



Funded by the
European Union

Volume 02
2025

CATCH VR

Capacity building in Teaching of Virtual Reality

AUGMENTED
REALITY (AR) AND
VIRTUAL REALITY
(VR) USING
DIGITAL TWINING



CATCH_VR

DEVELOPING
CURRICULUM FOR
DIGITAL TWIN
GRADUATE DEGREE
PROGRAM FOR
PAKISTANI PARTNER
UNIVERSITIES.

www.catchvr-cbhe.eu



EU Funded ERASMUS+ Capacity Building in Higher Education Project, Capacity building in TeaCHing of AR/VR (CATCH_VR).



Funded by the
European Union





Catch_VR

Highlights from Strategic Engagements: A Recap of Meetings at GIKI, University of Okara, TUS, and MUET

CATCH_VR Project meetings and trainings were held with leadership and faculty at GIKI, the University of Oradea, the Technological University of Sofia, and MUET in Setting up of

- Collaboration platform
- Established governance framework for project implementation
- Defined roles for each partner institution in curriculum and lab development
- Initiated cross-institutional research partnerships in AR/VR and Digital Twins
- Discussion on implementation of adequate monitoring and control mechanisms at all levels of the project management.
- Development of Project Calendar having complete list of Tasks given in the work packages with start and end date, their assignment, along with status for quick follow.



MUET Hosts Workshop on AR/VR and Digital Twins Under the EU-Funded CATCH-VR Project

The Erasmus+ EU-funded CATCH-VR Project, in collaboration with the Department of Electronic Engineering at Mehran University of Engineering & Technology (MUET), successfully conducted an intensive workshop on Augmented Reality (AR), Virtual Reality (VR), and Digital Twins. The event aimed to build capacity and raise awareness about cutting-edge immersive technologies and their applications in education, research, and industry.

The workshop was graced by the esteemed presence of Prof. Dr. Aneel Kumar, Pro Vice Chancellor MUET, who commended the efforts of the organizing team and emphasized the strategic importance of such initiatives in transforming higher education and research. Special appreciation was extended to Prof. Dr. Bhawani Shankar Chowdhry for his visionary leadership and pivotal role in spearheading the CATCH-VR project. Dr. Shoaib Rehman Soomro was also acknowledged for his valuable technical contributions, especially in delivering the hands-on training sessions central to the workshop's success.

Prof. Dr. Bhawani Shankar Chowdhry provided a comprehensive overview of the Erasmus+ Capacity Building in Higher Education (CBHE) project CATCH-VR, highlighting its objectives, international collaborations, and its potential to revolutionize digital learning ecosystems. Prof. Dr. Wajeeha Shah, Chairperson of the Department of Electronic Engineering, underscored the importance of practical exposure in emerging technologies and applauded the department's role in delivering high-impact, hands-on training for faculty and students alike.

The workshop featured immersive sessions led by Dr. Shoaib Rehman Soomro, who provided participants with real-time demonstrations and training on AR/VR tools and applications. Participants gained practical skills in building and interacting with virtual environments, positioning them to better integrate these technologies into education, research, and industrial settings.

Training in AR/VR is rapidly becoming essential in today's digital era, offering transformative potential in sectors ranging from engineering and healthcare to urban planning and education. By equipping students and faculty with hands-on experience in immersive technologies, MUET enables future-ready professionals and fosters innovation aligned with Industry 4.0.

At the conclusion of the workshop, Prof. Dr. Aneel Kumar presented appreciation shields to the distinguished presenters and distributed certificates to all participants, recognizing their active involvement and commitment to learning.

The success of this workshop marks a significant milestone in MUET's ongoing efforts to integrate emerging technologies into academic and research domains, strengthening its position as a forward-thinking institution aligned with global educational trends.



OPTICA

IEEE
KARACHI SECTION



ONE-DAY WORKSHOP ON AR/VR TECHNOLOGIES

ORGANIZED BY ELECTRONIC ENGINEERING DEPARTMENT IN COLLABORATION
WITH EU FUNDED CBHE-CATCHVR PROJECT

WORKSHOP CONTENTS:

- 3D display and 3D imaging technologies for AR/VR
- Hands-on Demo of Meta Quest VR Headset
- Creating 3D Content for AR/VR and Unity 3D
- AR/VR Applications and Digital Twins



REFRESHMENT WILL BE SERVED!!

REGISTRATION FEES

Rs 150 (Rs 100 for IEEE and OPTICA
Student Members)



DATE
11-DEC-2024



TIME
9 AM TO 2 PM



PLACE
AV HALL, IICT BUILDING
MUET, JAMSHORO

CONTACT DETAILS

Engr. Shoaib Hassan Khaskheli
Senior Instrumentation Engineer
Department of Electronic Engineering
Cell: +92 332-2660292
Email: shoaib.khaskheli@admin.muet.edu.pk

PAYMENT DETAILS

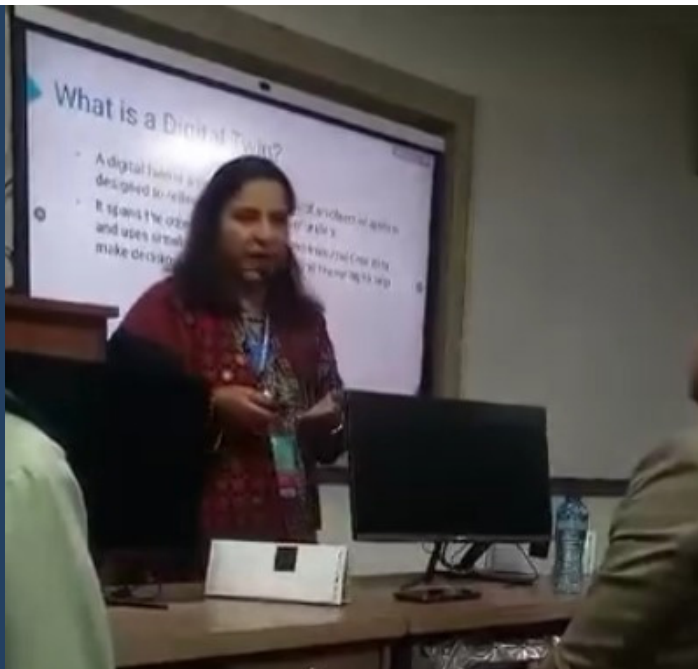
HBL: Kamran Kazi (00720075258101)
Easypaisa: Shoaib Hassan (0332-2660292)
Registration Link
<https://forms.gle/BEbSAZzs4mW38cz7>



Prof. Dr. Shehnila Zardari Delivering a Keynote on Digital Twins: Risks and Mitigation Strategies

Prof. Dr. Shehnila Zardari delivered a keynote address at the Thar Institute of Engineering Sciences and Technology on 'Risks and Their Mitigation Strategies in Digital Twins'.

She highlighted that while Digital Twins are rapidly transforming industries worldwide, they also introduce critical challenges such as cybersecurity threats, data integrity concerns, and scalability issues. In her keynote, Dr. Zardari discussed these risks in depth and presented practical mitigation strategies to help industries strengthen reliability, resilience, and trust in this fast-evolving field.



MUET and QUEST jointly held a Curriculum Development Workshop for Master's program in AR/VR and Digital Twin.

MUET and QUEST jointly held a Curriculum Development Workshop for Master's degree in AR/VR and digital twins under the EU-funded Erasmus+ project CATCH_VR.

MUET hosted a joint hybrid meeting for eight European and Pakistani partners, focusing on the Erasmus+ EU-funded "2nd Workshop on Curriculum Development and Project Review meeting in a hybrid mode, with a focus on Capacity Building in teaching using AR and VR, specifically CATCH_VR. The event started with opening remarks and an overview of overall progress, including the status of deliverables and milestones, by Prof. Dr. Bhawani Shankar Chowdhry, Coordinator and Project Manager of the EU-funded Erasmus+ project CATCH_VR. Prof Chowdhry emphasized that all partner universities go through the Task list and follow their timeline in completing the given tasks.

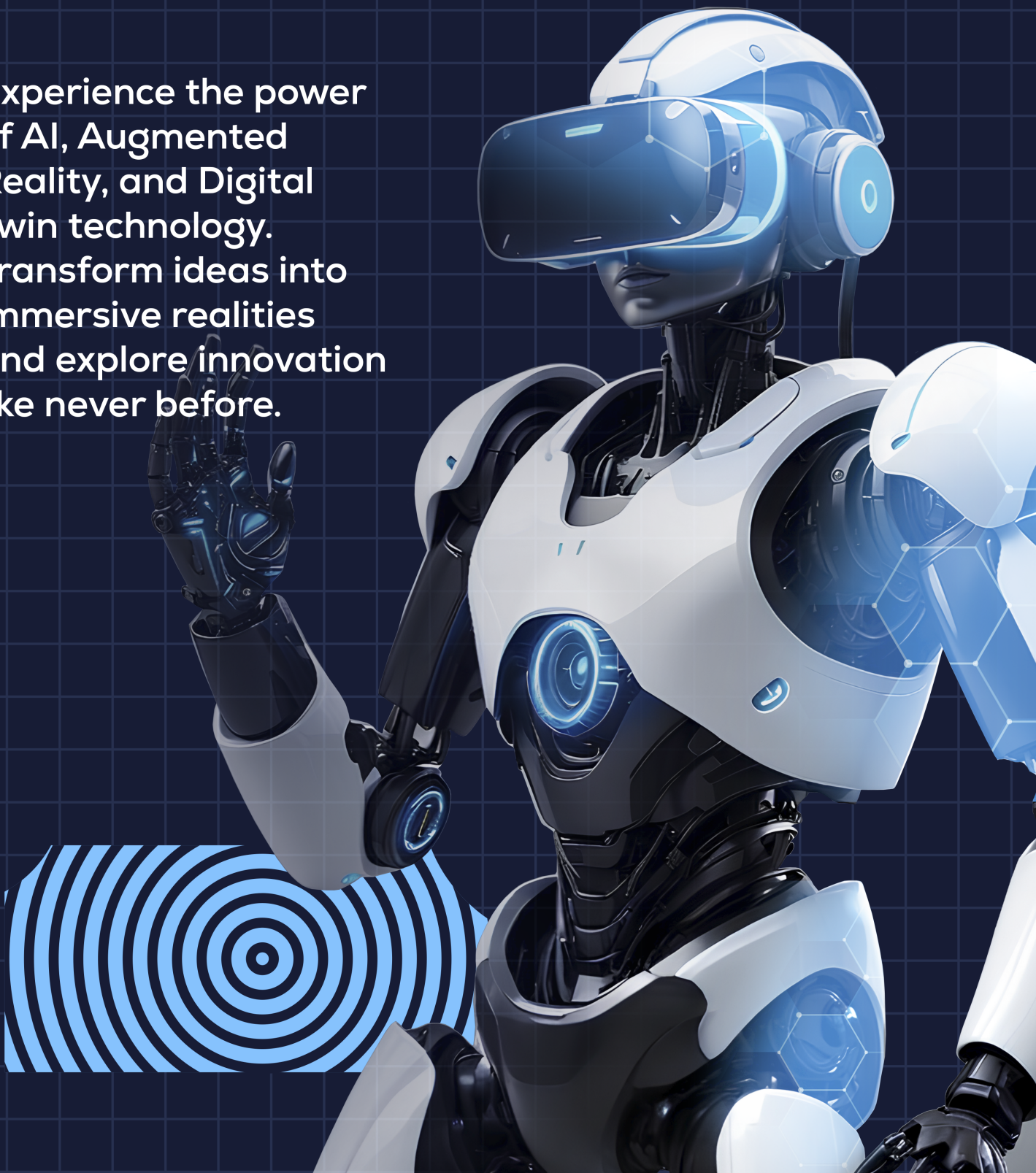
A presentation on "EON-XR Platform: Advancing VR in Industry and Education" by Dr. Lehel Szabolcs Csokmai, Research engineer in CCIITA research center and the Industrial Engineering PhD school at the University of Oradea, Romania. There was an insightful discussion on the role of AR/VR in teaching and its impact on various fields. He shared multiple resources and project details. A Curriculum Development workshop followed it. Prof. Dr. Ali Turab Jeffery, from GIKI presented the detailed framework of core areas and relevant labs. Prof. Dr. M Tahir Khan, from UET Peshawar, gave a detailed presentation on the lab equipment and the center of excellence in Digital Twin.



CATCH VR

STEP INTO THE FUTURE

Experience the power
of AI, Augmented
Reality, and Digital
Twin technology.
Transform ideas into
immersive realities
and explore innovation
like never before.



2.3. Volunteering students developed the project on an Augmented Reality 3D System for School Education

A Department of Electronic Engineering team visited a public school in the periphery of the district Dadu to implement the Augmented Reality 3D System. This was the 2nd prototype delivered to a public school. The student volunteering team and project supervisor, Dr Shoaib Soomro, interacted with the school students and staff and demonstrated the prototype for interactive 3D visualizations of STEM concepts. The final-year undergraduate students developed the system.



2.4. Following training, and online courses attended by the faculty members and students of Pakistani partner universities as per recommendations of Dr Lubna L Dhirani (UL, Ireland)

- i) Introduction to Digital Twin 24th Oct 2024 conducted by Prof Eoin O' Connel
- ii) Synchronizing Physical and Digital Twins 31st Oct 2024 conducted by Prof Eoin O' Connel
- iii) Three projects at github.com on AR/VR/XR
- iv) Top 10 applications and Use cases for Digital Twin/Unity available at unity.com
- v) Accelerating Digital Twin Development with Gen AI and Capabilities Periodic Table
https://www.brighttalk.com/webcast/18347/642483?utm_source=brighttalk-portal&utm_medium=web&utm_campaign=channel-page&utm_content=recorded

In-house development of AR Holographic Display System by MUET undergraduate students for basic training

Another achievement of the project included the successful development of an in-house AR Holographic Display System for training in interactive educational visualization. The pyramid-like optical structured display system comprises semi-reflective glass for splitting views. It uses a single high-resolution LED display to deliver vivid and clear holographic content to its viewers.

A good number of educational training courses on the AR holographic display system have also been provided to students, faculty members, and the general public.



Catch VR Innovation

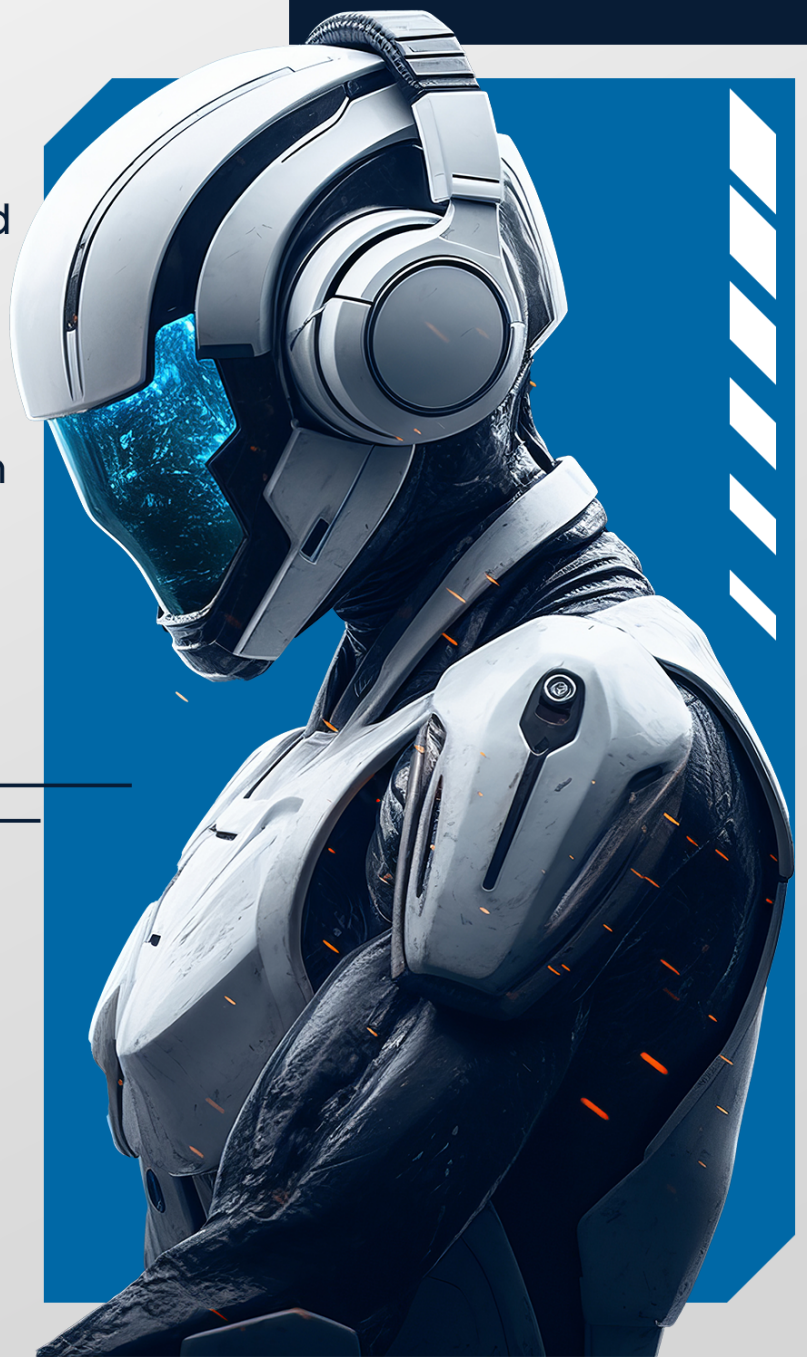
**Shaping the Future
of Immersive Technology**

Unlocking the Power of AI,
AR & Digital Twins

Step into a world where reality
meets imagination.

Catch VR delivers cutting-edge
immersive experiences powered
by AI, augmented reality, and
digital twin technology.

Transform ideas into interactive
journeys and explore innovation
without limits.



Under the EU-funded CBHE Catch VR Project, a one-day international symposium on digital twins in manufacturing systems was organized. This symposium focused on innovations regarding the role of digital twins in contemporary manufacturing. Sessions, which included speakers from Ireland, Romania, Bulgaria, and Pakistan, featured AR/VR, AI, and immersive learning.

- Introduction to EON Reality's 25+ year journey in XR and AI innovation.
- How EON-XR empowers education, training, and industrial simulations through immersive learning.
- Live demonstration: AI-powered Train AI for automatically converting documents into interactive XR lessons. Virtual tour: Robotics Labs and Digital Twins powered by EON-XR.

01:09:39

 Take Control Chat QA People Ratio React View More Controls Mic Video Share Leave

Understanding the Concepts

Feature	AR	VR	MR
Real World	Yes	No	Yes
Immersion	Partial	Full	Blended
Interaction	Limited	Full in virtual world	Real and virtual object interaction
Hardware	Phones, AR Glasses	VR Headsets	HoloLens, Magic Leap

AR
Augmented Reality

VR
Virtual Reality

MR
Mixed Reality

Video Conferencing URL: [https://teams.microsoft.com/join?meetingid=...&context=...](#)

Meeting Title: Hilo -> Honolulu in Hawaii on April 28, 1988

Aloha
Airlines
Flight 243

Take Control Chat QA People Ratio React View More Controls Mic Video Share Leave

 1/6 >

DIGITAL TWIN



```

graph TD
    PE[Physical Entities] --> VE[Virtual Entities]
    VE --> DA[Data]
    DA --> CO[Connections]
    CO --> SE[Services]
    SE --> PE
            
```

MARINE Sustainability

Digital Twin Example - Predictive and Condition monitoring



Physical Twin

Physical entity and related components

Physical data and related information



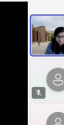
Digital Twin

Information and related information

Information and related information

Information and related information

Source: Digital twins, a breaking stream to achieve ocean sustainability | Lloyd's Register Sustainability Solutions Center



Proposed / Recommended Seminars, Workshops, and Trainings related to Future Digital Twins and AR/VR Applications

1. AR/VR Technologies
2. IoT and Digital Twins for Industry 5.0
3. Digital Twins in Action: A New Frontier for Industrial Cybersecurity
4. Digital Twins for manufacturing lines: definition and taxonomy, specific characteristics, technologies, and software stacks for IoT data analytics, goals, and opportunities
5. Reality check and capabilities of AR/VR systems

Future Videos related to Future Digital Twins and AR/VR Applications

News

Engineering Review 06 April 1-15, 2025

EU-funded Erasmus Plus Project CATCH_VR MUET, QUEST hold Curriculum Development Workshop for Masters in AR/VR and digital Twin

MUET hosted a joint hybrid meeting for eight European and Pakistani partners for the Erasmus+-funded "2nd Workshop on the Curriculum Development and Project Review meeting" in a hybrid mode focusing on Capacity Building in Teaching in AR and VR, namely CATCH_VR.

The event started with opening remarks and an overview of overall progress, including the status of deliverables and milestones, by Prof. Dr. Bilwan Shaukat Chowdhry, Coordinator and Project Manager of the EU-funded Erasmus Plus project CATCH_VR. Prof. Chowdhry emphasized all the partners' commitment to go through the task list and follow their timeline in completion of given tasks.

A presentation on "EON-3D Platform: Advancing VR in Industry and Education" by Dr. Lebel Szaboicz was given. Research engineer in CATCH_VR center and the Industrial Engineering PhD school at University of Craiova Romania. There was an insightful discussion on the role of AR/VR in teaching and its impact on various fields. He shared various resources and project details. A Curriculum Development workshop followed it. Prof. Dr. Ali Turab Jeffery, from QUEST presented the detailed framework of core areas and relevant labs. Prof. Dr. M Tahir Khan, from UET Peshawar, gave a detailed presentation on the lab equipment and the center of excellence in Digital Twin.

Prof. Dr. Pankaj Kumar from QUEST and Muhammad Zakir Sheikh updated on the dissemination activities of the project using all the social media platforms and the CATCH_VR portal (<https://catchvr-cbhe.eu/>).

Prof. Dr. Anwar Kousar decorated the visiting guest with Souvenirs and appreciated efforts of Pakistani and European partners for completing the tasks in time.

Aror University Unveils OGDCL Game Design Lab: A Leap in Digital Innovation

A new University of Art, Architecture, Design & Heritage in Sukkur has marked a significant milestone with the inauguration of the OGDCL Game Design Lab.

This state-of-the-art facility, sponsored by the Oil & Gas Development Company Limited (OGDCL), was officially opened on February 7, 2025, by Ahmed Hayat Lah, MD/CEO of OGDCL.

The OGDCL Game Design Lab is a remarkable addition to Aror University's academic infrastructure, aimed at advancing education in game development and related technological fields. The facility boasts 17 high-performance workstations equipped with the latest NVIDIA GPUs, enabling students to create sophisticated 3D models, immersive game environments, and complex simulations.

The inauguration ceremony was graced by several distinguished guests, including Mustafa Ali Soomro, Executive Director (Production) at OGDCL; Sikandar Ali Shahid, General Manager (CSR) at OGDCL; Asim Ali Khan Ghouri, Director of Iron by Ghauri; Eng. Abdul Fatah Shahid, Former President of the Sukkur Chamber of Commerce; Prof. Dr. Durr Muhammad Parhan, Pro Vice Chancellor of MUET Khairpur Campus; and Shabbir Memon, Director of Pakistan Sweet Home Sukkur.

Prof. Dr. Zahid Hussain Khani, Vice Chancellor of Aror University, expressed his gratitude towards OGDCL for their generous support in establishing the Game Design Lab. He emphasized that this initiative aligns with the university's commitment to providing world-class education, fostering innovation, promoting entrepreneurship, and equipping graduates with industry-relevant skills.

The collaboration between Aror University and OGDCL signifies a shared commitment to advancing education in technology and creative industries. The lab offers students a unique opportunity to develop expertise in game design, 3D modeling, and interactive simulations, ensuring they are well-prepared for the rapidly evolving digital landscape.

Educational, Research, and Economic Impact

Educational Benefits: Hands-on skills development in game design, 3D modeling, and virtual simulations.

Enhancement of the curriculum with advanced tools and software.

Opportunities for collaboration with industry experts through internships, workshops, and guest lectures.

Research and Innovation: A platform for exploring new frontiers in game mechanics, artificial intelligence, and user experience.

Research applications in education, healthcare, and urban planning through gamification and simulation.

Development of emerging technologies like Virtual Reality (VR) and Augmented Reality (AR).

Economic Contributions: Preparation of students for careers in game development, tech companies, and startups.

Encouragement of entrepreneurship through training in game design and digital media.

Attraction of investment in technology, education, and creative industries.

Strengthening of Sindh's growing tech ecosystem by producing skilled professionals for local and international markets.

Unique Standing Among Pakistani Universities

The OGDCL Game Design Lab at Aror University is the first dedicated facility of its kind in Sindh. While universities across Pakistan, such as NUST, COMSATS, BNU, LUMS, and FAST-NUECES, have game development labs, this facility sets a new benchmark for game design education in the province.

Other institutions offering game design programs include Iqbal University, Punjab University, and the University of Sargodha, each providing state-of-the-art labs and coursework focused on multimedia, animation, and interactive media. Among these, NUST, COMSATS, and BNU are recognized for their cutting-edge research in AI-driven gaming and immersive media technologies.

Investment and Sustainability

Setting up a Game Design Lab requires substantial investment in infrastructure and technology. The estimated cost for establishing such a facility ranges between PKR 20 million to 50 million, with annual operational expenses of PKR 5 million to 10 million. These costs cover high-performance workstations, software licenses, maintenance, and faculty training.

With its state-of-the-art resources, industry collaborations, and a strong focus on innovation, the OGDCL Game Design Lab at Aror University is poised to become a leading hub for education, research, and economic development in the digital and creative sectors of Pakistan. - ER Report

News

Engineering Review 03 June 16-30

One-Day Int'l Symposium Under EU-Funded Erasmus+ CBHE CATCH_VR Project

Digital Twins in Manufacturing Systems

Under the auspices of the EU-funded Capacity Building in Higher Education (CBHE) CATCH_VR Project, Mehran University of Engineering & Technology (MUET) hosted a one-day international Digital Twins in Manufacturing Systems Symposium.

The event convened researchers and industry experts from Ireland, Romania, Sweden, Bulgaria, Portugal, England, and Pakistan to share the latest innovations in augmented reality (AR), virtual reality (VR), artificial intelligence (AI), and immersive learning.

The symposium opened with remarks by Professor Dr. Saleem Raza Sano, Vice-Chancellor of QUEST, who welcomed delegates and underscored the growing importance of digital technologies in engineering education. Dr. Bilwan Shaukat Chowdhry, MUET Coordinator for the CATCH_VR project, then presented an overview of the project's deliverables, tasks, and milestones.

Key presentations included:

- Dr. Pardeep Kumar Hariri (QUEST) on the "Importance of Digital Transformation in Manufacturing."
- Mr. Khushi Muhammad (GIR Institute) examining "AR/VR in Modern Manufacturing."
- Prof. Dr. Agata Malowka (Technical University of Sofia) discussing "Real-Time Data Integration with Digital Twins."
- Dr. Lebel Szaboicz

The symposium also featured a panel discussion, moderated by Dr. Tahir Khan (UET Peshawar) and Dr. Ali Turab Jeffery (GIRK), which covered:

- EON Reality's 25-year journey in XR and AI innovation
- Immersive learning applications in education, training, and industrial simulation
- Live AI-powered document-to-XR lesson demonstrations
- Virtual tours of robotics labs
- Global success stories and future XR and AI trends

Closing remarks were delivered by Dr. Labna Lucini Dhirani, Symposium Chair, who praised the collaborative spirit and emphasized the symposium's role in advancing sustainable, technology-driven engineering education. It is worth mentioning that Engineering Review is also an Associate Partner of the project. More details are available at: <https://catchvr-cbhe.eu/>

Contributions Count:

Authors and Collaborators of the CATCH_VR project partner universities presented their keynote talks in the WRE23 conference, and four Chapters based on these talks have been accepted for publication in the book: Digital Twinning for Discrete Manufacturing, Edited By Haiyan Zhao, Ghulam Hussain, Ghulam Abbas, Khalid Rahman, CRC press, eBook ISBN9781003610151 (Expected publication date Nov, 2025).

- The Role of Cybersecurity and Big Data in Digital Twinning: A Review, Challenges, and Opportunities
- Benchmarking sim2real Gap: High-fidelity Digital Twinning of Agile Manufacturing Scenarios
- Roles of Digital Twin in Wireless Networks
- Into the Metaverse: Quantum Computing for Digital Twins - it's impact, applications, and limitations

One-day International Symposium on “Digital Twins in the Manufacturing System”

This meeting was held at the University of Limerick, Ireland (01 – 04 July 2025), organized in collaboration with the European Union (Erasmus+) and partner universities from Europe and Asia.

Over the four days, participants engaged in sessions covering project management, training initiatives, digital twin applications, and AR/VR-based academic modules. Key highlights included presentations by Prof. Dr. Bhawani Shankar Chowdhry on steering committee updates and reporting, Dr. Lubna Luxmi Dhirani on capacity building and training resources, and Dr. Abi Waqas on project and financial management. In addition, Prof. Pardeep Kumar shared insights on lab development, while Prof. Tahir Khan discussed the Centre of Excellence initiatives.

The workshop also included hands-on AR/VR and Digital Twin training sessions, lab visits, demonstrations in smart manufacturing, and discussions on mentorship models. The event concluded with strategic planning for future dissemination and project meetings, an open floor discussion, and acknowledgments of all partner contributions. This gathering marked a crucial milestone in strengthening collaboration and building capacity for the integration of AR/VR in higher education.



The poster features a man in a suit using a VR headset, with a digital interface overlaying a factory scene. Logos for UNCTAD, Erasmus+, and the European Union are at the top left. The text reads: "Digital Twins for Smart Learning", "Capacity Building in Teaching of", "Virtual Reality", "Extended Reality", "Smart Manufacturing", "01 July, 2025 - 04 July, 2025", "UNIVERSITY OF LIMERICK". At the bottom are logos for NHRF, UCC, Engineering Review, BASTEK, and eon energy.

UNCTAD
Erasmus+
European Union

Digital Twins for Smart Learning

Capacity Building in Teaching of

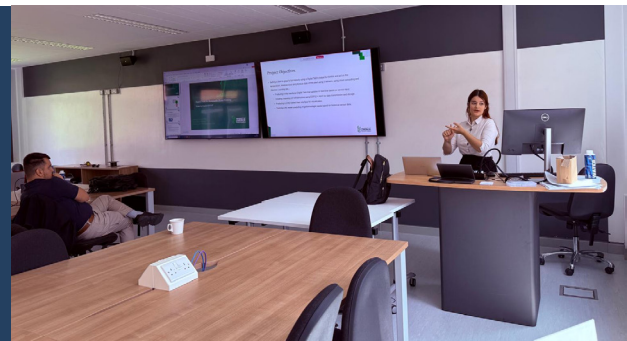
Virtual Reality Extended Reality

Smart Manufacturing

- Date -
01 July, 2025 - 04 July, 2025

- Venue -
UNIVERSITY OF LIMERICK

NHRF UCC Engineering Review BASTEK eon energy





Funded by the
European Union

DESIGNED AND PUBLISHED BY

DISSEMINATION TEAM CATCH_VR

CONTACT

 catchvrdigital@gmail.com

 @catch.vr

 @catch-vr

 @catchvr_

 @catchvr

 @Catch_VR

 @Catch_VR

PARTNERS



www.catchvr-cbhe.eu

