



Knowing through Making

Richard Wingate, Heather King, Leigh Wilson & Elizabeth Rushton

King's Together Award funded project

2022

King's Maker Spaces

WHEATSTONE LAB
Patrick Mesquida
Megan Grace-Hughes
 Faculty NMES
 Area: 20 m²
 Capacity 5
 Staff and students by swipe access
Informal maker space for Physics and Engineering

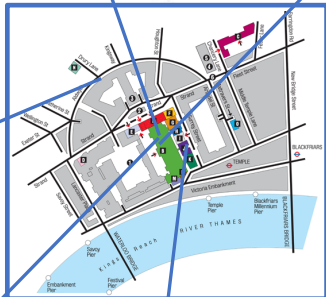
ENGINEERING MAKER SPACE
Wei Liu
 Faculty NMES
 Area: 1500 m²
 Staff and student swipe access

GUY'S COMMUNITY GARDEN
Oliver Austen
 Faculty Guy's campus
 Area: 30 m²
 Capacity: 20+
 Staff and students swipe access and signup
Growing and up-cycling, woodwork and skills shops to build a community

ARTS AND HUMANITIES IN MIDWIFERY
Penny Charles
 Faculty NMPC
 Area: 0 m²
 Capacity 85
 Students in various timetabled spaces
Creative, reflective workshops as part of core curriculum. No fixed home – small classrooms and lecture theatres

GENERAL CLASSROOM
Oliver Austen
 Faculty FoLSM
 Area: 289 m²
 Capacity 137
 Staff and students by swipe access
Large capacity 3D printing and collaboration space

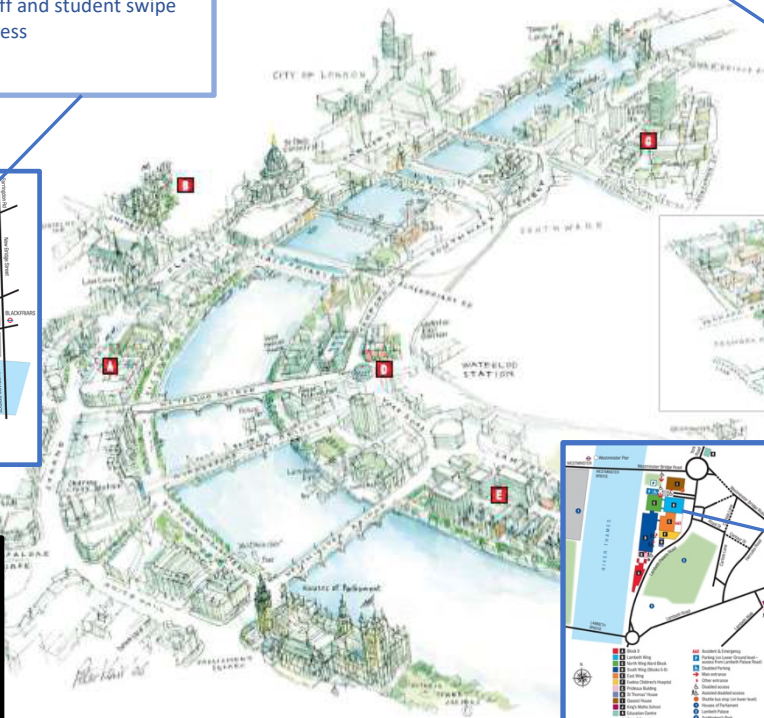
EXCHANGE
Jayne Peake
 Faculty SSPP
 Area: 240 m²
 Capacity 150
 Staff and students by swipe access
Exhibition, performance and informal study space



STRAND CAMPUS

EDUCATION MAKER SPACE
Heather King
 Faculty SSPP
 Area: 18.8m²
 Capacity:5
 Staff and students by swipe access

REACH
Ed Stevens
reachspace@kcl.ac.uk
 Faculty AH
 Area: 205 m²
 Capacity 55
 Staff and students by swipe access
Community conversation, pop-up project space disrupting education expectations



GUY'S CAMPUS

HABlab (PROPOSED)
Richard Wingate
 Faculty FoLSM/Library/Gordon Museum
 Area: 500 m²
 Capacity 353
 Staff and students by swipe access mixed with public areas.
Informal learning space and collections



ST THOMAS' CAMPUS

ENGINEERING LAB
Kawal Rhode
 Faculty NMES
 Area: 150 m²
 Capacity 20
 Staff and students by swipe access
Maker space for Engineering

Highlighted yellow boxes are featured in this report

Knowing through Making

Knowing through Making is a joint project between IOPPN, FoLSM and SSPP supported by a King's Together Award. Conducted through the pandemic, the study faced considerable challenges and relied on the willing cooperation of interviewees and an enthusiastic collaboration with undergraduate researchers.

This report surveys the range of Maker Spaces & Making practices at King's, discusses commonalities and shared experiences, and offers some initial recommendations on how both activities and spaces may evolve to further foster Making in Higher Education.

Key insights from the project

1 The origins of the space or activity can be traced to a strong vision to address a perceived deficit in opportunities to express creativity.

2 Maker Spaces and Making approaches productively challenge and extend disciplinary allegiances creating new collaborations across the College.

3 The freedom to create and own new practices and knowledges results in the learner and academic identity being reconfigured in new and surprising ways.

4 The unscripted nature of the Maker Space permits growth, expression, and inclusion.

5 Maker Spaces and participation within them, cannot be forced. The success of such spaces is in part due to their informality and ad hoc beginnings.



Emma Clarke (A&H in Midwifery)



Henrietta Dent (MA Textiles, RCA)

Introduction

In recent years, the maker movement in education has spread dramatically, encompassing a range of activities, from physical to digital, from sewing clubs to hackathons. Such projects are often located in dedicated Maker Spaces. These hubs of creative enterprise profit from an innate value in collective studio practices which, with their more pragmatic and artisanal outcomes, can encourage sharing, inclusivity, equity and learning.

In the university context, the rapid emergence of Maker Spaces necessitates consideration of their design, their educative potential, and their contribution to the wider academic mission.

Creativity and exploration may be inherent to research and practice in the disciplines of science, engineering and art, but they are not common features of most Higher Education

teaching contexts. University courses typically foreground predetermined learning outcomes, timetables and summative assessment.

By contrast, Making and the Maker Space concept sit within a nexus of creativity and playfulness where the freedom to fail is permitted and encouraged. Such practices can jar with systematised educational practices. Their introduction to the Higher Education ecosystem prompts the following questions:

[What are the pedagogical affordances of Maker Spaces for Higher Education?](#)

[What can we learn from colleagues who have successfully established Making curricula, and how can practice be shared more widely?](#)

To explore these questions, we conducted a series of interviews with a range of stakeholders across King's College. Our semi-structured in-depth conversations, lasting between 60 and 90 minutes, captured the experiences and perspectives of Making and Maker Spaces from students and academic staff, from Engineering to Arts and Humanities, and from Midwifery to community gardens.

The following are a selection of examples of Spaces, Makers and activities across King's. Our aim in this report is to showcase the range of practices on campus in order to initiate broader discussions about the role and potential of Making and Making Spaces in Higher Education.

Guy's Community Garden

"Think big, act local"

Oliver Austen



The garden spans a thoroughfare from the Guys campus to Borough High Street and is populated by concrete planters which were unused at the back of the Henriette Raphael Building. There is an ambition to expand to

another architect-landscaped area, where recycled heat from a subterranean plant room will provide a perfect bedding area.

Inspiration and Philosophy



The Community Garden is led by Oliver, a senior technical manager with an academic research background. His current position includes a sustainability mandate that gives him one afternoon per week to work on this project.

The core philosophy that guides the Community Garden is one of working towards a shared ownership of whatever activities are taking place.

This stands out as a distinctive driving force. The Garden also benefits from Oli's prior experience with the Loughborough Junction Community Garden and Re-Makery, and his core belief that Making inherently includes the practices of cultivation.

Future

A key ambition is to develop a community of regular users who can then define the uses and "rules" of the Garden. While the space cannot be entirely unsupervised, Oli hopes that many people will use the space and bring their own energy, organisation and ideas to think 'big' in this very 'local' setting.

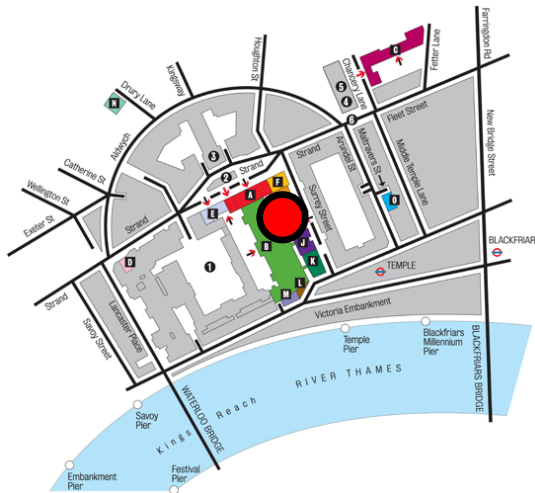
Interaction with Kings Vision

It is noteworthy that the Service Strategy and Culture and London teams have been a crucial ally in facilitating the development of a space that might otherwise have remained a landscaped pathway.

Wheatstone Laboratory

“Not a research space in the conventional sense”

Patrick Mesquida



The history

The Lab has been established for 6 years, initially funded from an external grant. The idea was to create a space equipped with manufacturing tools for students to experiment and make.

What's in it?

A sewing machine – surprisingly popular! – a 3D printer, laser cutter, and programmable drill. There are also tools that have been brought and left behind by the community.

Who uses it?

The room can accommodate 5 users. One academic and one technician ensure Health and Safety, training and maintain a membership list. The space used to be advertised on the Physics Department home page, but many of the users now come from outside the Department: for example, engineering students with an interest in Makertronics. There is a 10% core regular user base; 90% are on-off visitors. Pattern of use follows the rhythms of the academic year. It is a space for developing friendships and community.



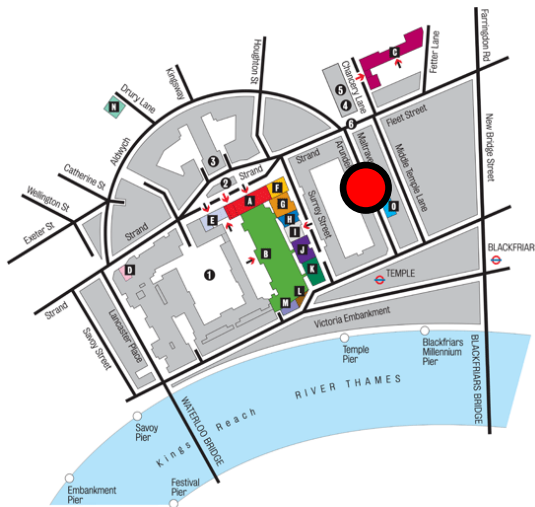
Interactions with curriculum

Traditionally, it had seemed that only a minority of Physics students wanted more hands-on “engineering” experiences. However, a new term-long group project module, with a hands-on component, has proved very popular and successful and resulted in more students utilising the space. The Wheatstone thus offers an unconventional or alternative setting to the standard Physics research laboratory (which uses more specialised and sophisticated equipment). The Wheatstone also fills an important gap in the curriculum by providing students with opportunities to explore and experiment with the affordances and limitations of a variety of tools.

REACH

“Scruffy and imperfect”

Ed Stevens and Mark Johnson



REACH (Research Engagement in the Arts, Culture and Humanities) is a hub for projects, events and conversations. A small grant helped establish the space in previously unused office space and the intention was to disrupt normal patterns of education. The idea

of inviting in the community was core to its aims but this ambition is challenged by accessibility issues and need to secure the space.



The Space

There was insufficient money to decorate the space, but its scruffiness and imperfection is now part of its essential character. REACH offers space for creativity and community, with write-on walls, lino flooring, screen printing equipment, and an adopt-a-plant scheme.

Activity

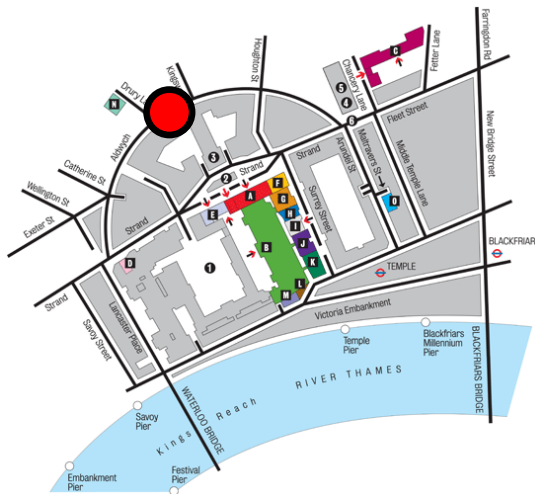
Small A&H research grants fuel activity in the space. Applications can be made by students, staff and community (via community engagement grants). In the short history of REACH, the first pop-up research call generated a range of outcomes, from networking to academic publications, in addition to opportunities for students on the KURF scheme.

Mini-evaluation projects are fed back into the planning of the space to ensure that lessons are continually learned and applied.

The Exchange

“A showcase through creative practice”

Jayne Peake



The Exchange is a large, open space on the ground floor of Bush House. It has windows onto the Aldwych and an excellent floor for dance performances. It is not a “polished” space but a multi-user environment that is currently being used for student study. Classrooms lead off the space

limiting use during teaching hours. Large architectural blocks provide some structure to the space and also permit the space to be used as an exhibition platform.

The aim of the space was to showcase the work of the SSPP through creative practice, giving space, for example, to PhD students to investigate complex themes.



Who uses it?

Student awareness of the space has grown organically. Its current use as a student study area may lead to increased awareness and interest in

the Exchange space. The footfall is expected to increase with the streetscape improvements around The Aldwych. Specific events bring in invited audiences.

Interactions with the curriculum

A key aim is to inculcate creative practice into modules. This has highlighted the need for academic champions. While the traction of art with research is relatively strong, the same creative methods resonate less easily within teaching.



Engineering Maker Space

*“Unscripted, loose but tight,
like Led Zeppelin”*

Kawal Rhode



Hard won negotiations liberated a robotics/electronics space for use by all in Engineering. The space could be

described as a “general” engineering space, offering students the chance to experiment and explore outside of traditional labs which are home to more sophisticated equipment and stricter procedures. In this way, the Maker Space provides an opportunity for open lab work that does not have to follow the regular script or programme.

How is it used?

Students bring their own equipment either to do their assigned work or simply play with Makertronics. The unscripted nature of the space creates a loose but tight environment. Freedom and creativity allow students to meet and then exceed anticipated learning outcomes.

Interaction with the curriculum

The impact has been substantial. The “open” lab has become an important part of all practical work on the undergraduate programme.

Assessment, curriculum and attendance are all aligned with exploration as the goal. Flexible approaches are deemed not only desirable but necessary.

What are the key ingredients of the space?

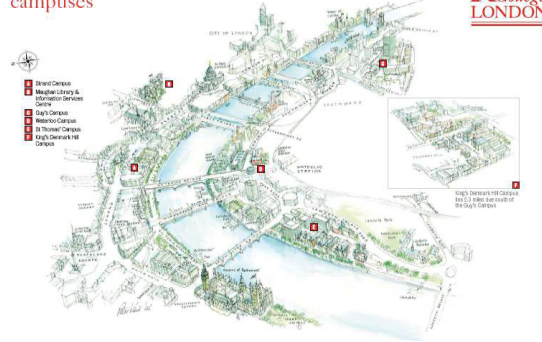
The space is a melting pot where student-student and staff-student interactions thrive. Students often shape and create functions within the space, but staff and students share resources - an atelier model of usage. This means that the space is always supported and training is available for those who need it.

Making in Midwifery

“Coping with wounds of the heart”

Penny Charles

The five campuses



There is no designated space for this innovative, compulsory module. The activity moves from venue to venue, guerrilla fashion. Any space can become a space of Making, in turn creating a safe space for reflection.

The ambition

The module was introduced on the back of concerns about resilience within the student cohort. The

activities were organised around the aim of providing tools to cope with “wounds of the heart”. The module has run as a compulsory third year unit since 2018.



Who participates?

Everyone. Its compulsory nature means that the module engages students who do not feel they have a relationship with creating or Making or art. Inviting students to explore uncertainty encourages vital self-reflection. It puts them off balance but, “If you can’t cope with this module, how will you cope with real life challenges?”

An exploration of “ways of seeing” has also been a significant part of the module. Specifically, this has allowed

trainee midwives to embrace different points of view and perspectives and also embrace ambiguity.

What happens in the module?

Creative writing, free writing, I-poems, observations and personal creative projects. The invitation to “create anything” has been a powerful tool to bring people together. Co-creation has led to the formation of friendship groups and valuable channels of communication outside the normal themes of the programme. The support of an artist-in-residence programme has been vital in embedding a creative, reflective perspective.



Artwork credits:
Katy Kay - Two twig weavings
Rosie Tate: Matryoshka Dolls

Making Insights – key findings from the project

Creativity, freedom, expression and experimentation are inherent characteristics of the Maker Spaces that we encountered at King's. By stepping sideways from the demands of a curriculum, creating windows of opportunity that reach beyond conventional demands of academic teaching, dynamic and innovative individuals have built opportunities for exploration and growth.

In each case the origins of the space or activity can be traced to a strong vision to address a perceived deficit in current teaching and learning opportunities and a determination to establish a new space for doing something different.

A common theme across all the case studies is their ad hoc emergence in the gaps created between things and events: a room that temporarily loses its purpose (the Exchange), to a new learning approach that adds a new dimension to student life (in Midwifery). In such moments and spaces,

opportunities to think outside of the box have been seized and capitalised upon.

The diversity of activities within the spaces reflects specific disciplinary foci, but also resonates with a shared ambition across the College to support innovative and creative expression and practice. What goes on in the individual Maker Spaces reflects who they serve. The 3D printer and sewing machine of the STEM Maker Space and the flexible displays and reconfigurable furniture of REACH represent the physical embodiment of disciplinary ambitions within a space.

Our attachments to our familiar classrooms, traditional teaching practices and the routines of our subjects defines our educational identity. Maker Spaces and Making approaches, on the other hand, challenge and extend disciplinary allegiance. Our interviews across the College highlighted a shared ambition of establishing new identities as learners. Making can confound expectations and create possibilities for conversations and collaborations.

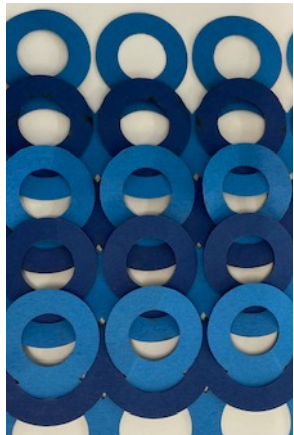
Significantly, the freedom to create and own new practices and knowledges results in the **learner and academic identity being reconfigured in new and productive ways.**

The Maker Space thus becomes a place where identities are productively disrupted. Academics, students and technicians engage in conversation and making, levelling the sometimes uneven landscape of learning in Higher Education.

Knowing Through Making has shown that the unscripted nature of the Maker Space permits growth, expression, and inclusion. Yet our analysis also finds that an open invitation to the space is not enough. The vision of their creators, the teaching that is built around Making and the atmosphere created by informality and a welcoming spirit ultimately drive the success of the Maker Space.

Interviews

- **Oliver Austen** (FoLSM)
- **Kawal Rhode** (NMES)
- **Jayne Peake** (SSPP)
- **Alison Duthie and Johanna Kieniewicz** (King's Culture Team)
- **Brian Hurwitz** (A&H)
- **Ed Stevens and Mark Johnson** (A&H)
- **Patrick Mesquida** (NMES)
- **Penny Charles** (FNMPC)
- **Cara Goodman** (Midwifery student)
- **Flora Smyth Zahra** (FoDOCS)
- **Greg Shannon** (LTS Architects)



Xin Zhou (MA Textiles, RCA)



Synthetic Anatomy



Synthetic Anatomy student work

Acronyms

FoLSM Faculty of Life Sciences and Medicine

NMES Natural, Mathematical and Engineering Sciences

A&H Arts and Humanities

FNMPC Faculty of Nursing, Midwifery and Palliative Care

FoDOCS Faculty of Dental, Oral and Craniofacial Sciences

SSPP Social Sciences and Public Policy

IOPPN Institute of Psychiatry, Psychology and Neuroscience

Report Authors

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Dr Elizabeth Rushton Institute of Education, UCL

Charlotte Roebuck KCL undergraduate, Anatomy, Developmental and Human Biology

Aisyah Reze Muhamad KCL undergraduate, Biomedical Imaging and Engineering Sciences



Roberta Schreyer (MA Textiles RCA)