

Féidearthachtaí as Cuimse
Infinite Possibilities

Embedding Sustainability into Third Level Education to meet Sustainable Development Goals

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ECSS: October 25th, 2023

Green ICT and ICT for Green Workshop



Motivation

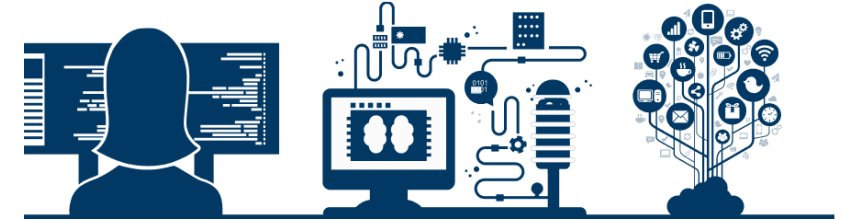
What Lead me Here?

- Graduate of Electrical and Electronic Engineering
 - PhD research in Communications Engineering

- Industry experience with Multinationals



- Head of Computer Science within the School
 - Lecturing in systems infrastructure, networks, security, and IoT
 - Research areas:
 - Systems Optimisation
 - Sustainable IT and Smart Spaces
 - Security
 - AI Systems (Including ML and LLM)
 - Security Anomaly Detection using ML



Embedding Sustainability into Third Level Education to meet Sustainable Development Goals

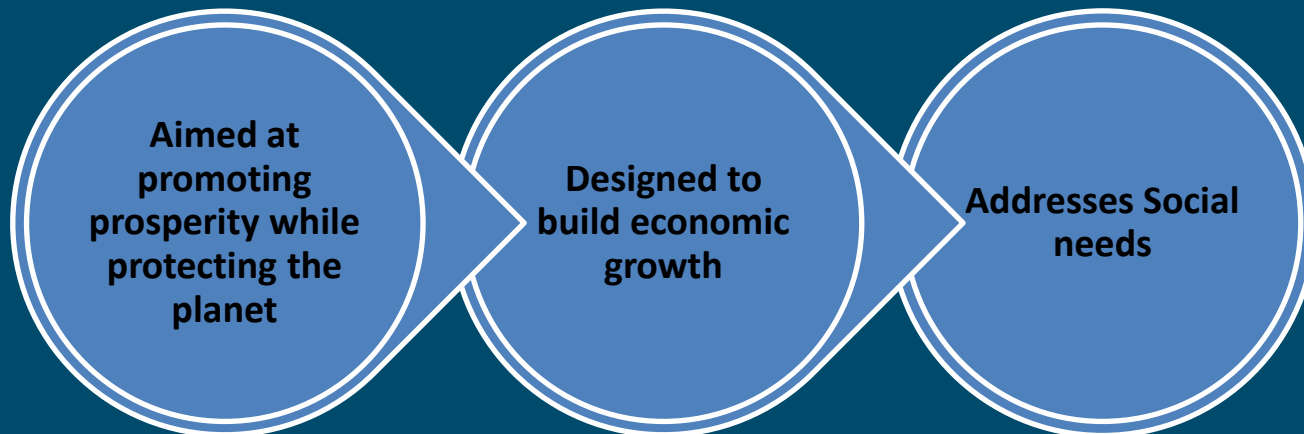
Overview



An Intersection of People and Technology

Sustainable Development Goals

17 Goals Introduced by the UN



Education
Health
Social Protection
Job Opportunities

SDG 4 : Quality Education

4 QUALITY EDUCATION



ENSURE INCLUSIVE AND EQUITABLE QUALITY EDUCATION AND PROMOTE LIFELONG LEARNING OPPORTUNITIES FOR ALL

24 MILLION LEARNERS

(PRE-PRIMARY TO UNIVERSITY LEVEL)

MAY NEVER

RETURN TO SCHOOL



ENTRENCHED INEQUITIES IN EDUCATION HAVE ONLY WORSENERD DURING THE PANDEMIC



COVID-19 PANDEMIC

HAS DEEPEENED A

GLOBAL LEARNING CRISIS

147 MILLION CHILDREN

MISSED OVER HALF

OF IN-PERSON

INSTRUCTION

IN 2020-2021



MANY COUNTRIES ARE IMPROVING SCHOOL INFRASTRUCTURE AS CLASSROOMS REOPEN

GLOBALLY,
PRIMARY SCHOOLS
(2019-2020)



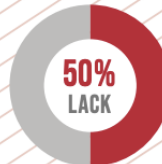
ELECTRICITY



DRINKING WATER



BASIC SANITATION



COMPUTERS



INTERNET ACCESS

IoT for Sustainable Development

The Potential to Accelerate Progress towards SDGs

The World Economic Forum

- IoT for Sustainable Development
- Aims to encourage the use of IoT for achieving SDGs
- Proposes a framework to evaluate the IoT deployments against the UN SDGs

How?

- Ask the questions about how IoT can be used
- Develop a framework, map to projects, apply to case studies
- KPIs, Targets, Scalability and Vulnerable Groups



Benefits of IoT in Education

How can IoT Enhance Education for Sustainable Development

Improved Access

- IoT enables remote and inclusive learning opportunities for underserved communities

Personalised Learning

- Adaptive IoT devices can tailor educational content to individual student needs

Real-Time Data Analytics

- IoT sensors provide valuable insights to optimise learning environments and educational resources



Case Studies for Success

Implementations of IoT in Education have Contributed to meeting SDGs

Smart Classrooms

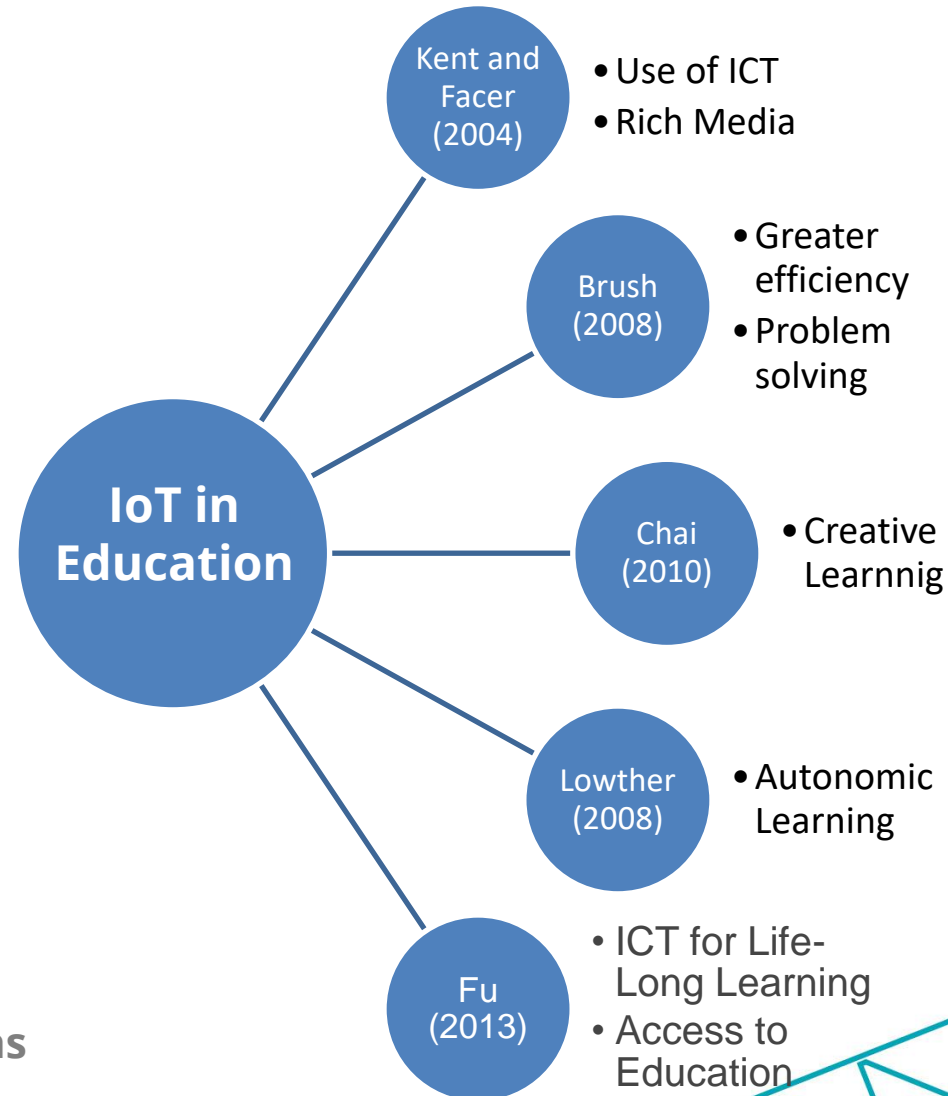
- IoT-enabled classrooms
 - Enhanced collaboration
 - Interactivity
 - Resource efficient

Connected Devices

- IoT-based educational tools
 - Wearable devices for interactive learning experiences

Digital Infrastructure

- IoT-powered networks
 - Connectivity solutions
 - Remote education in underserved areas



Challenges and Considerations

Engineering, Technical and Integration

What are the Challenges for the Successful Integration of IoT into Education?

Data Privacy and Security

- Ensure the protection of sensitive student data and privacy

Infrastructure and Connectivity

- Overcome limitations in connectivity and infrastructure, especially in remote areas

Digital Skills and Training

- Equip educators with the necessary skills to effectively integrate IoT into their teaching practices



What is the Impact of IoT in Education?

Scenario – Digital Transformation of the Classroom

Student

- Less reliance on print
- Abundance of information available
- Self-paced learning
- Greater convenience
- Replicate the **experience** at home



Lecturer

- More efficient delivery
- Automate routine tasks (e.g. grading)
- Gather data on individual student performance
- Adjust lesson plans
- Improve engagement

What is the Impact of IoT in Education?

Scenario – Digital Transformation of the Classroom

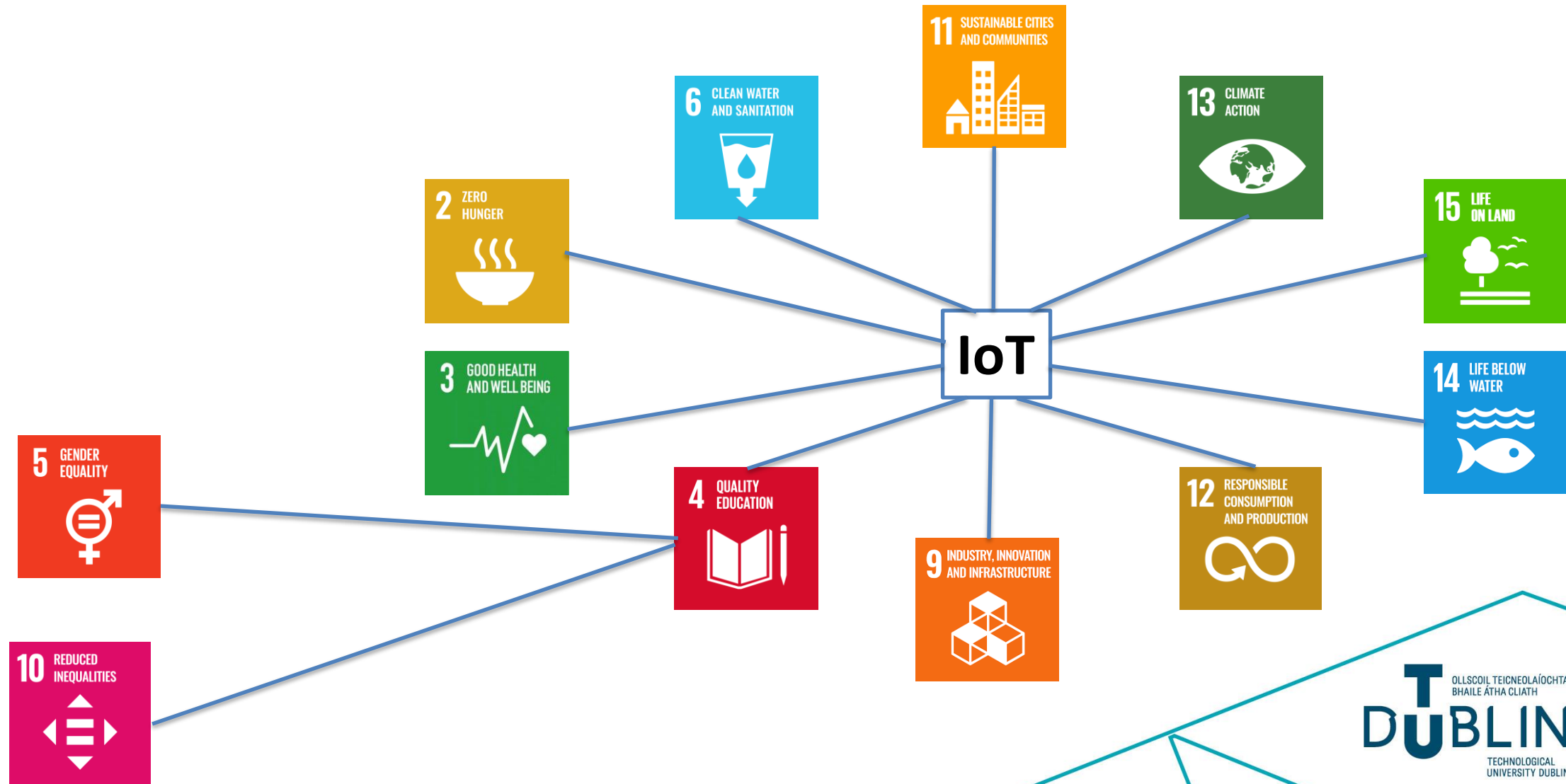
Environment - Resources

- Passive monitoring of resource usage
- Reduce equipment requirements and operating costs
- Connected campus
 - Transport schedules
 - Service schedules
 - Social connectivity
 - Time efficiency, safer and more engaged



Summary

Transformative Potential of IoT in Education for Meeting SDGs



Summary

Transformative Potential of IoT in Education for Meeting SDGs

Key Points

- Responsible as educators
- SDGs designed to address global inequality
- World Economic Forum provides framework
- Transformation has many challenges
- The reward potential is high

Call to Action

- Stakeholder Collaboration
 - Educators
 - Policymakers
 - Technology Providers



TU Dublin Computer Science

Thank You

IoT Class of 2022 at BUCT

