



Engineering & Product
Design Education

Exploring Diversity in Engineering & Product Design Education

Proceedings of the 28th International Conference
on Engineering & Product Design Education

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Hosted by the

School of Civil, Aerospace and Design Engineering

In collaboration with the

Engineering Education Research Group at The
University of Bristol

Editors

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Editors: Jeff Barrie, Thea Morgan, Joel Ross, Becky Selwyn, Chris McMahon, Lyndon Buck, Ross Brisco, and Erik Bohemia.

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E&PDE 2026 Foreword

Exploring Diversity in Engineering and Product Design Education

The 28th International Conference on Engineering and Product Design Education (E&PDE) with the theme 'Exploring Diversity in Engineering and Product Design Education' was held at the University of Bristol, on the 3rd and 5th of September 2026. The conference was hosted by the School of Civil, Aerospace and Design Engineering in collaboration with the Engineering Education Research Group. The conference was planned and arranged with the Design Education Special Interest Group (DESIG) of the Design Society, and the Institution of Engineering Designers (IED).

Since its inception in 1999 in the United Kingdom, the E&PDE conference has grown into a leading international forum. Established as a global event in 2004, it alternates annually between the UK and partner institutions abroad. Its mission is to connect educators, researchers, and industry professionals who are passionate about advancing engineering and product design education. The conference provides a platform to exchange expertise, explore contemporary and emerging methodologies, and discuss the evolving relationship between academia, industry, and society.

In 2019, E&PDE introduced visual papers, in which sketched images play the central role in communicating insights, with text providing a supporting function. These contributions continue to expand the conference's knowledge base by capturing ideas in ways that are particularly relevant to design education and research.

Conference theme

Equality, diversity, and inclusion (EDI) are three interconnected concepts that aim to create a fair and welcoming environment for people in education and the workplace. While the gender divide in engineering is acknowledged and faces its own unique challenges to promote gender equality and meet growing industry demand for skilled and professional engineering, according to Represent Recruitment Agency, the design workforce in the UK remains well over three-quarters male. This is substantially higher than the 53% national average. Women are not only likely to be paid worse than male colleagues, but they are also likely to be in less senior positions: with only 17% of design managers who are female. For people who come from Black, Asian or Minority Ethnic (BAME) backgrounds, they make up just 13% of jobs in the industry. BAME staff make up just 12% of senior positions and the pay gap can range up to 17%.

There are also issues around sexuality, especially around what can be perceived as male-dominated, heterosexual professions. LGBTQ+ engineers make up a very small percentage (around 5%) with the design industry doing slightly better (11.7% according to a AIGI census survey from 2019). Nonetheless, there are complex issues around visibility and recognition around sexuality.

While universities are now adapting to accommodate for an increase of neuro-divergent students, and those with learning disabilities, how can engineering and design industries benefit from graduates who see the world differently?

The design industry is also facing demographic challenges, with the vast majority of design professionals in their 20s and 30s. There is a distinct lack of older professional designers.

There are also disparities around socio-economic diversity between engineering and design, with a decline of school age students undertaking Design & Technology (D&T) at GCSE and A-level.

With diversity in a design or engineering team, it can be argued that the result is better products, services, and appropriate solutions. The challenge of this conference is a rally call to ask the difficult questions, acknowledge and address the complex problems and provide solutions that inspire to go beyond characteristics, statistics and data.

The Proceedings

The call for papers invited contributions that:

- explore innovative educational concepts and strategies to prepare students and graduates for future design challenges
- share best practices in transferring knowledge between academia and industry;
- identify and address skills gaps between higher education and professional practice
- provide a platform for diverse voices and perspectives within the design education community.

This year's conference sub-themes included:

- Novel methods for accommodating diversity and inclusivity in multidisciplinary and group-based students' engineering design projects
- Challenges and opportunities for educators to foster an inclusive learning environment for students with diverse needs
- Critique of design methods used in product and service design education
- Fostering EDI through engineering design educational methods
- Educating students in considering equality, diversity and inclusivity in product and service design development
- Integrating the knowledge of diverse designers and cultural nuances in the design phases of products and services
- Innovative approaches promoting EDI principles in engineering and product design education
- Collaborative design education practices fostering the appropriate design of products and services
- Opportunities for AI to enhance diversity in engineering and product design education
- Industry and academia collaborative models for fostering diversity
- Understanding students' experiences from school to higher education, to industry in order to acknowledge and tackle the challenges and barriers faced by designers from minority Ethnic and Heritage communities as well as low socio-economic status

The 2026 conference attracted 132 abstracts, including one visual contribution and 13 student submissions. Following a rigorous double-blind peer review process, 96 papers were selected for inclusion in these proceedings. Over the two-day event,

more than 110 participants from 24 countries engaged in four workshops and 92 paper presentations, creating a vibrant space for exchange and collaboration.

Keynotes

The conference featured two keynote speakers who provided compelling perspectives on diversity within engineering and design industries.

Sunny Panesar, Head of Sales at Ensera Design, shared insights from his career in medical product design consultancy industry and the need to improve diversity in the sector. He provided an overview of the Ethnic Diversity Excellence Program, supported by other UK design consultancies, as well as measures of its success and reflections from his own personal experience.

Laura Tuck, R&D Lead at The Washing Machine Project, spoke about her work in empowering women in off-grid communities using appropriate technology and feedback, as well as her involvement in FemTech product development and advocating inclusive spaces for women.

Acknowledgements

The success of E&PDE 2026 is the result of the dedication of many individuals and organisations. I wish to express my sincere gratitude to the conference co-chairs, Prof Chris McMahon, Dr Thea Morgan, Dr Becky Selwyn and Dr Joel Ross for their support throughout the organisation of the event. Special thanks are also due to Jo Winslow, Ross Brisco, Lyndon Buck, Erik Bohemia, and Francesca Mattoli, for their continued guidance and support.

I am indebted to the members of the international scientific review board for their reviews, which ensured the high quality of the papers presented. Appreciation also goes to Lauren Duvall and Catering and Events team for their organisational support, as well as other professional services staff who contribute tirelessly to the daily workings of the University.

I thank all participants (old and new) for their contributions and engagement. Your commitment, friendship and passion continue to make the E&PDE conference a unique and dynamic forum for advancing engineering and product design education worldwide.

I dedicate this foreword to the late Prof Jason Arday, who took his own life on the 14th of August 2026 after accusations of plagiarism and subjected to relentless public scrutiny by the British media and online platforms; which has deeply shocked the academic community. Prof Arday provided a compelling keynote address at the 2024 Bristol Institute of Teaching and Learning (BILT) 'Voice and Choice-student agency, empowerment and co-creation'. Arday's keynote was titled 'Reasons to be cheerful: is higher education becoming a more inclusive space?' which discussed the continued challenges faced by the sector, with a view to providing a roadmap to future sustained interventions and mobilise greater inclusion and equality. Arday's death is a wake-up call to the higher education sector to re-evaluate how diverse, inclusive and equal they truly are, against what they perceive to be. To fellow academics who have faced unfair discrimination due to age, race, gender, sexuality or religion, we hear you, we see you-and E&PDE will continue to be a welcoming and inclusive space for all.

As a young, black professor with autism, Jason's life story was full of hope and aspiration to anyone who grew up thinking that life in academia was not for them, including myself, which sadly came to a tragic and unjustly end. Rest in Power.

Jeff Barrie

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University of Bristol
4th September 2026



Established in 1945, Incorporated by Royal Charter in 2012, the Institution of Engineering Designers is the premier organisation in the UK to represent those working in the many fields of engineering and product design.

Our members enjoy a range of benefits, including mentoring and guidance to professional registration, exclusive access to our job board and newsletters to keep members up to date with relevant developments and events. We host regular events which offer our members the chance to network with other professionals and members receive the Institution's bimonthly journal – Engineering Designer.

We are committed to encouraging CPD for all our members and support ongoing training and skills development.

We offer a wide range of professional registrations: our own register for professional product designers includes the exclusive Chartered Technological Product Designer (CTPD) which is on a par with all other Chartered registrations and exists to provide professional recognition and standing to those suitably qualified and competent persons working in Product Design, with the sister grade of Registered Product Designer (RProdDes) for those not working at Chartered level.

We are licensed by the Engineering Council to assess candidates wishing to join the register of Professional Engineers and Technicians and we also accredit academic and training courses, for registration with either the Institution or with the Engineering Council. Those members who achieve the appropriate academic and competence standards receive Chartered Engineer, Incorporated Engineer or Engineering Technician status.

We are also a licensed body of the Society for the Environment and are able to register suitably qualified and competent members as Chartered Environmentalists (CEnv).

We welcome members from any organisation that has a design function and employs design engineers, and we have many academic teaching staff in membership. To find out more about becoming a member of the IED and a professional registered designer go to www.ied.org.uk



The Design Society is a global community of researchers, educators and practitioners dedicated to advancing the science and practice of design, established in 2000 as a successor to the Workshop Design-Konstruktion (WDK) group 1981. By connecting leading minds across academia and industry, the Society promotes innovation, collaboration and knowledge exchange in engineering design, product development and design research.

Through its internationally recognised conferences, including the flagship International Conference on Engineering Design (ICED), and the Engineering and Product Design Education series (E&PDE) the Society provides a platform for presenting cutting-edge research, sharing best practice, and building lasting professional networks.

Beyond conferences, the Design Society supports a vibrant international research community through Special Interest Groups, publications, doctoral development activities, awards and professional networking opportunities. Whether you are an established researcher, industry professional or emerging scholar, the Design Society offers a forum to collaborate, learn and help shape the future of design.

Why should you engage with the Design Society?

- Connect with a global network of leading researchers, educators and industry professionals working across engineering design, innovation and product development.
- Stay at the forefront of emerging topics including AI in design, sustainability, systems engineering, design methods, creativity and human-centred design.
- Join Special Interest Groups (SIGs) to collaborate with experts who share your research interests and contribute to focused communities within the wider design field.
- Access high-quality research outputs and conference proceedings that showcase the latest developments in design research and practice.
- Develop your professional network through workshops, seminars, conferences and online community activities.
- Support your career development through opportunities aimed at doctoral researchers, early-career academics and established professionals.
- Help shape the future of design research and education by participating in one of the world's most influential engineering design communities.

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Table of Contents

Paper Title	Pages
DIVERSITY IN FINAL YEAR PRODUCT DESIGN PROJECTS: WHO ARE WE DESIGNING FOR?	1 - 6
METHOD FOR ASSESSING THE INGENUITY OF LOW-TECH DESIGNERS IN THE CONTEXT OF A STUDENT HACKATHON	7 - 12
SUPPORTING DIVERSITY IN CIVIL ENGINEERING EDUCATION: EXPERIENCES OF STUDENTS WITH VOCATIONAL AND ACADEMIC BACKGROUNDS	13 - 18
CROSS-CULTURAL LEARNING IN ENGINEERING EDUCATION: A BINATIONAL CASE STUDY ON INTERCULTURAL COMPETENCE AND SUSTAINABLE POLYMER PROCESSING	19 - 24
FROM DIVERGENCE TO CONVERGENCE: A STUDY ON THE CO-CREATIVE PROCESS OF MULTICULTURAL TEAMS ADDRESSING SOCIAL DESIGN ISSUES	25 - 30
PEDAGOGICAL INNOVATION: A LABORATORY FOR COLABORATIVE AND INCLUSIVE DESIGN	31 - 36
THE T-SHAPE OF FEMALE DESIGN ENGINEERS: STUDYING HOW THE DESIGN SKILLS OF FEMALE DESIGN ENGINEERS EVOLVE THROUGH THEIR CAREERS	37 - 42
HOW DID WE END UP HERE? MAKING DESIGN HISTORY RELEVANT FOR FUTURE INDUSTRIAL DESIGN ENGINEERS	43 - 48
A STUDY ON ENHANCING FEMALE HIGH SCHOOL STUDENTS' STEM CAREER AWARENESS THROUGH CAREER EDUCATION IN JAPAN	49 - 54
FROM BEATS TO BLUEPRINTS: RETHINKING CREATIVITY IN ENGINEERING EDUCATION	55 - 60
DIVERSITY AND DISCOMFORT	61 - 66
DIVERSE (DIGITAL) TEXTILE DESIGNING MODELS AND THE UN-/TOUCHABLE LEARNING EFFECTS	67 - 72
CO-CREATING A PROGRAMME OF BELONGING FOR UNDERGRADUATE WIDENING PARTICIPATION ENGINEERING STUDENTS	73 - 78
INCLUSIVE SOCIAL DESIGN IN PRODUCT DESIGN EDUCATION DEVELOPING THERAPEUTIC SOLUTIONS FOR SPASTICITY IN THE MEXICAN PUBLIC HEALTH CONTEXT	79 - 84
EXPLORING THE ROLE OF INDUSTRIAL DESIGNERS IN ENTERPRISE INNOVATION STRATEGIES FROM THE PERSPECTIVE OF TALENT CULTIVATION	85 - 90
TOWARDS A TOOL FOR SCAFFOLDING DESIGN SYNTHESIS	91 - 96
RESEQUENCING CAD IN DESIGN EDUCATION: A CURRICULAR CRITIQUE OF 3D MODELLING METHODS IN PRODUCT DESIGN LEARNING	97 - 102
UNCOVERING NEUTRALITY: A CRITICAL PEDAGOGICAL ANALYSIS OF BIAS IN DESIGN THINKING FRAMEWORKS	103 - 108
THE COLOUR + GENDER FRAMEWORK: RE/DECOLOURING GENDERED SYMBOLISM IN PRODUCT LANGUAGE	109 - 114
MAKING SENSE BEFORE MAKING THINGS. BUILDING DESIGN RESEARCH LITERACY AND EPISTEMOLOGICAL AWARENESS IN FIRST-YEAR MASTER STUDENTS IN DESIGN	115 - 120
CAREER PATHWAYS OF INDUSTRIAL DESIGN GRADUATES	121 - 124
A STRATEGIC PERSPECTIVE FOR FUTURE-PROOF WORKFORCE DEVELOPMENT: INSIGHTS INTO THE DIGITAL LIFECYCLE LAB	125 - 130
INTEGRATING POSTGRADUATE, UNDERGRADUATE, AND K-12 DESIGN LEARNING THROUGH INTERNATIONAL VIRTUAL MOBILITY	131 - 136

CULTURAL AESTHETICS IN DESIGN LEARNING: BUILDING SPARSH, AN EMOTIONALLY DURABLE HYBRID GRINDER THROUGH NAVARASA AND EDD9	137 - 142
ENGINEERING INCLUSION THROUGH TACTILE INNOVATION: CO- DESIGNING ACCESSIBLE URBAN MODELS FOR DISABLED USERS IN LAMBETH	143 - 148
DESIGNING COLLABORATION, NOT ONLY PROJECTS. EMBEDDING PROJECT MANAGEMENT TO FOSTER COLLABORATIVE TEAMWORK IN PROJECT-BASED LEARNING	149 - 154
IMPLEMENTING CONTRACT GRADING IN A PRODUCT DESIGN COURSE TO PROMOTE ITERATION AND LEARNING THROUGH BUILDING	155 - 160
FROM INDIVIDUAL TO INTERCONNECTED: AI-MEDIATED MICRO-STORIES AS A PEDAGOGICAL BRIDGE FOR RELATIONAL AND ETHICAL DESIGN LEARNING IN AUSTRALIA	161 - 166
RETHINKING DESIGN EDUCATION IN AN AI-ENABLED ERA: A COLLABORATIVE AUTOETHNOGRAPHIC APPROACH	167 - 172
IMPLEMENTATION OF A RECYCLING DESIGN WORKSHOP INSPIRED BY BIOMIMICRY.	173 - 178
PROMPT, COMPARE, REFLECT, REPEAT: LEARNING RESPONSIBLE AI USE FOR PRODUCT DESIGN	179 - 184
COMPONENT SWAP ON VIRTUAL CATAPULTS FOR PROBLEM-SOLVING IN ENGINEERING EDUCATION	185 - 190
DESIGNING TO THRIVE – EXAMINING PERCEPTIONS AND EMBEDDING PRACTICE TO SUPPORT HUMAN FLOURISHING IN PRODUCT DESIGN STUDENTS AND EDUCATORS	191 - 196
EDUCATING FOR CRISIS PREPAREDNESS THROUGH DESIGN STORYTELLING	197 - 202
MENTAL IMAGERY VIVIDNESS AND ITS IMPACT ON LEARNING ATTAINMENT IN DESIGN EDUCATION	203 - 208
SIMULATION WITH OR WITHOUT DEPTH? DIDACTIC OPPORTUNITIES AND BOUNDARIES OF FEA USE IN EARLY ENGINEERING EDUCATION	209 - 214
INCLUSIVE DESIGN PRACTICE - INCREASING ADOPTION BY ENGINEERING STUDENTS	215 - 220
BEYOND HUMAN INCLUSION: AI AND THE EXPANSION OF CREATIVE PARTICIPATION IN DESIGN	221 - 226
FACILITATING MULTIDISCIPLINARYITY WHEN DESIGNING HEALTHCARE SERVICES WITH DIVERSE STAKEHOLDERS	227 - 232
CHALLENGES OF TEACHING SOFT SKILLS IN DISTANCE LEARNING: A CROSS-DISCIPLINARY APPROACH	233 - 238
THE VITRUVIAN WOMAN FROM PATRIARCHAL DESIGN TO GENDER EQUITY THROUGH ERGONOMICS EDUCATION	239 - 243
HOW ENGINEERING DEGREE APPRENTICESHIPS HAVE AN IMPACT ON EQUALITY, DIVERSITY AND INCLUSION (EDI): A LOCAL STUDY	244 - 249
ECOSYSTEMS SURROUNDING NEURODIVERSITY IN DESIGN EDUCATION; A CASE STUDY	250 - 255
UNDERSTANDING GENAI USE IN STUDENT ENGINEERING DESIGN WORK: INSIGHTS FROM A PILOT INTERVIEW STUDY	256 - 261
REFLECT, REPRODUCE, OR CHALLENGE? DECOLONISATION AND THE FUTURE OF IRISH PRODUCT DESIGN EDUCATION	262 - 267
THE VALUE OF BEING LOST: WHY UNCERTAINTY MATTERS IN DESIGN EDUCATION	268 - 273
MAPPING KNOWLEDGE INTEGRATION CHALLENGES IN PARTICIPATORY AND CO-DESIGN PROCESSES: TOWARDS A DESIGN KNOWLEDGE INTEGRATION SPECTRUM	274 - 279
ROLL THE DICE, RANDOM QUESTIONS IN THE MIDDLE	280 - 285

APPLYING GENERATIVE AI IN DESIGN EDUCATION: AN OVERVIEW OF CURRENT WORK AND FUTURE RESEARCH DIRECTIONS	286 - 291
DETERMINING THE COMPETENCIES IN DESIGN LITERACY AND PEDAGOGICAL LITERACY FOR NON-DESIGN-TRAINED HIGH SCHOOL TEACHERS TO EFFECTIVELY FACILITATE DESIGN-BASED COMPLEX PROBLEM-SOLVING IN GENERAL EDUCATION	292 - 297
DIVERSIFY EXPERIENCES: MOTIVATE SUSTAINABILITY IN DESIGN PROJECTS	298 - 303
MORE-THAN-HUMAN DESIGN PEDAGOGIES IN INDUSTRIAL DESIGN: A SYSTEMATIC REVIEW	304 - 309
USER-CENTRED DESIGN OF THERAPEUTIC DEVICES FOR MOUNTED EQUINE-ASSISTED THERAPY WITH CHILDREN WITH INTELLECTUAL AND MOTOR DISABILITIES	310 - 315
MAPPING REGENERATION: SYSTEMIC THINKING AND DIVERSITY IN DESIGN EDUCATION THROUGH GIGAMAPS IN MEXICO'S SIERRA GORDA	316 - 321
UNIVERSAL DESIGN – EVOLUTION OR REVOLUTION? AN INTERROGATION OF UNIVERSAL DESIGN AS A CATALYST FOR EQUITY, DIVERSITY AND INCLUSION THROUGH THE LENS OF PRODUCT DESIGN THEORY, PHILOSOPHY AND PRACTICE	322 - 326
PROFESSIONAL PRACTICE – REFLEXIVITY AND EDI	327 - 332
CRAFT EDUCATION AS A CATALYST FOR CULTURAL SUSTAINABILITY IN SAUDI DESIGN CURRICULA: A CASE STUDY OF DESIGN STUDENTS AT IMAM ABDULRAHMAN BIN FAISAL UNIVERISTY	333 - 338
BRIDGING DISCIPLINES: COOPERATIVE EDUCATION OUTCOMES IN INDUSTRIAL DESIGN AND MECHANICAL ENGINEERING	339 - 343
INFLUENCES OF PEER CRITIQUE, COLLABORATION AND ITERATION ON TEAM DYNAMICS AND HUMAN CENTERED DESIGN OUTCOMES IN PRODUCT DESIGN STUDIOS	344 - 349
TRANSITIONING TO REGENERATIVE DESIGN: LEARNING BEYOND TRADITIONAL EDUCATION	350 - 355
CAN I WORK WITH YOU? THE IMPACT OF GROUP ALLOCATION CONSTRAINTS AND THE OPPORTUNITY FOR STUDENTS TO WORK WITH ONE ANOTHER	356 - 361
SERVICE DESIGN FOR AND WITH CHILDREN: A COLLABORATIVE STUDIO EXPERIENCE	362 - 367
URBAN GARDEN AS A TOOLKIT FOR UNDERSTANDING DIVERSITY IN DESIGN EDUCATION	368 - 372
AI-GENERATED FORMATIVE FEEDBACK FOR ENGINEERING LAB REPORTS	373 - 378
FILLING THE (EDUCATIONAL) GAP: DESIGNING FOR AND WITH THE FUTURE	379 - 384
TEACHING ENGINEERING DESIGN RESEARCH SKILLS; AN AUTHENTIC APPROACH	385 - 390
TEAMING UP TO PREPARE STUDENTS FOR PUBLIC-SECTOR SERVICE DESIGN	391 - 396
BEYOND VISUAL TOOLS: AN INCLUSIVE EDUCATIONAL EXPERIENCE IN CO-DESIGNING YACHT INTERIORS WITH AND FOR USERS WITH VISUAL IMPAIRMENTS	397 - 402
REGENERATIVE RESPONSIBILITY IN ACTION: CO-CREATION OF KNOWLEDGE IN TIMBER COMMUNITIES OF QUERÉTARO	403 - 408
INTEGRATING DESIGN THINKING TO FOSTER PATENTABLE INNOVATION IN DESIGN EDUCATION	409 - 414
THE DIVERSITY OF LEARNERS' VOICES AS A DRIVER FOR DESIGNING A LEARNING SYSTEM 4.0 THROUGH A TRIZ-BASED METHOD	415 - 420
SET UP TO FAIL: REFLECTIVE PRACTICE AND CULTURAL ADAPTATION IN TEACHING DESIGN AT A TRANSNATIONAL INSTITUTION IN CHINA	421 - 426

TEAM DYNAMICS & AI MEDIATION: THE CENTRALITY OF DECISION-MAKING IN DESIGN ENGINEERING HIGHER EDUCATION	427 - 432
A FRAMEWORK FOR FORMATIVE FEEDBACK, ENCOURAGING ENGAGEMENT AND AUTONOMY OF NEURODIVERGENT STUDENTS	433 - 438
OBSERVATIONS ON STUDENT DESIGN STRATEGIES IN THE CONTEXT OF A COLLABORATIVE TIMBER DESIGN WORKSHOP	439 - 444
DESIGNING REFLECTION: LEARNING ABOUT SUSTAINABILITY IN SMALL CRAFT-BASED DESIGN FIRMS	445 - 450
STRATEGIC USE OF FORMATIVE ASSESSMENT IN NEURODIVERSE CLASSES WITHIN ENGINEERING	451 - 456
AI – A PROBLEM SOLVER IN ENGINEERING EDUCATION? OPPORTUNITIES FOR MORE INCLUSIVE PRODUCT DEVELOPMENT TEACHING	457 - 462
EXAMINING REFLEXIVITY: QUESTIONING VALUES THROUGH VISUAL-VERBAL DESIGN MODELS	463 - 468
ADAPTING GUIDELINE-BASED ENGINEERING TRAINING FOR CULTURALLY DIVERSE TEAMS: INSIGHTS FROM INDUSTRIAL CAD/PLM TRANSITIONS	469 - 474
UNDERSTANDING MOTIVATIONS IN INDUSTRIAL DESIGN GRADUATE EDUCATION: A MULTI-STAKEHOLDER ANALYSIS	475 - 480
HUMAN-CENTRED DESIGN FOR ENVIRONMENTAL EDUCATION: CO-CREATING PLAYFUL TOOLS TO ADDRESS TEXTILE WASTE IN CAMPANA–ALTAMIRA	481 - 486
AI-ENHANCED GAMIFICATION IN ERP SIMULATION: THE MXREP AND VIRTUAL PLANT APPROACH	487 - 492
FROM CLASSROOM TO CONCEPT: BUILDING AN INCLUSIVE PRODUCT DESIGN STUDIO FOR GRADUATE STUDENTS	493 - 498
DESIGN PROCESS FOR INTEGRATIVE REASONING: A MODEL FOR IDENTIFYING AND ENHANCING COMPETENCIES	499 - 504
IS THERE A DESIGN PATH TO CREATING VENTURES?	505 - 510
INCLUSIVE DESIGN: LEARNING THROUGH REAL-WORLD COMPLEXITY	511 - 516
BEYOND MY SIGHT: DESIGNING INCLUSIVE TOOLS AND REDESIGNING GAMIFIED VR ACTIVITIES FOR VISUAL IMPAIRMENT	517 - 522
AM I MY BROTHER'S KEEPER? WHAT THE WORLD'S MAJOR RELIGIONS TEACH US ABOUT INCLUSIVE DESIGN	523 - 528
THE IMPACT OF STAGE TRADITION DERIVED ROLE-PLAY ON DESIGN THINKING PEDAGOGY	529 - 533
DESIGN THINKING IN PRACTICE: AN INTERNATIONAL CROSS-CASE EDUCATION COMPARISON OF PEDAGOGICAL PATHWAYS	534 - 539
HOW DO STUDENTS' PERSONAL AND CULTURAL BACKGROUNDS INFLUENCE THE DEVELOPMENT OF THEIR DESIGN IDENTITIES WITHIN UNDERGRADUATE PRODUCT DESIGN EDUCATION?	540 - 545
UNLOCKING SPATIAL FLUENCY: A SCAFFOLDED APPROACH TO VR VISUALIZATION IN FOUNDATIONAL DESIGN EDUCATION	546 - 551
BREAKING BARRIERS, BUILDING BRIDGES: FOSTERING TRANSDISCIPLINARY LEARNING BY USING FACILITATIVE INTERVENTIONS	552 - 557
BRIDGING DISCIPLINES THROUGH MAKING: COMPETENCY DEVELOPMENT IN INTERDISCIPLINARY WEARABLE REHABILITATION TECHNOLOGY EDUCATION	558 - 563
ENGINEERING GROUP SUCCESS THROUGH ACTIVE INTERVENTIONS AND COMMUNITY BUILDING	564 - 569

DESIGNING COLLABORATION, NOT ONLY PROJECTS. EMBEDDING PROJECT MANAGEMENT TO FOSTER COLLABORATIVE TEAMWORK IN PROJECT-BASED LEARNING

Francesca MATTIOLI and Martina LABARTA LABRADOR
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ABSTRACT

Collaboration and project-based learning are central to design and engineering education, yet their integration often lacks systematic pedagogical support and explicit instructional design. This paper investigates how instructional innovation can strengthen the integration of collaboration and project management within a multidisciplinary and international PBL course. It presents the iterative development of a teamwork-focused module in a Design & Engineering master's programme at Politecnico di Milano, initially introduced to foster collaborative competences and later expanded to incorporate project management practices. Over six years and three research-through-instructional-design (RTID) cycles, structured tools, peer review formats, visual frameworks, and a digital platform were implemented to make team processes visible, coordinated, and reflective. The study draws on qualitative analysis of voluntary student feedback (n=18 in the final cycle), focusing on self-reported learning and course appreciation. Findings show that collaboration and project management are mutually reinforcing students framed teamwork as a professional responsibility while developing organisational and relational competences. Those reporting gains in planning and workflow organisation also valued collaboration most strongly. The iterative cycles enabled consolidation of effective practices while sustaining ongoing refinement. The findings highlight the importance of systematic teaching staff self-assessment in fostering inclusive, adaptable, and relationally grounded PBL environments.

Keywords: Collaborative learning, project-based learning, teamwork, project management

1 INTRODUCTION

Collaborative learning is widely employed in design and engineering pedagogy, especially in project-based learning (PBL) courses [1]. The learning experience in PBL becomes particularly rich when collaborative learning in culturally plural classes is also integrated: students learn to draw on diverse expertise and viewpoints to tackle complex projects, thereby exercising their social competencies. Despite the centrality of collaboration in PBL education, instructional design and coaching methodologies to foster collaborative competences remain largely unexplored and have only recently been addressed [1, 2]. Building on the mutual influence of collaboration and project management (PM) identified in the literature, this paper addresses the following research question: *How can instructional design innovation support the integration of PM and collaboration within complex, multidisciplinary PBL courses?* The research presents an assessment of students' self-reported perceptions of learning in a PBL course, in which collaboration and PM have been robustly incorporated into a six-year process.

2 THEORETICAL BACKGROUNDS

2.1 Mutual relationship between collaboration and PM

Research shows that project success becomes more likely as intra-team collaboration improves. Collaboration functions as a critical human success factor, shaping both project outcomes and team morale. It supports the integration of diverse knowledge, fosters innovation, and connects interpersonal satisfaction with tangible performance indicators such as schedule compliance. Empirical evidence indicates that collaboration—remarkably when grounded in trust—is a strong predictor of overall project success [3]. Conversely, project management provides structures and tools that enable sustained collaboration. PBL can provide coordination mechanisms (e.g., task allocation and milestone tracking),

while contemporary PM applications support task organisation, timelines, and communication [4]. Project management roles further ensure alignment and accountability through tools such as work breakdown structures and communication plans. This reveals a dialectic relationship: collaboration fuels project performance, while project management provides the framework that enables it.

2.2 Framing research-through-instructional-design (RTID)

We frame research-through-instructional-design (RTID) as an approach that examines learning—and learning about instruction—within a constructivist paradigm, where learners actively construct knowledge through experience and interaction, and their experiences in turn inform instructors’ understanding of instructional design [5]. Within this paradigm, instructional designers and educators no longer treat instructional design as a linear planning activity; instead, they enact it as an iterative process that continuously moves between reflection and action in complex learning environments [6]. Because contextual and social factors strongly shape teaching, educators increasingly rely on action research approaches that integrate inquiry with practice and support the continuous improvement of learning settings [7]. Among the possible relationships between research and instructional change, RTID can be framed as instructional research *as* improvement [6]. Educators’ professional actions themselves generate knowledge, but if they lack explicit self-reflective methods, many teaching experiments remain tacit and difficult to consolidate as research. RTID addresses this gap by treating instructional modifications as situated research opportunities. When educators document how they iteratively reconfigure interconnected components of teaching practice—such as activities, assessment, grouping, and curriculum resources [8]. Through documented RTID, instructional researchers can transform local experimentation into cumulative knowledge about learning ecosystems.

3 METHODS: A SIX-YEAR RETROSPECTIVE ON THREE CYCLES OF RTID

The research is framed as a retrospective of three RTID cycles across six editions of a PBL course, with results focused on the final cycle. The course, Final Project Work (FPW), is a mandatory design studio in the Design & Engineering master’s programme at Politecnico di Milano, with 50–60 students annually, coming from different world-regions, different background disciplines (i.e., industrial design, engineering) and professional experiences. The teaching staff includes 5–6 lecturers from diverse backgrounds (e.g., product design, mechanical and materials engineering), each leading a module, and a teaching assistant. The first and second authors served as lecturer and teaching assistant, respectively.

Table 1. Previous publications associated with the three RTID cycles

Cycle	Associated publication			
	Title	Authors	Year	Venue
First Cycle	Never Take Teamwork for Granted! A Tutorship Experience on Soft-Skills	Mattioli F. & Ferraris S. D.	2021	E&PDE Conference
	Learning and Teaching Global Cooperation Skills in Culturally Plural Design. Collaborative Learning Practices and Experiences in Plural Classes	Mattioli F.	2022	Doctoral Thesis
Second Cycle	Peers as Experts to Cooperate with: a Case Study of Teaching Activities to Switch from Inter-Group Competition to Collaboration in a Design Studio	Mattioli F., Figoli F.A. & Wilhelm G.	2023	E&PDE Conference
Third Cycle	Seeing the Process: Empowering Students in Design and Engineering through Visual Frameworks	Labarta Labrador M., Mattioli F. & Ferraris S.D.	2025	E&PDE Conference
	Prototyping collaboration: managing collaborative projects in design education	Labarta Labrador M. & Mattioli F.	2025	Section of the book <i>Prototyping and Experiential Knowledge</i>

The six years of RTID are summarised by highlighting the key instructional design elements of each cycle. Insights were gathered after each edition via voluntary, non-anonymised surveys completed after the final marks, in which students reflected on what they learned, what they liked most and least, and any suggestions for improvement. De-anonymisation seeks to ensure that students’ feedback remains assertive and meaningful. The survey included a notice informing of its voluntary nature and the potential use of anonymised data for academic publication. Around 15-20 students (about 20-30% of the class) answered each year. A voluntary participatory design session with students followed the questionnaire. Here, teaching staff guided students in addressing questionnaire-identified issues and formulating instructional design solutions, some of which were implemented. Involving students as

research participants turns RTID into a co-design methodology in which meaningful educational changes can emerge bottom-up rather than top-down, as in many instructional settings. Sharing decision-making can enhance students' self-agency and aims to achieve more targeted benefits. Although yearly adjustments drew on prior insights, reporting is organised in two-year cycles, reflecting the introduction of major design changes. Table 1 lists publications documenting these intermediate steps.

The results of the survey were analysed qualitatively, following a thematic coding methodology. The coding process helped find patterns in answers to questions "What I learned" and "What I liked." Frequent answers were clustered in macro-topics to find tensions and correlations between what students perceived they had learned and what they valued.

3.1 First cycle (Intra-team Collaboration): academic years 2020-2021 and 2021-2022

In response to the lack of explicit support for student teamwork, the first RTID cycle implemented the "Teamwork Module" as a mandatory, evaluated component of the FPW. Initially, students—especially those with prior PBL experience—underestimated the module, but structured activities such as team agreements and reviews highlighted that teamwork is a professional competence requiring active management. Mandatory integration proved more effective than optional seminars in this grade-oriented context. The cycle also investigated global cooperation skills—specifically the ability to express views, build consensus, and defuse conflicts—, showing that a teaching staff expert can act as a bridge between students and instructors, providing crucial feedback on transferable competences.

3.2 Second cycle (Inter-team Collaboration): academic years 2022-2023 and 2023-2024

The first cycle demonstrated that, beyond intra-team collaboration, a highly competitive culture characterised the context where FPW was situated (i.e., class, curricula, school level). Such competition, especially emerging at the inter-team level, was hindering the effectiveness of collaborative competence development. Thus, the iteration focused on the poor class-level collaborative climate by designing instruction to enhance the relevance of peer support and knowledge sharing across teams. Findings showed that introducing the "large design studio" metaphor and shared technical research tasks significantly mitigated competition. Activities such as simultaneous multi-team reviews and shared digital boards for peer reviews during milestone presentations (e.g., Padlet) fostered a culture of help and collaboration at the class level, alleviating the pressure and stress on intra-team dynamics. Data confirmed that students perceived this as a unique advantage compared to other team-based courses.

3.3 Third cycle (Project Management): academic years 2024-2025 and 2025-2026

Given persistent negative feedback on overall course organisation, particularly in coordinating design, technical, material, and manufacturing modules, the teaching staff undertook systematic self-assessment and optimisation. The Teamwork Module was restructured and renamed the Project Management Module, integrating a Notion-based platform to unify communication and make collaborative processes tangible. Students recognised project management tools as essential for navigating complexity and making trackable design decisions. The FPW process was visually presented using a Gantt-style chart, which proved too rigid, leading to a revised visualisation reflecting divergent-convergent phases. Finally, a randomised team assignment system replaced self-selection, incorporated student preferences, and prevented previous exclusionary dynamics. These changes were informed by results collected after the first year of the two-year cycle. The next sections present the results of the latest assessment of the course's last edition (i.e., fall semester, AY 2025-2026) through qualitative coding of responses to the open questionnaire (n=18; 35% of students). The analysis is here limited to self-reported learning (i.e., what I learned) and the appreciation of the course experience (i.e., what I liked) because these two allowed building an interpretation around learning related to collaboration and PM, as well as the elements of course design that were appreciated and connected with these learning outcomes.

4 RESULTS

4.1 What I liked: Appreciation of the course experience

The findings show that measures introduced across the three RTID cycles have consolidated, become established, or gained renewed recognition among successive cohorts. Some practices persisted positively for six years, others remained valued after four, and recent interventions show early signs of sustained impact beyond their initial two-year testing phase.

Consolidated teaching staff support. One of the most meaningful actions taken at the very beginning of the RTID pathway was assigning a member of the teaching staff to support and mentor students as they navigated the complexity of teamwork (Fig. 1). This innovative effort has since become a vital component of the course. Nearly one-third of the respondents (n=5) clearly recognised and valued “the level of interest and care” the teaching staff invested in organising the course. One student reflected that the teaching staff’s primary priority genuinely seemed to be helping students succeed while fostering a safe space for “open and honest discussion”. Also, supporting teams based on their individual needs and struggles through one-to-one, on-demand reviews proved highly valued and helpful. Overall, a collaborative student–teacher relationship took shape and consolidated over time.



Figure 1. Codes clustered under “Consolidated Teaching Staff Support”

Established collaborative and teamwork practices. Some students (n=7) reported experiencing a more collaborative and open dynamic among peers than in previous courses (Fig. 2). Multi-team reviews and peer review sessions (n=2 respondents) emerged as particularly effective practices for fostering class-level collaboration. Students described them as reducing performance pressure while creating space for team-to-team dialogue. The new randomised team-formation format was overall well received (n=4). One student shared that they were actually “very happy with the random teams”. This increased teams’ cultural plurality and pushed students beyond their comfort zones, encouraging self-awareness. As one noted, “I got proof that general communication (mine first) needs urgent improvement”.



Figure 2. Codes clustered under “Establishment of Collaborative & Teamwork Practices”

Enhanced course structure and organisation. The effort to make project and course phases explicit, structured, and cohesive was noted (Fig. 3). One student wrote, “what I liked most was the organisation of the design phases and the time allocated to each”. Students appreciated that the thematic modules were interrelated and highlighted the course’s pacing, with one noting, “it was great to see a course that actually values our free time and holidays, allowing us to balance the workload effectively”. Clear milestones and deadlines supported self-management and reduced stress, while enabling students to “thoroughly explore every aspect of the project”.



Figure 3. Codes clustered under “Enhanced Course Structure & Organisation”

4.2 What I learned: Self-reported learning

The perceived learning outcomes clustered around three areas (Fig. 4): Design Process Understanding (n=13), Project Management and Organisation (n=10), and Teamwork and Interpersonal Skills (n=10).

Design process understanding. Students described how they began to see the Design and Engineering (D&E) project as a whole rather than as a sequence of disconnected phases. They recognised the complexity of the process and reframed iteration as a necessary act of refinement rather than repetition. Several highlighted learning how to craft a counter-brief, a moment that marked a shift from executing

tasks to questioning and reframing them. Others stressed the importance of contextual research and of grounding design decisions in a clear understanding of product meaning.

Project management and organisation. Respondents emphasised learning to define roles more clearly and allocate tasks more deliberately, which led to more structured workflow planning. They did not describe project management tools as mere technical additions. Instead, they linked them to a growing sense of responsibility and foresight. Managing time under pressure, balancing uneven workloads, and organising milestones pushed them to shift from reactive coordination to intentional planning. One student described this shift as a move toward a more mature way of structuring complex projects.

Teamwork and interpersonal skills. Students generally reported gaining experience in intra-team and class-level collaboration, practising compromise, and regulating emotions. Peer review moments and collaboration beyond personal comfort zones challenged established habits and required active negotiation, which proved essential in fostering a sense of self-efficacy in “handling teamwork more civilly and professionally”. Students described learning to listen—particularly in giving and receiving constructive criticism within the team—to tolerate ambiguity, manage tension, and self-assessment.

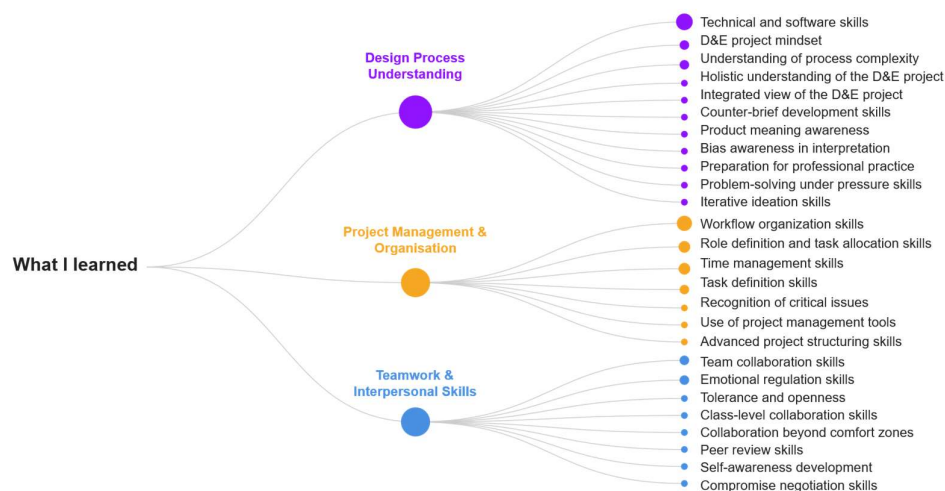


Figure 4. Code clusters related to the students' self-reported learning areas

5 SO-WHAT: ANSWERING THE RESEARCH QUESTION

The following analysis is based on the patterns visualised in Fig.5, which map the intersections between students' reported learning and their appreciation of course elements.

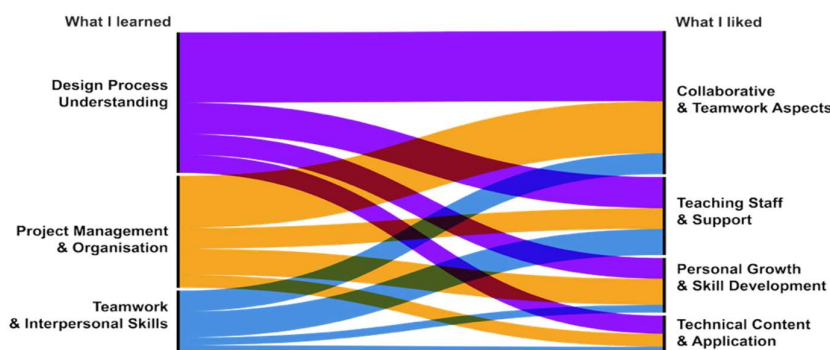


Figure 5. Intersection of learning and appreciation clusters; link thickness represents the number of respondents mentioning both in their responses

Hard learning, soft appreciation. “Hard” domains dominate students' descriptions of learning, while “soft” domains emerge in what they valued most. Students report process literacy, role definition, and workflow planning as outcomes, yet emphasise collaboration, dialogue, and teamwork. This crossing suggests complementarity: technical and organisational learning unfolds within relational conditions, with those gaining project management skills also valuing collaboration, moving between domains.

Collaboration as the central dimension. “Collaboration and Teamwork Aspects” is the most appreciated dimension of the course. Many students who reported gains in “Design Process Understanding and Project Management” identified collaboration as one of the course's strongest values. The same respondents often appear in both clusters. Students who strengthened their understanding of process and organisation also saw the importance of collaboration in shaping that growth.

The collaboration and project management synergy. The data show a mutual relationship between project management and collaboration, supporting theoretical claims that they reinforce each other. While project management emerged mainly as a learning domain, collaboration was the most appreciated aspect. Students who gained skills in planning, role definition, and workflow organisation also valued collaboration highly, suggesting that structured project management clarifies responsibilities and communication, while collaboration gives these tools meaning in everyday team interactions. The findings point to a reciprocal link: organisational clarity supports collaboration, and collaboration, in turn, strengthens organisational learning within the project-based environment.

Teaching staff as a driver of relational learning. Another meaningful intersection concerns “Teaching Staff Support”. Students who valued mentoring, structured feedback, and facilitated dialogue often reported growth in teamwork and interpersonal skills. The teaching staff's approach shaped how teams negotiated roles, managed tension, and practised peer review. Appreciation for support aligns with reported development in relational competence.

CONCLUSION AND FUTURE WORK

This study reinforces the idea that collaboration is not merely a complementary element but an intrinsic component of both project management implementation and learning in PBL environments. The research empirically supports the view that structured project management practices and collaborative dynamics are mutually reinforcing, especially in culturally plural contexts: clear roles, milestones, and workflow planning provide the conditions for effective teamwork, while active collaboration gives project management its practical and relational significance. The iterative approach adopted over six years demonstrates the value of consolidating established practices and enhancing them, ensuring that successful interventions become embedded while remaining open to refinement and adaptation. A limitation is survey responses: participants who choose to answer the questionnaire may differ from the broader student population. Finally, the results underscore the importance of teaching staff engaging in systematic self-assessment: their reflective practices not only guide instructional improvements but also shape students' relational learning, reinforcing collaboration as a central outcome of PBL.

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