



FLAVIA NISTOR, YIMING XU,
QIANRONG GUO, PONNI ASHOK

GRAND CHALLENGE
2026

THE OFFCUT LAB



SUSTAINABILITY - EDUCATION



PERSONAL CONTRIBUTIONS

FLAVIA NISTOR

MA Fashion

- Outreach for sourcing waste materials
- Conducted primary research by engaging with professionals working within the education system
- Developed both leather and woven material prototypes
- Researched appropriate making techniques
- Presentation design

YIMING XU

MA Design Products

- Participated in every discussion.
- Conducted leather research on history, craftsmanship, and types.
- Explored prototyping leftover scraps from before.
- I created a small product using the waste leather transported by the company.

QIANRONG GUO

MA Service Design

- London leather waste research & ecosystem of leather products
- Research on what are we trying to achieve with circularity
- Research on Industry engagement
- One ideation and prototyping

PONNI ASHOK

MA Textiles

- Design technology curriculum research
- Industry benefits and UK education policies research
- Outreach for waste sourcing
- Exploration 1 ideation and prototyping
- Planning and synthesising all research for final presentation by slides



THE MACRO PROBLEM

ONLY  70% OF A  SKIN IS USED TO MAKE A BAG

KEY POINTS:

- LOST MATERIAL VALUE
- LOST EMBEDDED ENERGY
- MISSED REUSE POTENTIAL

UK TEXTILE WASTE EXISTS

UK PRODUCES



OF WASTE

Leather is a concentrated, high-impact stream but rarely reused locally.





CASE STUDIES

CURRENT MODELS LINKING DESIGN, SUSTAINABILITY, AND LEARNING

Education Initiatives Material redistribution initiatives



Fixperts

- Uses design thinking to solve real community problems through making.
- Frames sustainability as a core design skill, not an add-on. Embeds into design education frameworks and toolkits



ReFAB

- Acts as a material library for surplus fabrics, supporting reuse through making and workshops.



THE LEATHERSELLERS

- Collects and redistributes surplus leather from UK tanneries to design universities to reduce industrial waste and support material education.

These initiatives embed sustainability into learning frameworks, but do not focus on material reuse as a core design method.

Fixperts (2023)
UK Design Council (2021)

These initiatives treat waste as a material resource, but do not embed it into structured school learning.

Leathersellers' Company (2020), The Surplus Leather Project.
ReFAB Studio (n.d.)



OUR
PROPOSAL

WE PROPOSE A LOW-BARRIER MODEL THAT REPURPOSES INDUSTRY WASTE INTO SCHOOL DESIGN EDUCATION



Uses industry
waste (leather
+ end of life
textiles) as the
primary material



Modular
workshop
framework
for schools



Designed
from KS3
Design and
Technology
contexts



OUR PROPOSAL

KS3 Design and Technology alignment

What the curriculum emphasises

Material-led design (waste)



Design a useful object



Choice, making and iteration



Local waste becomes both the material and the learning context

Local waste as a design context



- Locally sourced leather waste, post-consumer and end-of-life fabrics.

SUPPORTING CONCEPTS

- material literacy
- systems awareness
- supply chain
- reuse
- desiging with waste
- circular design systems
- ethical and local sourcing

How we are exploring the DT ideology.



DT PRINCIPLES

Our explorations

DIFFERENT SKILL LEVELS

A variety of technical complexity

DIFFERENT FACILITIES

Different tools to accomodate difference in access

LEARNING THROUGH MAKING

All explorations produce functional objects

ITERATION AND TESTING

Students adjust size, form, fastening, colour



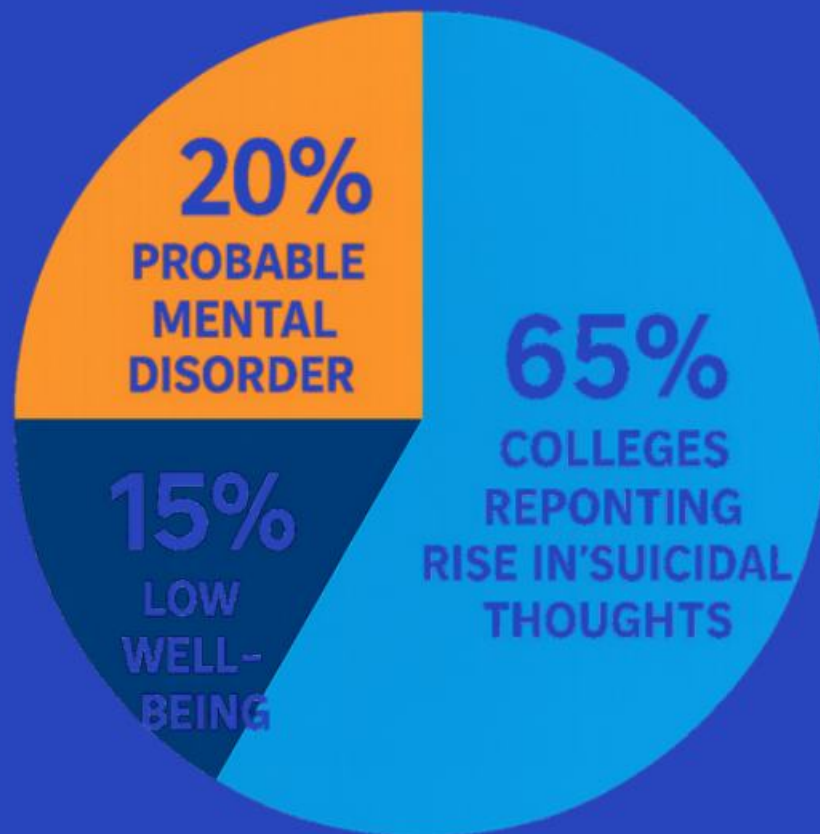
PRIMARY RESEARCH

Methods

- Semi-structured interview with an education professional (Valentina)
- Informal consultation with Hannah Lambert (education & schools liaison)

KEY INSIGHTS

- HANDS-ON LEARNING: DIRECT MATERIAL ENGAGEMENT; “LOOSE PARTS.”
- KS3 ENGAGEMENT
- SKILLS & WELLBEING
- DELIVERY CONSIDERATIONS

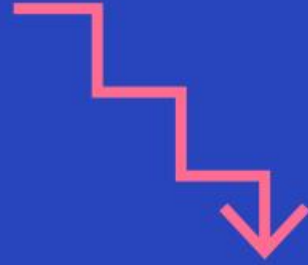




MATERIAL SOURCING

BRIDGE OF WEIR REFAB STUDIO

We sourced real industry waste as the primary material for the workshops.



WASTE BECOMES THE STARTING MATERIAL, NOT A THEME.



Surplus and offcut leather from
an automotive leather
manufacturer



End-of-life and surplus textiles
from fashion and interior
industries



FROM MATERIAL EXPLORATION TO WORKSHOP- BASED LEARNING

- Each workshop introduces new material logic + construction skill
- Focus: Making through iterative testing
- Students discover leather's properties through hands-on manipulation

METHODS

- EXPERIENTIAL LEARNING (KOLB, 1984)
- CONSTRUCTIVIST LEARNING (PIAGET / BRUNER):
KNOWLEDGE BUILT THROUGH ACTION
- “LEARNING BY DOING”



WORKSHOP 1

KNOTTING & WEAVING



FOCUS

Work only with the shape of the offcut. Free exploration of leather through knotting and weaving. No patterns, no stitching, only tension and interlacing.

WHAT STUDENTS DO

Manipulate leather strips by hand. Build structure through knots and weave. Observe stiffness, flexibility and resistance.

WHAT STUDENTS LEARN

Material properties through touch. Stability created by tension. Form emerging without fixed templates

METHOD

Experiential and embodied learning (learning through doing and handling).



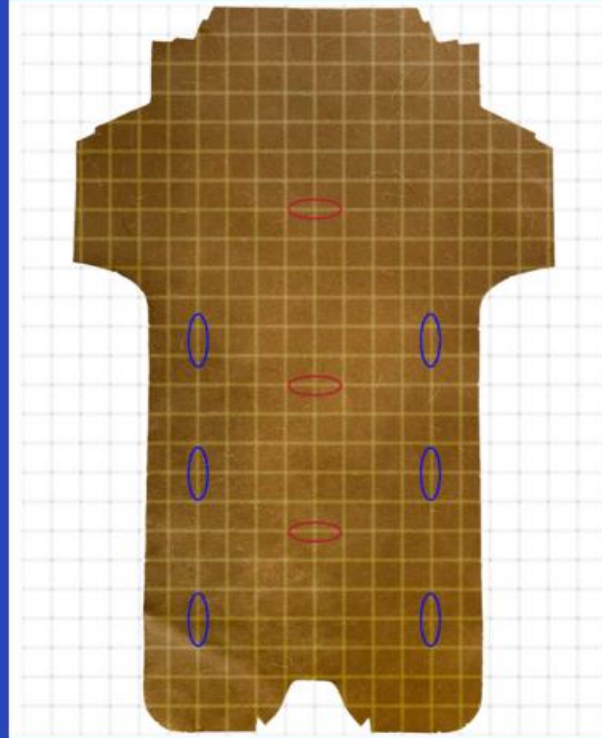
GUIDE

TO START WITH

KNOTTING



DRAW A BASE GRID



FOLD AND IDENTIFY SEAMS





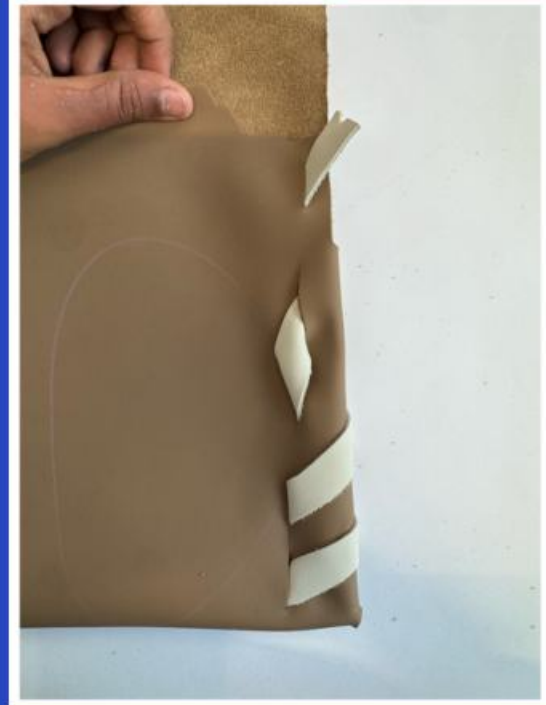
GUIDE

TO START WITH

SLIT FOR THE SEAMS



WEAVE AND KNOT THE
ENDS TO SECURE





FOR EXAMPLE



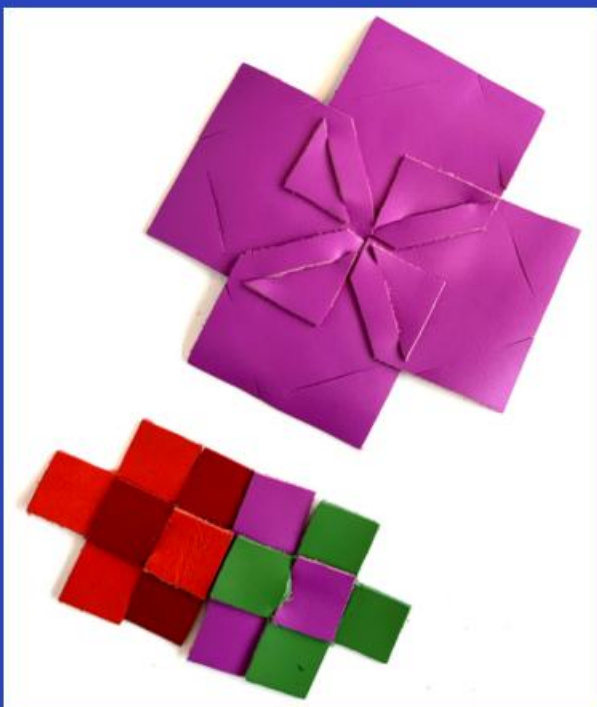


FOR EXAMPLE





SLITS & INTERLOCKING



FOCUS

Using cutting and slotting to transform flat offcuts into volume.

WHAT STUDENTS DO

Cut slits into irregular leather shapes. Slot and interlock parts. Fold flat forms into 3D structures.

WHAT STUDENTS LEARN

Relationship between shape and structure. Parts-to-whole construction logic. How repetition creates form

METHOD

Constructionist learning, understanding systems by building them.



GUIDE AND EXAMPLE

OPTION 1 - ONE 2D PIECE TO 3D

SLIT AND INTERLOCK



GUIDE AND EXAMPLE

OPTION 2 - MANY SMALL 2D PEICES TO 3D

REPEAT, SLIT AND INTERLOCK





WORKSHOP 3

FASTENERS & FUNCTION

FOCUS

Introducing hardware to explore closure, durability and function. Combine knotting, interlocking and fasteners to create new structural variations

WHAT STUDENTS DO

Add snap fasteners or rivets. Create openings and closures. Test stability and access. See how to

WHAT STUDENTS LEARN

Difference between temporary and fixed joins. How function changes form. How hardware reinforces structure.

METHOD

Design-for-purpose and functional problem-solving.



GUIDE AND EXAMPLE

WEARABLE OR CARRYABLE FORMS

PATTERN CUT, IDENTIFY CLOSURES, INSERT HARDWARE



repetitive
2D forms +
fasteners



folding
+ fasteners

folding
+ fasteners
+ knotting



EXPERIMENTATION

OTHER EXPLORATIONS

AN ALTERNATIVE FOR LEATHER





CUSTOMISATION

DESIGNING WITHIN CONSTRAINTS

All streams allow students to customise outcomes while working with the same waste materials and tools.

HOW STUDENTS CAN CUSTOMISE:

- Size (longer/shorter/ wider/narrower)
- Arrangement (weave pattern, fold direction, insert placement)
- Material choice (leather vs fabric, thick vs thin offcuts)
- Function (pen holder, bottle holder, pouch, strap)
- Fastening method (knot, snap button, insert, stitch, or a combination)
- Colour combinations

Customisation turns material reuse into a design decision, not a recipe.



CONTEXT

LEARNING OUTCOMES

- **DESIGN THINKING, MADE TANGIBLE: REAL INDUSTRY OFFCUTS AS DESIGN CONSTRAINT**



- **MATERIAL LITERACY: IDENTIFY MATERIAL PROPERTIES AND MATCH TO FUNCTION**



- **SYSTEMS THINKING AT KS3 LEVEL: MAP A SIMPLE LOCAL LOOP OF INDUSTRY OFFCUT TO SCHOOL WORKSHOP TO PRODUCT IN USE TO REPAIR/UPGRADE.**



- **AGENCY + RELEVANCE: DESIGN FOR REAL SCHOOL NEEDS.**



WHY LOCAL SOURCING

Curriculum-fit contexts:
KS3 DT explicitly includes working across domestic/local and industrial contexts



Authenticity:
Pupils handle the same material types used in real manufacturing



Low barrier, high variation: Offcuts naturally create constraints perfect for iteration and problem-solving.



Local narrative:
Materials, supply chains, and waste not just as theory, but in practice



CONTEXT

WHY COMPANIES BENEFIT + WHAT'S PUSHING THIS IN UK EDUCATION

WHY INDUSTRY BENEFITS POLICY DRIVERS IN UK EDUCATION

- Cost + Compliance pressure on waste:

UK organisations that produce/handle waste have legal duty of care for correct handling/transfer.

Organisations must take “all reasonable measures” to apply the waste hierarchy (prioritise prevention/reuse before disposal).

- Disposal keeps getting more expensive: Landfill

Tax rates increase

- ESG / sustainability reporting + brand trust:

Donating/redistributing usable offcuts supports measurable “waste prevention / reuse” actions for CSR claims.

- Partnerships create value from unavoidable offcuts:

converts offcuts into educational resources + proof-of-concept products, creating a positive “secondary life” pathway that aligns with the waste hierarchy.

HMRC / GOV.UK — Increases to Landfill Tax rates from 1 April 2024
UK Government (legislation.gov.uk) — The Waste (England and Wales) Regulations 2011

The Department for Education’s climate and sustainability strategy creates a policy context that supports practical, material-led learning in schools.

- DfE strategy to 2030 makes sustainability a system-wide priority:

Sustainability and Climate Change Strategy sets a 2030 vision and includes action areas like climate education and operations & supply chains

- Every education setting expected to act:

By 2025 all education settings should nominate a sustainability lead and have a climate action plan

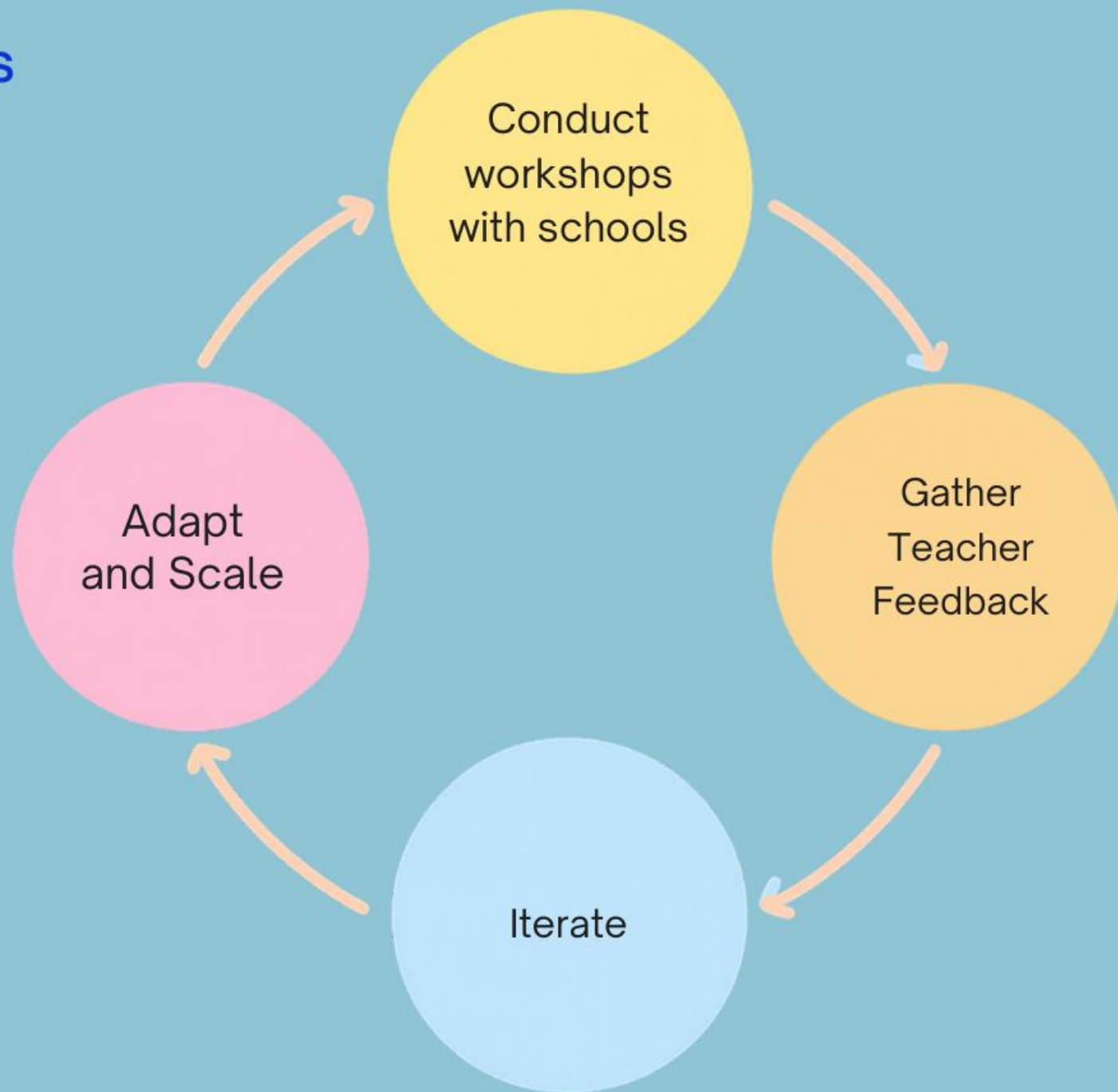
- Schools are being positioned to build ‘practical experience’

DfE strategy repeatedly emphasises hands-on activity, “practical experience,” and preparing young people for a world impacted by climate change

UK Department for Education — Sustainability leadership and climate action plans in education



NEXT STEPS





CONCLUSION

This project positions industrial textile and leather waste as a learning resource within KS3 Design and Technology. By embedding locally sourced surplus materials into material-led making, sustainability is learned through design decisions rather than abstract instruction. The work proposes a framework where reuse becomes part of how design knowledge is formed.

THANK
YOU.