NEP's objectives of inculcating life skills such as communication, cooperation, teamwork, and resilience. This paper presents a case study and findings from a design-build studio conducted at the School of Planning and Architecture, Bhopal, India. The students' perspectives on the design-build studio were collected through an open-ended survey. The findings give evidence of students' learning beyond studio boundaries.

Keywords: Collaborative Learning·Teamwork· Design-build Studio·Architecture·Education

Future Readiness Through Capstone Project

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Abstract: Automotive companies are continuously transforming to cater to the needs of future mobility. Future mobility constitutes Autonomous, Connected, Electric, and Shared (ACES), which requires new mindsets, skills, and competencies. Equipping fresh engineers with futuristic skills and competencies was attempted using a Capstone Project. The objective of the capstone project was to enable engineers to solve an open-ended problem in a time-bound fashion. The project was a practice-oriented design that integrated multiple engineering domains such as multi-body simulation, electronic hardware, system software, algorithm development, mechanical CAD, system integration, and professional skills. The project cycle included process steps such as work breakdown structure, designing, analysis, feasibility studies, vehicle build, testing, and achieving performance and cost targets. Teams were formed from the entire group of new engineers. Each team designed, built, and operated a multi-wheeled, remotely operated cart as part of the capstone project. Periodic assessments of the skills and competencies were carried out during different stages of the project. The paper describes the concept, process steps, and impact analysis of employing a capstone project to develop the future skills and competencies of engineers in manufacturing/automotive companies. This capstone project helped fresh engineers to work effectively in interdisciplinary teams and solve the assigned/selected problem innovatively using scientific methods & tools and demonstrating continuous learning.

Keywords: Capstone Project · Future Readiness·Mobility Engineers·Fresher Engineers·Competency Development·Futuristic Skills·Professional Skills

Impact of Technology, Society and Industry on Higher Education in India

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Abstract. The global community has recently realized that the educational system of a state has a direct bearing on its economic success of that state. Education is the foundation of a nation's power. A highly educated population is an unavoidable component of every industrialized nation. India has the third-largest higher education system in the world, after those of China and the United States, respectively. Higher education first started to transition into the private sector in 1991, when the Liberalization, Privatization, and Globalization (LPG) Policy was first implemented. An economy that is considered to be based on knowledge places a significant emphasis on human capabilities, creative output, and the application of intellectual capital. Such an economy is supported by learning and adaptation throughout one's entire life, inventive utilization of previously acquired data, and significant generation of new information through research and development. This article focuses only on applications in higher education that can facilitate the dissemination of information, such as education that is supported by technological means. As a direct consequence of it, the structure of the educational system in India has undergone a profound transformation. With the establishment of COVID-19, there has been an increase in the need for social segregation measures, such as the broad adoption of lockdowns in several different countries. The transition from traditional education, which needs a direct connection between teachers and students in physical classrooms, to E learning in the context of the pandemic.

Keywords: Higher Education System · LPG · Privatization ·COVID-19· e-Learning

Enhancing the Student Engagement in the executive education programs: An empirical study from teaching of Supply Chain Management in Work Integrated Learning Programs

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Abstract: Working Professionals who pursue education programs along with their employment have quite different learning needs as compared to those of the on-campus students. These students can have a lower attention span or lower engagement in the classroom because of having other responsibilities of work-life and family. They also can have higher expectations from the instructor in terms of the learnings to be obtained since they have already acquired some basic knowledge over the years of experience. This study aims to investigate the influence of a few pedagogical interventions that were used while teaching the "Supply Chain Management" course in BITS Pilani Work Integrated Learning Programs. The effectiveness of such pedagogical interventions was is measured through a structured survey by comparing the responses given by the students to this course with the ones given to the other courses without such interventions. Two techniques of ANOVA and T-test for equality of means have been applied to validate the hypothesis, and it is found that the stated pedagogical interventions resulted in statistically significant improvement in student engagement.

Keywords: Student engagement· Work integrated learning· Cross-functional pedagogy· Holistic perspective·management teaching· Industry-readiness· Bloom's taxonomy·Teaching-learning outcomes

Effect of Facilitating Conditions on the Use of Social Networks as Pedagogical Tool in Higher Education

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Abstract: As internet connectivity gains ubiquity and social network sites emerge as the most popular venue for gathering of people of all ages, the government and educationists can think of putting social networks to better use by using them as a pedagogical tool, especially for higher education. Although some studies have been conducted in this regard, the findings often seem to lack proper scientific and statistical validation. Moreover, majority of these research works having been conducted in Western countries, may not hold true in the case of developing countries like India. Over the last few years, the Government of India has been trying to reduce the digital divide and has strived to ensure that the benefits of technology reach all strata of society. The Digital India campaign has been conceptualized to invigorate such initiatives. Thus, this seems to be the right time to explore the possibility of using social network sites as pedagogical tools for disseminating higher education in India.The current research work focuses on this need and attempts to come out with some key findings in this regard. Taking cue from the Unified Theory of Acceptance and Use of Technology, proposed by Venkatesh et. al. (2003), we have checked whether facilitating conditions have a significant effect on the adoption of social network sites for educational purposes and whether there is any difference in this from the students, teachers and administrators' perspective. Random sampling has been employed to collect such views and appropriate statistical techniques have been used to empirically validate the findings. Although this constitutes only a part of a larger study, the findings mentioned in this paper should help the government and educational institutes to develop an appropriate strategy to use social media in higher education.

Keywords: Social Media· Higher Education· Digital India· Pedagogical tool

An outcome-based online educational framework (E-Shikhshan) for quality accreditation

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Abstract: It is now widely recognized that the graduates pursuing education will need to demonstrate mastery over knowledge, skills and attitudes needed for the ever-transforming job market. To assure skill development as per the market requirement, Indian Institute of Technology, Kharagpur, India conceived the Pedagogy Project under the National Mission on Education through ICT (NMEICT) sponsored by the Ministry of Human Resource Development (MHRD), Government of India in 2013. Under this project, a collaborative web- based framework has been developed for developing, monitoring, sharing and administering outcome-based learning. The various modules under the framework have been discussed in detail with relevant illustrations provided at suitable spaces. The paper emphasizes the development of this online framework 'E-Shikhshan' keeping in mind the concepts of accreditation and principles of self-learning pedagogy. The paper also describes how this tool can be used for implementing accreditation in classroom. It is expected that the paper will serve as a template for other institutions to either adopt or simulate the framework to meet their quality assurance objectives.

Keywords: Accreditation· Education· e-learning· Outcome-based· Pedagogy

Innovative Practices in Vocabulary Acquisition for L2 Learners with the aid of Computer Assisted Language Learning and TBLT– An analysis

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Abstract: The current study concentrates on the core ideas of vocabulary learning and how they guide and shape the current vocabulary pedagogy. It also focuses on vocabulary acquisition concerns, such as the general neglect of vocabulary education throughout the years, the value of acquiring many words, the need to understand diverse facets of these terms, and responsive and productive mastery. A heterogenous group of L2 learners who were admitted in I BA English at Lady Doak College were given a diagnostic test to assess their grammar, sentence structure and vocabulary. Based on the results of the test the learners were streamlined into two levels viz., Level A (Advanced) and Level B (Basic). To assure a better level of involvement, the heterogeneous group needed to be equipped to overcome their prior hesitation, fear, and poor motivation. The findings assisted the educators to adopt and implement different simple and innovative pedagogical strategies to help them improve their English vocabulary. Activities like oral presentations and reading tests came handy in the assessment process. Mobile Assisted Language Learning (MALL), Computer Assisted Language Learning (CALL), Task Based Language Teaching (TBLT) were few strategies to mention. The focus of TBLT is on meaningful, all-encompassing language practice, where learners must use all four language skills—listening, reading, speaking, and writing—to complete a task. The results after implementation revealed that students not only improved their English vocabulary but also harboured interest in participating in all the Task Based activities using CALL method which is a major step towards language acquisition.

Keywords: Vocabulary ·Task Based Language Teaching (TBLT)·Activities· Language acquisition· Reading· Speaking·CALL/MALL

Track 5

Innovative Pedagogical Practices for Technology Enhanced learning

Impact of Student Teacher Time on Student Engagement

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Abstract: There is so much innovation in pedagogy around us - but what is often overlooked is one major key element i.e. student's engagement. What if there was a tool that could empower students to start their day differently - a tool which engages students to be motivated to learn?For kindergarten one such tool to engage students is Circle time. It is now almost an universal activity. However, little to no research has been done in absence of this time in middle or higher years. This research aims to examine the influence of introducing 'Student teacher time' to grades 1-12 to see the difference in their attendance, engagement, participation, leadership and overall engagement via Student Teacher Time.Early findings suggest that STT which typically involves about 15 to 20 minutes (mandatory time), which, although a relatively brief span of time, occurs nearly every day in most classrooms from grade 1-12; therefore, students have been exposed to a total of 45 hours of student teacher time, as a low estimate, over a full, 180-day academic year. Consequently, this particular segment of the school day represents an important and little-understood lever for improving student's exposure to high-quality student engagement and involvement for the day.Evidence calls into question the richness and quality of student teacher time and early findings suggests that even modest improvements in quality and an increased focus on child participation/student leadership can ensure that facilitators are not squandering valuable learning time by chalk & talk method and depleting children's behavioural self-regulation during the first lesson of the day. Innovation in pedagogy is about student engagement first, students mental presence and nurturing the joy of learning and this can happen with well structured 'Student Teacher Time'

Keywords: Teaching vs Learning· Innovation in student Engagement· Teacher Student Relationship

Inclusive Education: An Application of ICT to overcome the Functional Limitations of Visually Impaired Students

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Abstract: The present research study highlights the functional limitations in online teaching and testing for Visually Impaired students. Learning amidst visual impairment, overcoming the odds through assistive techniques and tools is challenging. The locomotive disability learners faced the bright side of empowerment through online teaching whereas the visually impaired students has limited access to the latest technologies and online tools as Learning Management Systems as they are visual based and rely on the student's ability to see the screen to use the mouse. Inclusive Education promotes child learning, through participation of parents and the community in planning and executing services for disabled children. The study analyses the barriers of visually challenged learners in accessing their digital materials and the examination system through a scribe. The data received through a structured questionnaire is scrutinized and the research has identified the effectiveness of scribe and their cooperation with a visually challenged candidate. The researchers share inputs on inclusive education, Disabled friendly E-learning to enable hybrid mode of teaching and learning to be made disabled-friendly.

Keywords: ICT in Pedagogy· Visually Impaired (VI)· Online Learning· Accessibility· Inclusive Education, Scribe

Spiralling of knowledge creation using the SECI- “Ba” Model in International Business courses among Post Graduate MBA Students

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Abstract: The innovative knowledge creation pedagogy was done in an International Business classroom learning environment that promoted knowledge creation by adopting a theoretical framework named SECI. The SECI model of knowledge dimensions (or the Nonaka-Takeuchi model) is a model of knowledge creation that explains how tacit is converted into explicit knowledge which is further used in future workplaces of students. In the post-pandemic scenario, the challenges for the course facilitators include less attention span of students, distraction in long lectures, engaging with peers in knowledge acquisition, and adoption to online to offline transition [6]. All of these challenges were a roadblock for the facilitators in the creation of required knowledge and attaining the learning outcomes of the course. Hence the research question is “how to design a classroom as an environment to promote knowledge creation in International Business courses?” An intervention was designed and implemented with a series of activities logically connected to create a learning space for postgraduate MBA students to explicit their tacit knowledge and acquire new knowledge through the process of Socialization, Externalization, Combination, and Internalization. As a knowledge-creation approach, the researcher applied and validated the spiral learning model of knowledge-creation using the SECI model in management education with the help of the 'Ba' concept.

Keywords: SECI· Knowledge creation· Innovative Pedagogy· International Business

A Relationship Study on Teacher Trainees' Perceived Use of Gamification of Learning and Gamification User Types

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Abstract: This paper discusses the results of quantitative research approach focused on examining the descriptives and relationships of psychological attributes associated with gamification in learning, A web-based survey was administered to collect data from the sample drawn from 60 students of the four-year integrated B.Ed. programme. The quantitative results concluded that teacher trainees had a high level of perceived use of gamification in learning and a high preference for gaming elements such as quests, levels and rewards. Additionally, they also showed a high level of gamification user types, such as free spirits, philanthropists and socialists. The correlation findings have indicated a high relationship between the various user types and perceptions except for the user type, the disruptor. Moreover, the findings implied that the user types and preference for gaming elements are directly attributed to how teacher trainees prefer to design gamified lessons for teaching. The study strengthens the importance of providing training for student teachers in gamification in learning.

Keywords: Gamification · Gamification User Types · Hexad

Use of Digital Randomizer for Assessment of Team-based Storytelling: An Empirical Study

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Abstract: Educators integrate technology in their classroom pedagogy with the aim to make teaching-learning more constructive, receptive and open to different learning styles, developing a conducive environment for better engagement with learners. The present research intends to explore the use of Digital Randomizer for classroom assessment with proper pedagogical planning and instruction designed for Team-Based Storytelling. Thus, the study aims to understand the students' perspectives on the appropriacy of utilizing the designed Digital Randomizer and its effectiveness and objectivity as the instructional tool used for the classroom evaluation of undergraduate engineering students. It also focuses to study the students perception of using Team based Storytelling assessment for formative assessment of their speaking skills. For the study, a questionnaire was designed and circulated through Google Forms among all the students of the course. The findings of the study suggest that the Digital Randomizer makes the classroom activity interesting, dynamic, and more systematic with well-crafted instructions and, well-articulated outcomes.

Keywords: Digital Randomizer ·Assessment · Educational technology· Team based storytelling· Digital tools

An Interdisciplinary Approach to Analyse the Awareness of ICT in Pedagogy among Teacher Trainees with Reference to Thanjavur District, South India

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Abstract : There is a widespread interest among graduates to pursue a career in teaching which in turn opened up a world of new avenues for their career development. Teaching is not a mere job but it is to be considered a commitment to the future of a country. A teacher of the twenty-first century is expected to have a culmination of various skills – Paralinguistics, Empathy, Cultural and Social Intelligence, and Soft skills, to name a few. Above all of these, the knowledge to use ICT in their classrooms has become necessary in the postCovid pandemic. Covid'19 has brought advanced changes in teaching and it has included technology in pedagogy. With this rationale, the present paper makes a survey of the awareness of ICT tools among Teacher Trainees of various subjects – Maths, Physics, Social, etc. in Thanjavur district through a structured questionnaire and oral interviews. The research also includes the perception of Teachers (both Government, Government Aided and Private schools) principals, Students, Parents, Differently-Abled children and Management to know their context to use ICT in pedagogy. The research analyses the data and present the findings of the study. The research would be beneficial to create awareness among the young Teacher Trainees of various disciplines, equip them to use ICT Tools in Teaching practice sessions and also introduce them to a range of ICT tools which they could use in their future careers. The article also presents the perception of teachers, parents and management to improve infrastructure at schools and make policy-level changes in the curriculum.

Keywords: ICT tools · Perception · Teaching PostCovid · Pedagogy ·Policy-changes · Infrastructure ·Curriculum

Application of “AR/VR+” Education based on Artificial Intelligence for Specially Abled

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Abstract: The increasing progress of artificial intelligence (AI) technology affects the development across the board. As an important base for cultivating talents in the new era and nurturing development forces, colleges and universities will inevitably usher in unprecedented intelligent changes. In the present age, it's hard to emphasis and handle the challenges experienced by specially abled persons, like those who are visually, audibly, or vocally handicapped, with a single device. Every topic has been systematically researched, and resolutions have been provided independently. The objective of this paper is to combine the development of AI technology in AR/VR and discusses the use of "AR/VR+" technology in the education of specially abled students. This Paper introduces an idea of AR/VR technology so that the deaf, dumb and blind people can experience the learning. Even for the virtual learning this will be useful. Based on big data analysis platforms such as Statista, this paper analyzes the AI industry and predicts the development of VR market scale. The research found that AR/VR has great potential in education and can profoundly affect teaching reform. Therefore, the purpose of is to explore the intelligent, new and technological teaching mode. The proposed work comprises of a device that would use the concept of Machine Learning for the implementation and the AR/VR technology. For the object detection by providing the eye for the blind, machine learning algorithms are used. The proposed work aims to create a user-friendly technology for communication and education of physically liable people.

Keywords: AR/VR · AI · Statista ·Machine Learning Algorithms

Effect of Personal Innovativeness and Self-Image on Language Learners' Acceptance of Mobile Assisted Language Learning in India

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Abstract: Abundant research has acknowledged the impact of several psychological factors based on Psychological Theory on the Technology Acceptance Model TAM, which has been used extensively for measuring the learners' acceptance of mobile-assisted language learning successfully. However, the influence of Personal Innovativeness PI and Self-Image SI has not been analyzed in the learners' acceptance of Mobile Assisted Language Learning (MALL). The present study aims to abridge the research gap in literature by extending TAM using personal innovativeness and self-image as precedents for calculating their effect on learners using Partial least square Structural Equation Modeling with SmartPLS v3.2.9. The results indicate the psychological factors motivate the learners and enhance their intent to use MALL for language acquisition, inspire them towards more creativity and for better academic performances. Secondly, the study establishes the influence of psychological factors on the technological components of TAM, which affirms the study's importance and need for further studies to assess the learners' perspectives; it also confirms psychological factors may be used to extend the TAM and may be regarded as significant components of the TAM.

Keywords: MALL· Personal innovativeness (PI)· Self-image (SI)· Technology acceptance model (TAM)· Psychological theory

Pedagogical Implication of Environmental Studies – a Case Study

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Abstract: Environmental Studies (EVS) is an essential curriculum subject of environmental concerns. Pedagogy in this subject differs from stages of education and gets more interesting as it proceeds further. The deterioration of the environment because of unethical practices by man deliberates the need for awareness of environmental issues to make the world healthy and productive for future generations. A different important development at global and national levels such as the United Nations General Assembly agreed on the ability to live in "a clean, healthy and sustainable environment" a human right for all, China's move on Green wall creation by 2025, India's commitment and pledge at Conference of the Parties (COP) 26 (Glasgow) in 2021, passing of Energy Conservation (Amendment) Bill 2022 in Lok Sabha, India to attain the target of reducing dependency on fossil fuel and achieving energy security and aim of National Education Policy (NEP) to yield maximum potential in students, imposes different spectacular changes in the pedagogy to satisfy the need of time in favor of environmental conservation. This paper focused on how, the content such as the multidisciplinary nature of EVS, ecosystem, biodiversity, pollution, human population, natural resources, etc. can be lectured effectively to the students of different faculties in the university by using the pedagogies like discussion methods, project methods, problem-solving methods, field trips, etc. This helps to enlighten the students about the consequences of their actions, the influence of technology and how students can resolve problems and heal the environment. Studying the environment is very crucial at this point in the world to sustain. 85.4% of students were convinced that faculty was able to come up with ideas to make the subject more understandable. 26.2%, 54.8%,14.3%, and 4.8 % of students think that the learning outcomes are very good, good, medium, and, poor respectively.

Keywords: Environmental studies· Pedagogy· NEP· Sustainable environment

Gamification in the Digital Classroom for Student Engagement and Learning: An Empirical Study of Higher Education Learners

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Abstract : This paper explores and analyzes the use of gamification as a digital pedagogic strategy for student engagement for different types of learners. It explores the potential of this innovative teaching methodology to engage learners and enable a retentive experience of study and skill content while attempting to increase student motivation and online classroom interaction. The primary research uses the findings and analysis of the empirical study that defines and establishes the concept of student engagement, digital pedagogy, and the need for life skills learning in higher education. The primary research is based on real-time case studies of classroom engagement by the researchers of participating students across 6 student cohorts (141 students overall), and their participation and output in the virtual classroom setting. The statistical test exploratory factor analysis has been used to identify the factors; (i) Classroom Participation, (ii) Interactive Learning, and (iii) Retentive Learning. Thereafter One-way ANNOVA has been used to test the impact of these factors with reference to gamification and results show a significant impact of gamification in the digital classroom for student engagement and learning. The findings can be used in the creation of longlasting life skills program embedded with innovative teaching pedagogy like gamification etc. to ensure the successful transfer of knowledge, skills, and abilities.

Keywords: Online Teaching · Gamification ·Game-Based Learning· Student Engagement·Digital Pedagogy· 21st Century Life Skills

Analyzing student engagement to enhance online teaching learning

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Abstract: Research in Educational Data Science has recently been abundant and pertinent. In the past two years of the pandemic, the concept of online learning has significantly increased flexibility in access to education. Although teaching in virtual world is a significant educational and technological issue. How to design successful online learning environments that can suit the need of students' expectations is a field that is always evolving. Although, such a task yields substantial rewards. Mainly based on Learning Analytics (LA) and Educational Data Mining (EDM) communities, virtual platforms are emerging to generate information regarding learning models. Analyzing student performance in an online learning environment at an early stage of course commencement may yield to categorize students into advanced and slow learners which can then be used to provide a customized learning environment for better results. In this paper, we have proposed a method to analyze student engagement. It considers online activities on a learning management system (LMS). Student engagement in an online environment like user activities, and behavioral and temporal data are taken into consideration. Based on these features our proposed method has compared the result of student engagement using the fuzzy miner algorithm and the sequential pattern mining algorithm and categorized into active, passive, and disengaged which helped us to identify advanced or slow learners. Predicting student performance will also help in resolving the student retention issue which is quite a big problem in an online environment.

Keywords: Student Engagement · Student Performance· Online learning

Team-Based Learning (TBL): Exploring an Active Learning Strategy for Two Undergraduate Courses in Biology

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Abstract: Team-Based Learning (TBL) is a highly structured collaborative learning method widely accepted and used in education. This unique flipped classroom setup is an effective way for the active engagement of students. This study aimed to describe how a Team-Based Learning (TBL) educational model was used in undergraduate biology tutorial courses at BITS-Pilani, Pilani Campus, to evaluate its success in increasing student learning and engagement as indicated by knowledge acquisition and class participation. The methodology of TBL intervention was carried out in tutorial classes of Genetics and Integrated biology courses for sophomore-year biology students at BITS-Pilani, Pilani Campus, who had to work on the specific topic alone and then in teams. Every TBL session started with a readiness assurance test (RAT), which the students were required to complete in two ways: first, they had to answer the questions independently (i.e., individual Readiness Assurance Test- iRAT), then they had to work in teams (i.e., team Readiness Assurance Test- tRAT) to come to an agreement, and finally, they had to complete an optional team-based non-evaluative application exercise. The results showed that the teams generally performed better than when students worked alone, and there was a substantial difference in which teams scored higher than individual scores. According to student feedback, TBL was preferred over the conventional format, and they found it a more interactive and fun-loving learning process. Students discovered that these TBL sessions helped them understand and grasp various concepts of Genetics and Integrated biology (a course in evolutionary biology and taxonomy) courses. In tutorial sessions of biology courses, the TBL approaches enabled an interactive learning environment to support student-centered learning, and the teams' performance was better than individual student performance.

Keywords: Team-Based Learning (TBL)· Flipped-Classroom·Active Learning· Genetics· Integrated Biology

Design and Development of Smart Wearable-Technology Enhanced Learning for Specially Abled Students

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Abstract: Smart gadget use has made traditional one-way teaching techniques less likely to effectively support students with disabilities, which is a major concern for educators. In light of these considerations, the current study represents an effort to create an intelligent, interactive educational system. As a result, we develop a smart watch wearable technology based on gestures to provide specially abled students enhanced learning services. In order to promote student interaction and attraction in the classroom, these wearable gadgets (smart watches) also precisely catch hand gestures of students with special needs and promptly respond to teachers. Additionally, using a variety of physical data from smart watches on students with disabilities, it is possible, using deep learning data analysis, to identify the key components of the learning process. Using cutting-edge deep learning models, we have discovered a visual voice and hand gesture recognition method in this work. This enables instantaneous alterations by teachers and suggests ways for students with disabilities to engage in multi-learning and imaginative thinking. It is specifically the smart interactive watch's responsibility to track students' physical activity and interaction outcomes in order to provide teachers with feedback. Furthermore, an illustrative system was used to exhibit the efficacy of the proposed method to have the ability to improve learning and teaching for both teachers and specially abled students

Keywords: Differently abled people· Smart watch· Automatic Speech Recognition (ASR) Technology· Intelligent system· Enhanced learning· Deep learning· NLP

Flipped Classroom- An Effective Instructional Approach for teaching Management Science to the Engineering Students

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Abstract: The COVID-19 pandemic and the recent technological advancements have given rise to the use of active, interactive, and innovative learning strategies in Higher Education in India that helps in promoting collaborative learning. The aim of introducing flipped classroom strategy using some active learning strategies is to evaluate its effectiveness in use and in academic performance, develop managerial, problem solving, creativity, and innovative skills in students, the need of the hour in the present situation where 80% of the engineering graduates are unemployable (aspiring minds report, 2019) and to arouse interest in the management courses which are given little emphasis by engineering students in their undergraduate program and which is affecting their placement because of the backlogs in Management courses. This strategy is used for the Management Science course which is a common paper for all the engineering branches of III/ IV B.Tech students. The sample consisted of 210 students from the IV ECE branch. The results showed that the students were highly engaged in learning; interest aroused in the subject; there was drastic progress in academic performance and improved problem-solving, creativity, managerial, and innovative skills.

Keywords: Flipped Classroom· Management Science·Skills· Engineering students

Analysis and Prediction of Students' Performance using Machine Learning

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Abstract: Predicting students' performance has drawn attainable interest in education. However, quantifying students' performance is quite challenging as it depends on several factors. This study focuses on using Educational data mining techniques (EDM) to estimate students' final grades based on their social, schoolrelated, and demographic data. Although past evaluations have a major impact on student achievement, however explanatory analysis has identified that there are other important features (e.g., absences, study time, etc.) that can determine the students' performance. So, some efficient feature selection techniques such as Random Forest Importance, ANOVA, Recursive Feature Elimination, and dimensionality reduction methods such as Factor Analysis, PCA, and LDA are applied to the Portuguese and Mathematics lessons dataset. We have highlighted two modules comparison of both binary and Four-level classification; firstly, we analyze the accuracy performance of different classical classifiers using all the dataset features, and secondly comparison with the relevant selected features. As a result of this research, more effective student prediction tools can be created, benefiting both the management of school resources and the quality of education

Keywords: Classifiers·Feature Selection·Dimensionality Reduction·Binary Classification·Four-level Classification

Programming and Machine learning in the chemistry classroom

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Abstract: This talk will describe various ways to integrate programming and machine learning concepts in the Chemistry curriculum. These activities are designed for undergraduates and can be adopted without the need for prerequisite courses in Computer Science. Students develop competency in programming through the implementation of basic programming elements such as iteration, modular functions, and arrays to solve chemistry problems. In this way, they build up problem-solving skills in chemistry and acquire programming skills to advance their future career potential. The functional programming features of Wolfram language (Mathematica) are particularly well-suited for this task. Some examples of lower-level activities are: data-mining the periodic table, creating interactive quizzes for molecular structure, and generating problem sets for chemistry problems. Image recognition is a very high-profile and ubiquitous application of machine learning. This task can be easily adapted for a chemistry audience by implementing machine learning to identify chemical glassware. Here, students build up the training data for glassware by collecting pictures and engage in an end-to-end data science project experience. These experiences provide students with hands-on experiences in machine learning, data science, and programming- all within chemical contexts.

Keywords:Machine Learning·Chemistry Education·Engaged Learning

Intelligent Tutoring Systems for Multidisciplinary Education

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Abstract: Intelligent Tutoring Systems (ITS) give intelligent recommendations to learners, teachers and administrators, through intelligent agents, for a more personalized learning experience. The intelligence in ITS agents is built through technological innovations of Education 4.0, such as Artificial Intelligence and Data Analytics. Education 4.0 requires a unique digital pedagogy to ensure personalization in a virtual world. The paper addresses two research questions. First, what is digital pedagogy? Second, how can it be applied effectively, using technology, in multidisciplinary education? The research methodology used is exploratory in nature, which examines the existing digital learning solutions through literature review and addresses their limitations to suggest a digital multidisciplinary education model. A comparison is drawn between learning algorithms of conventional subjects (such as computer programming education) and non-conventional subjects (such as moral education) to design an Intelligent Tutoring System model for multidisciplinary education. Components of the model include content repository, learner profile, and learning algorithms. The digital multidisciplinary education solution suggested, requires innovative digital pedagogy, revisiting assessment and evaluation methods; and redefining learning outcomes.

Keywords:Multidisciplinary Education·Intelligent Tutoring Systems·Digital Pedagogy.

Virtual Digital Electronics Laboratory Anytime Anywhere Using a Python-Based Digital Kit

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Abstract: A course on digital electronics (UG core course for ECE, CSE, and EE disciplines) is not complete without an associated laboratory where the students can verify the functionality and performance of digital circuits. However, the equipment cost, and more significantly, the dearth of skilled manpower required for running such a laboratory have vastly compromised the effectiveness of such courses. This problem came to a sharp focus during the COVID-19 pandemic, which catalyzed the hybrid interface between teachers and learners through the use of innovative teaching methodologies. Most universities that started with online and distance education courses with an aim of community outreach to students who could not attend physical classes had to compromise on courses that required a physical laboratory for performing experiments. This paper presents an innovative and novel virtual digital kit that enables students to perform simple digital electronics experiments on their laptops using a Python-based simulation that gives the look and feel of an actual digital kit. The simulation software can be freely downloaded as a package and run on a simple computer, in parallel for any number of users. The kit has a built-in interface for testing any digital design coded in Verilog. This gives the students early exposure to hardware description language designs and RTL simulation tools. In this paper, we will present the technical details of the kit, its development, and usage, including the challenges faced and solutions, arrived at. We will also share its successful deployment and evaluation during a course taught at Shiv Nadar University.

Keywords: Multidisciplinary Education · Intelligent Tutoring Systems · Digital Pedagogy.

Integration of Social Media in Teaching Learning Process – Challenges and its Solutions

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Abstract: In the 21st century, the ubiquitous influence of social media is quite visible worldwide. The application or integration of social media to the official educational settings broadens the exposure for modernised learners as well as for the educational institutions. Social media has offered cavernous benefits to its participants that have outstretched their views towards selfgrowth and the world as well. It aids in the augmentation of person's digital relationships with shared interests to connect people from a wider range of backgrounds. Social media is also beneficial to enhance learning, evaluation, management aspects and etc. in teaching learning process. But with the benefits of using the tech-based platform in the teaching learning process, there are always clear challenges which need to be addressed. In the present study, descriptive survey method has been employed to gather the data through Google form from 140 teachers and educators in various institutes. The analysis of results recommended that the social media tools frequently limit the learners' influence and control on its assessment, supervision and particularly on the audience. Thus, it can limit the possibilities to capitalise on the capable privilege of social media and its platforms. The present paper focuses on the significance, Challenges and the solutions of incorporating social media as a digital platform in an educational context.

Keywords: Social media· Teaching-learning process· Challenges · Solutions

Constructive Learning Strategy integrated AR-Technology in enhancing Learner Motivation towards the learning of Science

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Abstract: The recent paradigm shift in technology integration has entailed varied creative and innovative means in the educational processes. The role of teachers as facilitators are given wings to move out of his/her comfort zones to find meaningful and flexible ways to improve the learning and thinking processes in learners. Augmented Reality technology (AR-technology), despite its technological advancement and prodigious positive influence on the learners, the limited empirical research poses a challenge in the scrutiny of the same in the Indian context. Ignited by this, the investigators felt the need of evaluating the application of AR-technology through the constructivist approach in the classroom situation. An experimental study using 2x3 factorial design, aiming to measure the efficacy of Constructive Learning 5E Strategy integrating AR-Technology over Conventional Strategy in enhancing the Learner's Motivation towards learning science at different achievement levels (high, average and low) was carried out on a sample of 60 students at secondary school level. A self-constructed tool by the investigators, measured the Motivation levels of the students towards the learning of science. The tool comprising of the sub-components Attention, Relevance, Confidence and Satisfaction, measured the Motivation towards learning science. Analysis of Variance was used to test the hypotheses. Evidences obtained, showed significant effect of the use of AR-technology, in motivating the students towards learning of science. The study has implications for the futuristic implementation of AR-technology as an innovative pedagogic practice for enhanced learning outcomes at successive higher levels.

Keywords :Constructive Learning· Strategy integrating ·AR-technology· Learner Motivation· Learning of Science

Enhancing Academic Achievement of Underachievers through game-based teaching

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Abstract: Underachievement is perplexing the school children over the globe. This is a predicament situation, failing to perform up to the level. In some cases, underachievers become dropouts due to their poor academic performance. Pedagogy is one of the reasons behind this poor performance. Underachievers could perform better if they were taught an appropriate pedagogy. The teaching method must include the student perspective examples. If the teacher is able to find the potential of the student, it will help to motivate and to teach better in many respects. Underachievement could be reduced with the right interventions instead of failing or scoring less in their academics. Indigenous knowledge will play a key role in equipping the teaching concept. In this context, the game-based teaching instructional method instead of conventional teaching would be helpful in improving their academic achievement. The case study method was adopted to reverse the underachievement through game-based learning. Training underachievers by using indigenous knowledge sources such as game-based learning and simulation-based learning would give better results in reducing underachievement. The concept of indigenous knowledge offers a strengths-based framework to enhance the academic performance of underachievers. This paper focused on game-based teaching to equip the same with the classroom subjects in enhancing the academic achievement of underachievers.

Keywords : Predicament·Equipping·Dropouts·Potential

360° Teaching and learning Assessment model for Tier-3 city students: An Experimental Analysis.

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Abstract : Technical education plays a key role in developing human capital for a country by creating skilled human resources, escalating industrial productivity and improving the standard of life. Tier-3 cities in India try to give best technical education to the students coming from different cities, small towns and villages. In most cases the quality of students enrolling for technical institutes in tier-1 city is much superior to from tier-3 city. If you use the same pedagogy/procedure of Teaching Learning to tier-3 as of tier-1 cities, it will not meet industry standards expectation. This leads to inadequate quality of human resources to technical industrial market. So, there is a need for 360° Teaching and Learning Assessment model for Tier-3 students. In this paper we have shared the pedagogy and assessment model implemented at our institute which belongs to tier-3 by considering all essential measures and outcomes. We also exhibited analysis report through experimental results. The paper focuses on Assessment methodologies or tools that are aligned with the learning outcomes. It also highlights the results of experiments with assessment techniques.

Keywords: Teaching learning· Pedagogy·Outcomes· Industry ready· Technical education·ICT.

Metaverse based Teaching Technology to Develop the Neuroplasticity for Autism Spectrum Disorder – A Pedagogical Framework

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Abstract: Autism-Spectrum disorder (ASDs) is a series of developmental disabilities/disorders that is caused by differences in the human brain. According to the Centers for Disease Control and Prevention, there is no such kind of medicine available that can cure autism at a glance. Children with autism lack social communication and have repetitive behaviors. They also have abnormalities in social communications. Further, its population is also increasing day by day. It is necessary to develop special innovative pedagogical teaching technologies for social communication skills using multimedia technologies for children with ASDs. Education has its own importance in developing social, learning, and communication skills of ASDs children. Besides, children with ASDs are found to be like the multimedia systems, music enabled systems, interactive multimedia systems, etc. The primary objective of this study is to design an innovative pedagogical learning framework for the Metaverse technology-enabled system, where it collects the brain activity for every session of learning via a wearable device while learning and evaluates the emotional changes throughout the process. The methodology will make use of Metaverse-based learning pedagogical environment with various factors like Auditory Motor Mapping Training (AMMT), polysensory environment, cognitive Information and social communication. It will categorize the intended participants into different groups. Each of the students from the individual group will be assessed. The wearable devices have the functionalities of both acquiring the activities of the metaverse and the brain & eye-gaze movement activities. After a period of time, it also analyses the neuroplasticity. Various factors are mapped to the system. According to the theory of brain/neuroplasticity, the thinking-learning-acting actually changes both the brain's physical-structure and functional organization. It proposes an advanced Metaversebased teaching-learning technology that has a direct impact on the development of neuroplasticity. If it increases for the ASDs then hopefully, they will be normal as well.

Keyword: Autism; Pedagogy·Educational Technology· Metaverse·Neuroplasticity

Experiential Learning using Virtual Reality in Infrastructure and Construction Engineering Education

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Abstract: Augmented and Virtual Reality technologies pushes the learner into the experiential sphere and thereby optimizing learning outcomes using simulation, 3D imagery, and advanced audio-visual effects.Virtual reality is experiential learning that simulates real-life transferring the knowledge and skills into practice. The applications of Virtual Reality (VR) are growing exponentially in almost every industry, and particularly in construction projects and industries also. VR has a lot of potential as a tool for Architecture, Engineering and Construction (AEC) Education environment to enhance the knowledge and skills in designing by exploring virtual environments from several different perspectives, enabling to investigate the creative impulses that are difficult to touch, dangerous to handle or that do not exist. Building Information Modelling (BIM) with VR technologies enables to experience the project designs before they are built, as a digital duplication of the final product. VR software / hardware is integrated with BIM system applications like Autodesk 360, Revit plugins and other tools like Enscape and Eon Icube, to provide a walk through for the proposed project work as well as visualization of data to each parameter object. The pedagogical aspects and technical concepts are integrated in the design and creation of learning environment for the graduate engineering students of Infrastructure Engineering and Management by using experiential learning. This paper brings the benefits and challenges in implementing experiential learning environment\ using Immersive technologies in upskilling the learners' abilities.

Keywords: Experiential learning·Virtual Reality·Building Information Modelling·Construction Engineering.

Promoting Learner Autonomy using Twitter as an Instructional Platform among ESL Learners

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Abstract: The profusion of communicative channels is wide open in the 21st century, making it conceivable for teachers and learners to use online communication more frequently. Thus, technologies like Twitter can be used in ESL classrooms to enhance language learning within and beyond the classrooms. The study adopted an online survey to collect data; the researcher employed a quantitative study design. A total of 120 students from the SRM University Bachelor of Technology undergraduate programme participated in this study. The SPSS Software was used to examine the data; the study indicated that using Twitter prompts students to enhance their writing abilities outside the classroom. The researcher will apply Vygotsky's theory of social constructivism to analyze how ESL students construct knowledge and use Twitter as a learning tool. Furthermore, the research also demonstrated that Twitter could be used as a teaching tool to advance linguistic ability and can be assimilated into the Bachelor of Technology curriculum pedagogy. Thus, it will broaden learner-learner and learner-teacher interactions.

Keywords: ESL Learners· Language Acquisition· Learning Tool·Online Communication· Social Constructivism, Twitter

Effect of Integration of Modules Based onTPACK Framework on Academic Achievement in Relation to ICT Skills of Student Teachers at Secondary Leve

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Abstract: In the present exploration, technology was innovatively applied into teaching by designing ad developing the modules based on TPACK framework through google sites and embedding various applications like google forms, google slides, YouTube videos, comic strips and Padlet application into it. It intended to compare the effectiveness of two instructional strategies-integration of modules based on TPACK framework and conventional method on academic achievement of 521 student teachers at secondary level through quasi experimental non-equivalent control group design. Gain scores in achievement test were considered for the investigation. The results exhibited increase in achievement mean gain scores of student teachers instructed through TPACK based modules than conventional method. Also, integration of TPACK based modules affected the academic achievement of student teachers at various levels of ICT. Increase in mean gain scores of student teachers with low ICT skills was observed as compared to student teachers with average and high ICT skills when taught by TPACK based modules. In addition, academic achievement had interaction with instructional method and ICT skills as exposure to TPACK based modules in conjunction with ICT skills helped in the increase of academic achievement of student teachers. Therefore, integration of TPACK framework into teacher preparation programs is recommended ad student teachers should be trained to design ad develop curriculum based modules by integrating TPACK framework through technological innovations.

Keywords: Pre-service teachers· student teachers· Quasi- experimental non-equivalent control group design· TPACK framework

A holistic study of technology enhanced learning platform for continuous assessment and evaluation

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Abstract: Teaching learning process has gradually changed with the advent of technology. It not only facilitates the learners in terms of the contents, but also has proved to be time-saving in the fast paced world. Our present study has been done with some important objectives; viz. to investigate how online assessment can be done effectively, to identify the differences between such assessments with that of the routine practice, to find out how its has helped in effective learning and to inspect students' response and preference to this mode. The study is mainly based on the analysis of recorded data in MyPerfectice platform, which is an online platform for students where they can take tests created by teachers. This platform provides significant insight into the preparation and performance by students. Interesting results have been found during our study and analysis. Students can check their strengths and weaknesses of any subject by accessing variety of practice tests and compare themselves at any time. The charts and graphs in this platform help us in understanding the data in a very comprehensive way. It has also been found that such assessments and evaluation are more quickly done as compared with the traditional ones.

Keywords: Technology enhanced learning·Teaching learning process· Assessment· Evaluation

Track 6

Education in Sustainable Development Goals (SDGs)

Inequality in Education between the Powerful and the Powerless : A Study of Education in Sustainable Development Goals (SDGs)

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Abstract: Under the guidance of UNESCO, one of the agendas for 2030 is sustainable development in education. The education level defines the literacy, social capacity, skill set and knowledge base of the human capital of the nation. The study primarily focuses on education because it is a highly significant aspect in the growth and development of any nation. Education needs to be revolving and adaptive, changes need to be enhanced and reconciled by the people and the planet. The impact of education has affected the rural and underdeveloped countries majorly, as Educational Sustainable Development (ESD) falls short of considering and recognizing the harsh conditions and improper environmental surroundings that children in the underdeveloped countries face. The lack of resources and infrastructural development due to shortages of funds and political reasons have hampered the education system that the children deserve to acquire. The injustice in education that has been overlooked for the sole reason that underdeveloped countries do not have the support or the resources to progress ahead and have been pulled back year after year due to the inability of having power. The study highlights the disparities in educational advancement among the major nations, with a particular emphasis on the strong and weak nations. The study also takes into account the assistance that the UN Sustainable Development Goals (SDGs) provide. The study compares powerful and weaker nations, concentrating primarily on the disparity between educational standards and the potential for education improvement. The article concludes with the corrective measures that need to be enforced for a healthy and supportive environment for education in the developing countries. The support and guidance required for such countries to progress and chase a better economic condition can be achieved by the improvement of educational facilities and various opportunities that derive from a strong education system

Keywords: Inequality in Education· Sustainable Development Goals (SDGs)· Developed and Developing Countries

Career and Academic Disparity: The Importance of Skill Based Education

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Abstract: Human Capital growth is one of the most valuable resources of each and every nation that supports its economy. Achieving effectiveness in the use of all crucial resources, particularly human capital should be put as the top priority by any nation's policymakers. In this instance, accurate coordination of human capital is crucial to have educated, skilled individuals in the best positions possible. However, following economic change and the advancement of sustainable development, skill-job mismatch in the labour market has been on rise in India. Job-Skill Mismatch in India can be categorised into two main groups. The first is a lack of knowledge or expertise gap, where a worker's skill level falls short of what is needed for the job. Second, there is expertise underutilization (overeducation or overskilling), which occurs when a person's degree of education and skill surpass those needed for the job. The main objective of this study is to provide an updated conceptual framework to analyse skill-job mismatch. This framework lists potential mismatch causes and categorizes them in broad categories. Next, we determine the impact of modifications in the level of education of the personnel. This investigation looks at whether the rise in higher education over the the last two decades have improved skill-job matching on the labour force. The purpose of this research is to holistically identify the contextual relationships between the drivers of education, employment, and skill development.

Keywords: Human Capital Growth· Policymakers· Economic Change· Sustainable Development· Job-Skill Mismatch· Overeducation· Holistic

A Systematic Literature Review on Sustainable Competitive Advantage among Collegiate Education. A Step towards Attainment of Sustainable Development Goals.

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Abstract: The development of competitiveness among colleges is vital for attaining Sustainable Development Goals. Many studies focus on service quality and SDGs, student satisfaction and SDGs, environmental protection, and Sustainable development. These studies lack a common theoretical base to justify the relationship between SDG and Competence. The present study attempts to fill the gaps by systematically reviewing the literature on the Competitiveness of colleges in the light of the attainment of Sustainable Development Goals. The competitiveness of colleges is assessed with the help of the theory of RBV, where the resources and capabilities are the factors that play a critical role in understanding the sustainable competitive advantage among colleges. The study conducts a bibliometric analysis based on the international and national context studies on SDGs, which are available from the Scopus database after applying the basic inclusion and exclusion criteria. The study provides insights on developing Sustainable Competitive Advantage among colleges from a strategic perspective which is crucial for attaining SDGs.

Keywords: SDGs· RBV· Sustainable Competitive Advantage·Resources· Capabilities

Examining the Coping Styles of Teachers and Students to gain insights into their Well-being

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Abstract: Coping in simpler terms means the mechanism of dealing with stress and other challenging contexts that tend to drain an individual physically and emotionally. In today's VUCA world which is embroiled in uncertainty, individuals are expected to face challenges and tackle them effectively. While facing challenging contexts, individuals use different coping styles namely active coping, positive reframing, using emotional support, using social support, etc. These styles are in turn classified into problem-focused, emotion-focused, social support-focused, and avoidance-focused styles. Research studies have reported that the problem-focused coping style promotes well-being, the social support-focused style fosters an inclination toward problem-focused coping, and the avoidance-focused style is detrimental to the well-being of individuals. Hence knowledge of coping styles used by individuals is essential to promote well-being. A review of the literature revealed a dearth of studies on coping styles in the Indian context and that too among teachers and students. Hence this study aims to address the gap by examining the coping styles of teachers and students, to gain insights into enhancing their well-being. Enhancing the well-being of people is one of the sustainable development goals of the United Nations and hence this study gains importance. The sample for the study included 103 faculty members and 92 students from the Government and private colleges of South India. The Brief Cope was used to assess the coping styles adopted by the respondents. It has 28 items to capture fourteen coping styles, which are then categorized into four major types of coping. The study found that the teachers are using problem-focused and emotion-focused styles whereas the students are using social support-focused and emotion-focused styles. An analysis of the coping styles across demographics revealed interesting insights. This study has important implications and recommendations to improve the well-being of teachers and students in higher education institutions.

Keywords: Coping· Students· Teachers· Well-being

Environmental Education for Sustainable Development in Engineering Education: Current and Now Hither To

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Abstract: The practice and culture of protecting the environment can only be influenced and shaped by education, which has the supremacy to turn aspiration into reality. The extent of the educational mission's implementation in accordance with the idea of environmental and sustainable development is being investigated in light of educational demands with regard to the environment and sustainable development, notably in 21st century engineering education. As a result, the entire educational process needs to be prepared for sustainable development. Such comments require discussion due to the tremendous importance of their pedagogical impact. The paper presents theoretical tools that can be utilised to conduct a critical investigation of the constructs related to environmental and sustainable development and also to analyse which perspective of the environment, education, and of sustainable development in engineering education. The inclusion of environmental education in the broader context of education for the growth of responsible societies is finally taken into consideration. The findings indicate how crucial it is for students to receive formal instruction in environmental concepts for them to comprehend the broad idea of environmental conservation, protection, and enhancement. When making judgments and taking action in all engineering endeavours, consideration of the complexity and interconnectedness of diverse environmental components will ensure that the interest of environmental sustainability is given first priority.

Keywords: Engineering education· Environmental education·Sustainable development·21st century· Learning

Impact of Emotional Intelligence on the Well-being of Teachers and Students

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Abstract: Studies from across the world have reported a high prevalence of stress across all spheres of life and the field of higher education is no exception. The United Nations has given impetus to the well-being of people by incorporating the same in its sustainable development goals. The discussion on well-being can never be complete without a mention of emotional intelligence, a key skill in managing emotions, which in turn leads to well-being. The new normal is presently witnessing the key stakeholders of higher education, namely teachers and students adjusting themselves to the transition from online to hybrid classes. Research studies have reported a high prevalence of stress among teachers and students. With this background, this study examines the association between emotional intelligence and well-being among teachers and students. The sample for the study included 100 teachers and 100 students from Government and private colleges in South India. Emotional Intelligence was measured using "DeepaKrishnaveni Emotional Intelligence Test", developed for adults in the Indian context. Well-being was assessed using the "General Well-being Scale", which measures the 6 facets of well-being. The study found a significant association between emotional intelligence and well-being. It has implications for developing the emotional intelligence competencies of both teachers and students, thereby promoting their well-being.

Keywords: Emotional Intelligence· Well-being· mental health· UNSDG

State of the Art of Environmental Socioscientific issues enhancing Scientific Literacy : A systematic literature review approach

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Abstract:
Scientific literacy, comprising environmental literacy as one of its components, is considered as one of the primary goals of science education. Studies across the globe have shown that socioscientific issue based contexts in science classrooms are beneficial for increasing the levels of scientific literacy. Environmental socioscientific issues (ESSI) have been used to raise the awareness and literacy amongst students about the environment. Climate action, which is one of the most important Sustainable Development Goals, heavily depends on how much the next generation is aware and capable of taking actions to counter climate change. The aim of this study is to comprehend the state of the art of ESSI. The study being qualitative in nature has used systematic literature review (SLR) to answer the research questions. The SLR comprised 61 studies. The research questions focused on: type of methodology used; types of participants; skills developed through SSI; types of topics taught as SSI; geographical spread. Thus, it has been found that qualitative methods are used; students as participants in more than half of the studies; argumentation and decision-making the most targeted skills. However, it is also found that climate change followed by nuclear power are the most reported socioscientific issues. Further, the United States of America and Turkey being the two leading countries where most of the research in this field has taken place, while south asian countries seem to be lagging behind. Implication for teaching learning, teacher preparation and curriculum mentioned in these studies can be looked into in further studies.

Keywords: Environment Education· Scientific literacy·Socioscientific issues· Environmental Issues

Revisiting Vocational Education and Training in India

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Abstract: "Education is one thing no one can take away from you" – Elin Nordegren
Education is a pathway to achieve self-realization, and self-empowerment by developing intellect and acquiring the necessary skills. Education also makes individuals adaptable to the ever-changing environment and increases environmental awareness. Vocational education and training prepare learners for the job and make them more effective by giving an opportunity to participate and learn from firsthand experiences. National Education Policy (2019) suggested including vocational education into mainstream education by revamping all the aspects of vocational education and training. The model of vocational education in India operates in two levels, namely vocational education (theoretical) and training (practical). Despite the importance of vocational education and training, there are many challenges associated with it. The present study will inspect some of the crucial challenges of vocational education and training. The present study will also try to find the future improvement and development of vocational education and training. The study will throw some light on the cope and challenges of the National Skill Development Policy (NSDP). Last but not the least the study will suggest some strategies to enhance employability skills in order to increase competitive advantage in the long run. This study is based on the secondary data. The research method of this study was to review published articles on vocational education and training. The study reveals some key challenges of vocational education and training especially in India. Some of the vital challenges are lack of proper institutions, lack of proper attitude among people, scarcity of good teachers etc. In order to deal with the challenges setting up more institutions to impact vocational training and education is required. In addition to this the vocational education should not be separated from mainstream education rather it needs to be included mandatorily in mainstream education in order to increase competitive advantage. Skill development via vocational education and training is the most important aspect in the development of a country, hence, it needs coordinated efforts by the government and other stakeholders.

Keywords: Vocational education and training· NEP 2019· self-realization· skills

Conference Schedule

ICON-BITS 2023
2nd International Conference on Best Innovative Teaching Strategies
9-11 February, 2023

ICON-BITS 2023 Program Schedule

DAY 1 – Feb 9, 2023

Time Slot (IST)	Program
8:00 am – 8:45 am (Venue: NAB Audi)	Breakfast and On-spot Registration
9:00 am – 10:30 am (Venue: NAB Audi)	Inaugural Session Session Host: Dr. Meetha. V. Shenoy Link for YouTube Streaming: https://icms.bits-pilani.ac.in/liveevents/iconbits2023.aspx

	Event	Speaker	Time
1	Welcome Address	Prof. Shibani Khanra Jha, Faculty-In-Charge, TLC	9:00 - 9:15 am
2	Director's/ Conference Chair's Address	Prof. Sudhirkumar Barai Director, BITS Pilani - Pilani Campus, Conference Chair	9:15 – 9:30 am
3	Vice Chancellor's Address	Prof. Souvik Bhattacharyya Vice Chancellor, BITS Pilani	9:30 - 9:45 am
4	Address by the Chief Guest	Prof. Thakur S Powdyel Former Minister of Education, Royal Government of Bhutan	9:45-10:15 am
5	Vote of Thanks	Dr. Tamali Bhattacharyya Conference Convener	10:15 -10:30 am

10:30 am– 11:00 am (Venue: NAB)	Tea Break and Photograph Session
11:00 am- 11:45 am (Venue: NAB Audi)	Keynote Talk 1: Transforming Institutional Practices through Pedagogical Innovations in STEM Education Speaker: Prof. Padmanabhan Seshaiyer Mathematical Sciences, George Mason University, Virginia, US. Session Chair: Prof. Kausar Vaidya

Sponsoring Partners

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11:45.am –12:30 pm (Venue: NAB Audi)	**Keynote Talk 2: Higher Education in the Era of Digitalization: Transformation in Pedagogical Approach** **Speaker: Dr.-Ing. Carsten S. Schröder** **CEO and Co-Founder of DADB** **German Academy for Digital Education, Berlin, Germany** **Session Chair: Prof. Tapomoy Guha Sarkar**			
12:30 pm – 1:00 pm (Venue: NAB Audi)	**Industry Talk 1: The Evolution of skills - Bridging Education to employment gap in India** **Speaker: Anchal Chopra** **Regional head– Academic & Govt. vertical at LinkedIn** **Host: Dr. Meetha Shenoy**			
1:00 pm - 2:00 pm (Venue: Institute cafeteria)	**Lunch**			
2:00 pm- 4.00 pm (Venue: NAB 6101)	**Parallel Session 1A** **Track1: Cultural and Gender Studies in Higher Education** **Session Chair: Prof. Hari Nair** **Track coordinator: Dr. Madhurima Das** **Dr. Sainath Bitragunta**	**S. No**	**Name**	**Affiliation**	**Title of the Paper**
		1	Atish Das and Dr. Manhar Charan	IIT (BHU) VARANASI	Language, Culture and Accessibility in Higher Education: The Semiotic Pedagogy of Gandhian Education Against Disciplinary Dualism
		2	Nikhil Ruban	BITS Pilani	Division across boundaries: The downside of Cultural migration in the form of Caste
		3	Padmapriya P	SRM INSTITUTE OF SCIENCE AND TECHNOLOGY	Understanding Diversity and the Need for Inclusivity in Indian Higher Educational Universities: A Study
		4	Abirami Kanagarajan,	SASTRA DEEMED UNIVERSITY	Strategies to improve Linguistic, Cultural and Social Capital Triumvirate in Tertiary Students :

	Link for online: https://meet.google.com/wdc-mynk-qqp		Jayasree R and P Suganthi Suganthi		A Case Study among Undergraduate Teacher Trainees in South India
		5	Deepika Singh	Tata Institute of Social Sciences	Towards Structured Social Inclusion in Early Childhood Care and Education: A Case Study
		6	Devika Sangwan, Kumar Sankar Bhattacharya and Punita Raj	BITS Pilani	The Neoliberalisation of Education: An Approach to Prepare the Global Workforce
		7	Akshata Samant	GVM's Dr. Dada Vaidya College of Education, Farmagudi, Ponda, Goa	Confronting your Own Biases- Addressing Gender Equity in Teacher Education
		8	Supriya Lakhangaonkar and Pallavi Shintre	Vishwakarma University, Pune, Maharashtra,	Dealing with Cultural Diversity while Teaching Diverse Learners: A Systematic Literature Review

		S. No	Name	Affiliation	Title of the Paper
2:00 pm- 4.00 pm Venue: NAB 6102)	**Parallel Session 1B (6 presentations)** **Track2: STEM Education** **Session Chair: Prof. E.S. Kannan** **Track coordinator: Prof. Rita Sharma Prof. Paritosh Shukla** **Link for online:**	1	Nivid Desai, Leslee Lazar and Jooyoung Kim	Indian Institute of Technology, Gandhinagar	From Learning to Write to Writing to Learn: Incorporating Writing Across the Curriculum in Indian Engineering Pedagogy
		2	Calvin Sophistus King and V Kovaichelvan	Dr. Mahalingam College of Engineering and Technology	Developing Industry Ready Engineering Graduates in Collaboration with Industry and other Stakeholders
		3	Monal Desai, Kaninik Baradi,	Indian Institute of Technology Gandhinagar	Writing Mathematics in the Sciences: A case study for discipline-specific writing in Science and Engineering

	https://meet.google.com/wtz-anrz-kxv		Jooyoung Kim and Leslee Lazar		
		4	Shalini Shalini and Deepti Dimri	VIVEK COLLEGE OF EDUCATION BIJNOR UP	Research and Swings in stem Education: A Systematic Review.
		5	Debranjan Das, Sanjeevagani Ramanjaneyulu and A.S. Jalandharachari	University of Hyderabad	Redesigning the Content in line with STEAM Education and Achievement in Mathematics: Creative Pedagogical Approach at school level
		6	Gopala Krishna Koneru	BITS - Pilani, WILP Division	A Self-Ethnographic Study of Cognitive Impairments in Learning-Teaching – Recommendations for Effective Instruction Delivery in STEM Education
		7	Subehndu Datta Bhowmik	Cognizant	STEM education for students with low income families
		8	Sarala Upadhya and Hemalatha Reddy	Heartfulness Institute	"Think-Feel-Do "-A new model for sustained learning and growth in Science Technology Engineering and Mathematics (STEM) Education
2:00 pm- 4.00 pm Venue: NAB 6103)	**Parallel Sessions 1C** **Track3: Environmental Education for Sustainable Social Engineering**				
		S.No	**Name**	**Affiliation**	**Title of the Paper**
		1	Kirti Singh and Pushp Lata	BITS Pilani	Exploring LGBTQI+ Spaces in Indian Higher Education for Sustainable Development: Students' Perspectives

Session Chair:
Prof. Surekha Bhanot

Track coordinator:
Prof. Sailaja Nandigama
Prof. Kumar Sankar Bhattacharya

Link for online:
https://meet.google.com/qkk-xbkk-fmn

2	Shyamli Singh	Indian Institute of Public Administration (IIPA)	Climate School: A Capacity Building Strategy
3	Baiju P. Anthony and Anup am Yadav	BITS Pilani	Significance of Feminist Advocacy Practices for SDG 4
4	Akash Samadhiya and Dipendu Bhunia	BITS Pilani	Geo-polymerization: A novel technique for the development of new class cementitious materials
5	Nikita Dhankar, Satyendra Sharma, Srikanta Routroy and Krishna M.	BITS Pilani, Pilani campus,	IT enabled Application related to Agri-Supply Chain: A farmer learning perspectives
6	Seema Sinha, Kumar Sankar Bhattacharya and Sailaja Nandigama	BITS Pilani, Pilani campus,	Displacement, Migration and Resettlement: Reading the Mahabharata as a Palimpsest of the DIDR Model
7	Sandeep Arora and Shweta Saxena	School of Planning and Architecture Bhopal India	Evaluating the Building Bye-Laws for Solar Access: A case of Madhya Pradesh, India

2:00 pm- 4:00 pm
Venue: NAB 6104)

Parallel Sessions 1D

Track4: Technology, Society and Industry in Higher Education

Session Chair: Dr.-Ing. Carsten S. Schröder

Track coordinator: Sainath Bitrungta

Link for online: https://meet.google.com/wcm-xpny-mgm

S. No	Name	Affiliation	Title of the Paper
1	Aeishwary Mishra	BITS-WILP/Oracle	Art and Science of Storytelling with Data
2	Sai Madhuri Mullapati	Deloitte Consulting Ltd	Impact of Globalization on Technology & Higher Education
3	Dr. Gaurav Nagpal, Dr. Naga Vamsi Krishna Jasti and Dr. Ankita Nagpal	BITS Pilani	Enhancing the Student Engagement in Executive Education Programs: An empirical study from teaching of Supply Chain Management
4	Nirankush Dutta and Anil Bhat	BITS Pilani	Effect of Facilitating Conditions on the Use of Social Networks as Pedagogical Tool in Higher Education
5	Kavita Ingale, Shreya Shedge, Harshawardhan Rishi and Sanika Atre	MIT WPU School of Economics	Study of students' satisfaction in online education system- PLS SEM approach
6	Deeksha Pareek, Tanu Shukla and Virendra Singh Nirban	BITS Pilani	Exploring Tech-Spatiality and its Practices in Education
7	Daisy Gohain	Lady Doak College	Innovative Practices in Vocabulary Acquisition for L2 Learners with the aid of Computer-Assisted Language Learning and TBLT– An analysis

		8	Pradipta, Gaurav Kumar and Prabhansu	BITS Pilani	Kickstart LIFE through Technology

		S. No	Name	Affiliation	Title of the Paper
2:00 pm- 4:00 pm Venue: NAB 6105)	**Parallel Session 1E (7 presentations)** **Track5: Innovative Pedagogical Practices for Technology Enhanced learning** **Session Chair: Dr. Rwitajit Majumdar** **Track coordinator: Dr. Meetha Shenoy Dr. Ashutosh Bhatia** **Link for online: https://meet.google.com/yus-buqg-hny**	1	N. Pargavi N, Dr. K. Abirami Kanagarajan and P Suganthi Suganthi	SASTRA Deemed University, Tamilnadu, India	Inclusive Education: An Application of ICT to overcome the Functional Limitations of Visually Impaired Students
		2	Dr Usha Ajithkumar and Dr Priyadarshini Muthukrishnan	SASTRA UNIVERSITY	A Relationship Study on Teacher Trainees' Perceived Use of Gamification of Learning and Gamification User Types
		3	Sugandha Bhatnagar and Pushp Lata	BITS PILANI	Use of Digital Randomizer for Assessment of Team-based Story Telling: An Empirical Study
		4	Simran Ballani	CCE Finland	Impact of Student Teacher Time on Student Engagement
		5	Dr K Abirami Kanagarajan Kanagarajan, Ms Emily Jenifer A and S. Subha Prasath	SASTRA DEEMED UNIVERSITY, SASTRA DEEMED UNIVERSITY, M. Kumaraswamy College of Engineering	An Interdisciplinary approach to analyse the awareness of ICT in Pedagogy among Teacher Trainees with reference to Thanjavur District, South India
		6	Joby Varghese and Flosy C R Dsouza	St. Ann's College of Education (Autonomous), Mangalore	Constructive Learning Strategy integrating AR-Technology in enhancing Learner Motivation towards the learning of Science

		7	Minu Maria Joseph	Global Indian Public School	Application of "AR/VR+" Education Based on Artificial Intelligence for Specially Abled
		8	Nalini Palaniswamy, Sakthirama V and Pavithra M	PSG Institute of Management	Spiraling of knowledge creation using the “Ba” Model in International Business courses among Post Graduate MBA students
2:00 pm- 4:00 pm Venue: NAB 6106)	**Parallel Session 1F (7 presentations)** **Track 6: Education in Sustainable Development Goals (SDGs)** **Session Chair: Prof. NVM Rao** **Track coordinator: Dr. G. Muthukumar Dr. Balakrushna Padhi** **Link for online: https://meet.google.com/vdt-czxq-cdb**	**S. No**	**Name**	**Affiliation**	**Title of the Paper**
		1	Vishal Kumar, Sanjiv Kumar Choudhary and Rajni Singh	BITS PILANI, BITS PILANI, B.K Birla Institute of Higher education, Pilani	State of the Art of Environmental Socio-scientific issues enhancing Scientific Literacy: a systematic literature review approach
		2	Devika Sangwan, Kuldip Singh Sangwan and Punita Raj	BITS Pilani	Environmental education for sustainable development in engineering education: current and now hither to
		3	Namit Shrivastava, Jainil Shah and Chaitanya Iyer	BITS Pilani BITS Pilani BITS Pilani	Career and Academic Disparity: The Importance of Skill-based Education
		4	Vidhya Vinayachandran	Amrita Vishwa Vidyapeetham	A Systematic Literature Review on Sustainable Competitive Advantage among Collegiate Education. A Step towards Attainment of Sustainable Development Goals.
		5	Deepa R, Shirlyn Deborah D and Sathya R	PSG Institute of Management, PSG College of Technology	Examining the Coping Styles of Teachers and Students to gain insights into their Well-being

		6	Deepa R, Shinypriya A J and Shruthi V J	PSG Institute of Management, PSG College of Technology	Impact of Emotional Intelligence on the well-being of Teachers and Students
		7	Dr. Rita Karmakar, Dr. Sukanta Naskar and Brahmi Chhalani	Amity University Kolkata NITTTR Kolkata Amity University Kolkata	Revisiting Vocational Education and Training in India
		8	Lulua Mukadam and Supriya Lakhangaonkar	Vishwakarma University, Pune, Maharashtra	Inequality in Education between the Powerful and the Powerless: A Study of Education in Sustainable Development Goals (SDGs)
4:00 pm – 4:15 pm (Venue: NAB Audi)	**Tea Break**				
4:30 pm – 5:00 pm (Venue: NAB Audi)	**Industry Talk 2: Best Practices in Book Publishing (Springer)** **Speaker: Satvinder Kaur** **Springer Senior Publishing Editor, South Asia and West Asia region** **Host: Dr. Meetha Shenoy**				
5:15 pm-6:15 pm (Venue: NAB Audi)	**Workshop 1: Swa-Adhyan** **Participants are requested to bring laptop for hands-on-session** **Resource Persons: Dr. Tamali Bhattacharya, Dr. Shibani Khanra Jha, Dr. Ashutosh Bhatia** **Teaching Learning Centre, BITS Pilani**				
7:30 pm onwards (Venue: VFAST Lawn)	**Dinner**				
END of DAY 1					

ICON BITS Best Innovative Teaching Strategies

ICON-BITS 2023
2nd International Conference on Best Innovative Teaching Strategies
9-11 February, 2023

G20 भारत 2023 INDIA | 75 आज़ादी का अमृत महोत्सव

DAY 2 – Feb 10, 2023	
Time Slot (IST)	**Program**
8:00 am– 8:30 am (Venue: NAB Audi)	**Breakfast**
8:30 am- 9:15 am (Venue: NAB Audi) Online Link: https://meet.google.com/gyp-mteu-ngw	**Keynote Talk 3: Same Principles New Contexts: Counter Space as Emancipating Pedagogy** **Speaker: Prof. Hargrave** **Professor of Educational Technology and Critical Multicultural** **Iowa State University (ISU) College of Engineering, Ames, IA 50011, United States** **Session Chair: Prof. Padmanabhan Seshaiyer**
9.30 am- 10:15 am (Venue: NAB Audi)	**Keynote Talk 4: Higher Education for Sustainable Development and Sustainable Development of Higher Education** **Speaker: Prof. Jandhyala B G Tilak** **ICSSR National Fellow & Distinguished Professor, Council for Social Development, New Delhi** **Session Chair: Prof. Thakur S Powdyel**
10:15 am-10:30 am (Venue: NAB Audi)	**Tea Break**
10:30 pm-11:00 pm (Venue: NAB Audi)	**Industry Talk 3: Industry 4.0 and Ethical AI practices in Technology Pedagogy for Healthcare – Best Practices** **Speaker: Dr. Karthik Ramesh** **VP-International Markets| CP Providers & Lifesciences** **Host: Prof. Kumar Sankar Bhattacharya**
11:00 am- 12:00 noon (Venue: NAB Audi)	**Keynote Talk 5: Supporting Reflective Teaching Strategies in an Analytics-driven Learning Ecosystem** **Dr. Rwitajit Majumdar** **Program-specific Senior Lecturer, Kyoto University, Japan.** **Session Chair: Dr. E. S. Kannan**

12:00 pm- 1:00 pm (Venue: NAB Audi)

Workshop 2: Building the Next Generation Data Science Workforce for Sustainable Development

Resource Person: Prof. Padmanabhan Seshaiyer
Mathematical Sciences, George Mason University, Virginia, US.

Host: Prof. Shibani Khanra Jha

1:00 pm- 2:00 pm (venue: Institute cafeteria)

Lunch

2:00 pm – 4:00 pm (Venue: NAB Audi)

Parallel Session 2A (5 presentations)

Track2: STEM Education

Session Chair: Prof. Rahul Nigam

Track coordinator: Prof. Rita Sharma
Prof. Paritosh Shukla

Link for online: https://meet.google.com/xjz-xuakhco

S. No	Name	Affiliation	Title of the Paper
1	Sainath Bitragunta and Mahesh B	BITS Pilani, Pilani campus, Visvodaya Technical Academy	Role of STEM-Academic Disciplines and ICAQT for Progressing in Sustainable Development Goals: Qualitative Perspectives and Quantitative Insights
2	Navaneeth Chand S, Shruti Mehta, Rucha Joshi, Chaitanya Ayyappan, Mayanglambam Pooja Devi, Prashanth Kumar, Shashikant Pawar	Plaksha University	A new Reflective Thinking framework to improve Project-Based Learning of undergraduate engineering students
3	Sailaja Devaguptapu, Rohit Jain and Neetu Purohit	IIHMR University	Health Humanities: An Integrative Approach for Holistic Education and Wellbeing

4	Pankaj Bharti and Sushila Shekhawat	BITS Pilani, Pilani campus,	Using Science-Fiction Prototyping to Improve Cognitive and Problem-solving Skills in Indian Students
5	Priti Bajpai and Mukta Mithra Raj	BITS Pilani, Dubai campus,	Academic Outcomes of Female Students in STEM Education in the United Arab Emirates
6	Susithra N, Deepa M, Reba P and Santhanamari G	PSG Institute of Technology and Applied Research	Demystifying Effective Strategies for Delivering Professional Ethics in Engineering Education - A Metacognitive Approach
7	Kerin Hilker-Balkissoon, Rudra Nagalia and Padmanabhan Seshaiyer	George Mason University	Leveraging the First Year Learning Community to Enhance STEM-Sector Career Readiness and Student Success
8	Norezan Ibrahim, Nor Syazwani Rasid, Mawarni Mohamed, Padmanabhan Seshaiyer, Siti Fairuz Dalim, Muhamad Furkan Mat Salleh, Mohamad Hisyam Ismail	Universiti Teknologi Mara, Selangor Universiti Teknologi Mara, Selangor Universiti Teknologi Mara, Selangor George Mason University, Fairfax, VA Universiti Teknologi Mara, Selangor Universiti Teknologi Mara, Selangor	PREPARING FUTURE EDUCATORS THROUGH MULTIDISCIPLINARY COLLABORATION IN STEM EDUCATION: AN ANALYSIS FROM STUDENTS OF DIFFERENT MAJOR IN A PUBLIC UNIVERSITY IN MALAYSIA.

			and Mohammad Mubarrak Mohd Yusof	Universiti Teknologi Mara, Selangor	
		9	Habiba Hussain	National Institute of Technical Teachers' Training and Research, Kolkata	The shift to outcome-based assessment – teachers' perception

		S. No	Name	Affiliation	Title of the Paper
2:00 pm – 4:00 pm (Venue: NAB 6106)	**Parallel Session 2B (6 presentations)** **Track4: Technology, Society and Industry in Higher Education** **Session Chair: Prof. Rajesh Mehrotra** **Track coordinator: Dr. Sainath Bitrungta** **Link for online: https://meet.google.com/dpo-ichbubq**	1	Shivkumar S and Renukadevi S	National Institute of Technical Teacher Training and Research	TECHNOLOGY BASED EDUCATION - PERCEPTION OF TEACHERS AND STUDENTS IN HIGHER EDUCATION.
		2	Elish Tatpati, Dr. Himadri Bhushan Das, Dr. Calvin King and Shivaprasad M N	TVS Motor Company Limited TVS Motor Company Limited Dr. Mahalingam College of Engineering and Technology, TVS Motor Company Limited	FUTURE READINESS THROUGH CAPSTONE PROJECT
		3	Vijayakumar Thota and Dr Manoj Babu Palla	Amity University	Impact of Technology, Society and Industry on Higher Education in India
		4	Pradeep Gusain and Dr. Mira Mishra	G.D GOENKA UNIVERSITY, SOHNA ROAD, GURGAON	"An Exploratory Study For Identification of Component in Holistic Report Card for Trainee Primary Teacher"
		5	Shweta Saxena and Sandeep Arora	School of Planning and Architecture Bhopal India	Inculcating Collaborative Skills in Architecture Stu-dents through a Design-build Studio

		6	Sharon Jeevarajathy E and Hema N	SRM Institute of Science and Technology, Kattankulathur	Revamping Learning Environment with ICT Tools in Higher Education.
		7	Ruchika Bhoot and S.Ibotombi Singh	Tezpur University	Analysis and Prediction of Students' Performance using Machine Learning
		8	Purva Bhatt and Manju Singh	Malaviya National Institute of Technology Jaipur Malaviya National Institute of Technology Jaipur	Democratization of Technological Knowledge: Connecting Campus with Community
2:00 pm – 4:00 pm (Venue: NAB 6109)	**Parallel Session 2C (6 presentations)** **Track5: Innovative Pedagogical Practices for Technology Enhanced learning** **Session Chair: Prof. Virendra Singh Shekhawat** **Track coordinator: Dr. Meetha Shenoy Dr. Ashutosh Bhatia**	**S. No**	**Name**	**Affiliation**	**Title of the Paper**
		1	Varad Yardi and Maya Kurulekar	Vishwakarma University	Pedagogical Implication of Environmental Studies – a Case Study
		2	Gaurav Misra, Ravindra Singh Rawat, Sharmila Katre and Rs Aswani	UPES UPES Pearl Academy UPES	Gamification in the Digital Classroom for Student Engagement and Learning: An Empirical Study of Higher Education Learners
		3	ArunkumarSharma and Shraeddha Tiwari	California State University ICT Mumbai	Programming and Machine learning in the chemistry classroom
		4	Ashish Katyal, Pankaj Sharma	BITS-Pilani, Pilani Campus, Jhunjhunu, Rajasthan	Team Based Learning (TBL): Exploring an Active Learning Strategy for Two Undergraduate Courses in Biology

	Link for online: https://meet.google.com/kse-hqxq-urb		and Manoj Kannan	BITS-Pilani, Pilani Campus, Jhunjhunu, Rajasthan Plaksha University, SAS Nagar, Punjab	
		5	Suja Jayachandran and Bharti Joshi	Ramrao Adik Institute of Technology	Analyzing student engagement to enhance online teaching learning environment
		6	Irum Alvi	Rajasthan Technical University, Kota	Effect of Personal Innovativeness and Self-Image on Learners' Acceptance of Technology-Enhanced Language Learning in India
		7	Pradeepa Kumar and Hema Natrajan	SRMIST, KTR	Promoting Learner Autonomy using Twitter as an Instructional Platform among ESL Learners
4:00 pm–4:15 pm (Venue: NAB Audi)	**Tea Break**				
4:15 pm–5:00 pm (Venue: NAB Audi) **Online Link:** **https://meet.google.com/oii-cosr-odk**	**Keynote Talk 6: To Teach is Human** **Prof Roger West** **Trinity College University, Dublin, Ireland.** **Session Chair: Prof. Shamsher Bahadur Singh**				
7:00 pm onwards (Venue: VFAST Lawn)	**Cultural Program, Gala Dinner**				
END OF DAY 2					

DAY 3 – Feb 11 2023

Time Slot (IST)	Program
8:00 am – 8:45 am (Venue: NAB Audi)	**Breakfast**
9:00 am-9:45 am (Venue: NAB Audi) Online Link: https://meet.google.com/anf-ufpn-ufo	**Keynote Talk 7: Interdisciplinary Education in a Digital World** **Prof. Adrian Lee** **Associate Professor, Department of Chemistry, National University of Singapore, Singapore** **Session Chair: Prof. Rahul Nigam**
9:45 am- 10:45 am (Venue: NAB Audi)	**Workshop 3: STEAM Pedagogy in the Classroom** **Resource Person: Prof. Rishikesh Vaidya** **Teaching Learning Centre, BITS Pilani** **Host: Dr. Krishna Etika**
10:45 am-11:00 am (Venue: NAB Audi)	**Tea Break**
11:00 am-12:00 pm (Venue: NAB Audi)	**Parallel Session 3A** **(4 presentations)** **Track5: Innovative Pedagogical Practices for Technology Enhanced learning**

S. No	Name	Affiliation	Title of the Paper
1	Malliga P, Janardhanan G and Dineshkumar K S A	National Institute of Technical Teachers and Research (NITTTR), Chennai	Experiential Learning using Virtual Reality in Infrastructure and Construction Engineering Education

	Session Chair: Prof. P. Srinivasan **Track coordinator: Dr. Sainath Bitrungta** **Link for online: https://meet.google.com/qkq-ogaw-yza**	2	Sakshi Chopra and Amit Kauts	Guru Nanak Dev University	Effect of Integration of Modules Based onTPACK Framework on Academic Achievement in Relation to ICT Skills of Student Teachers at Secondary Level
		3	Noor-A-Nabi Khan and Habiba Hussain	Camellia Institute of Engineering and Technology, West Bengal National Institute of Technical Teachers' Training and Research, Kolkata	Metaverse based Teaching Technology to Develop the Neuroplasticity for Autism Spectrum Disorder – A Pedagogical Framework
		4	Akbari Jahan and Habiba Hussain	North Eastern Regional Institute of Science and Technology National Institute of Technical Teachers' Training and Research Kolkata	A holistic study of technology enhanced learning platform for continuous assessment and evaluation
		5	Tamali Bhattacharyya, Pratyush Banerjee and Bani Bhattacharya	BITS Pilani	An outcome-based online educational framework (e-Shikhshan) for quality accreditation

		S. No	**Name**	**Affiliation**	**Title of the Paper**
11:00 am-12:00 pm (Venue: NAB 6106)	**Parallel Session 3B (6 presentations)** **Track5: Innovative Pedagogical Practices**	1	Shweta Bhatnagar and Rashmi Agrawal	Manav Rachna International Institute of Research Studies	Intelligent Tutoring Systems for Multidisciplinary Education

	for Technology Enhanced learning **Session Chair: Prof. Chandra Shekhar** **Track coordinator: Dr. Meetha Shenoy Dr. Ashutosh Bhatia** **Link for online: https://meet.google.com/baw-qvoe-fvp**	2	Shreyanth S, Harshitha D S, Priyanka Agarwal, Kathiroli V and Niveditha S	BITS, Pilani, Indium Software (India) Private Limited, Bengaluru, BITS, Pilani BITS, Pilani Rajalakshmi Engineering College, Chennai	Design and Development of Smart Wearable Technology Enhanced Learning for Specially Abled Students
		3	Bandla Prathyusha	VNR Vignana Jyothi Institute of Engineering and Technology	Flipped Classroom – An Effective Instructional Approach for teaching Management Science the Engineering Students
		4	Shibani Khanra Jha and Ankit Kumar	BITS Pilani	Education Policy and Assessment Reformation: A Review and Survey Based Analytical Study

		S. No	Name	Affiliation	Title of the Paper
11:00 am-12:00 pm (Venue: NAB 6109)	**Parallel Session 3C (6 presentations)** **Track5: Innovative Pedagogical Practices for Technology Enhanced learning** **Session Chair: Prof. Navneet Gupta** **Track coordinator: Dr. Meetha Shenoy Dr. Ashutosh Bhatia** **Link for online:**	1	Anish Vipperla, Ranendra Biswas and Prateek Sikka	Arizona State University Retired Professor, IIT Kanpur and former Director, CEERI-CSIR, STMicroelectronics	Virtual Digital Electronics laboratory anytime anywhere using a Python-based Digital Kit
		2	Astha Arora and Dr. Sunil Dutt	PANJAB UNIVERSITY, CHANDIGARH, National Institute of Technical Teachers Training & Research, Chandigarh	Integration of Social Media in Teaching Learning Process – Challenges and its Solutions
		3	Appaji Korikana	University of Hyderabad	ENHANCING ACADEMIC ACHIEVEMENT OF UNDERACHIEVERS THROUGH GAME-BASED TEACHING

	https://meet.google.com/koi-bwdscqs	4	Khalid Alfatmi and Vijaylaxmi Bittal	Shri Vile Pare Kelavani Mandal's Institute of Technology	360° Teaching-learning and Assessment model for Tier-3 city students: An Experimental Analysis.
12:00 am-12:30 pm (Venue: NAB Audi)	**Industry Talk 4: Industry-oriented upskilling of future talents** **Speaker: M.F. Febin, Business Head- CollegeConnect, L&T EduTech (Larsen & Toubro)** **Host: Prof. Shibani Khanra Jha**				
1:00 pm-2:00 pm (Venue: Institute Cafeteria)	**Lunch Break**				
2:00 pm-3:00 pm (Venue: NAB Audi)	**Workshop 4 - Title: D-Tip: Design-Thinking, Innovation & Pedagogy** **Resource Person: Prof. Mainak Ghosh** **Professor & Head, Department of Architecture, Jadavpur University, Kolkata** **Host: Dr. Tamali Bhattacharyya**				
3:00 pm - 4:00 pm (Venue: NAB Audi)	**Valedictory Session** **Session Host: Tapomoy**	**Sr. No**	**Event**	**Speaker**	**Time**
		1	Director's Address	Prof. Sudhirkumar Barai Director, BITS Pilani–Pilani Campus	3:00 – 3:10 pm.
		2	Address by Chief Guest	Prof. L. K. Maheshwari Ex-Vice Chancellor BITS Pilani	3:10 – 3:20 pm
		3	Best Paper Award	Conference Chair/Conveners	3:20 – 3:30 pm
		4	Convener's Address and Vote of Thanks	Prof. Shibani Khanra Jha	3:30 – 3:45 pm
		5	Interaction with the Participants	Organizing Team	3:45 – 4:00 pm
4:00 pm (Venue: NAB Audi)	**High Tea and Interaction**				

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