

Increasing understanding of the role of engineering in vaccine development and manufacture

A collaborative project between UCL-Oxford Future Vaccine Manufacturing Research Hub (Vax-Hub) and UK secondary schools

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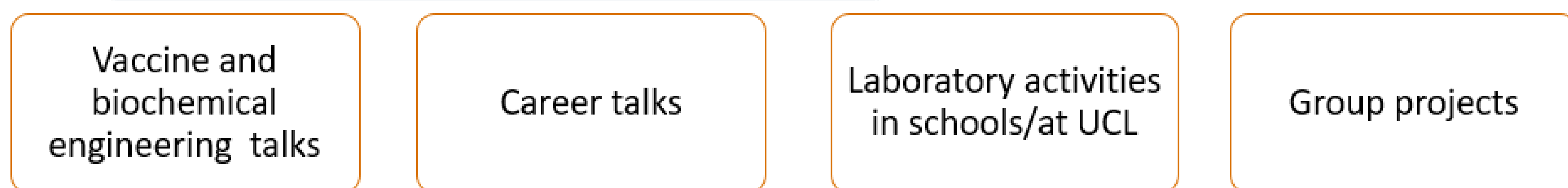
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Importance of outreach in schools

Bioprocess engineering plays a central role in taking vaccines from laboratory development to manufacture for clinical trials and scale up for mass vaccination programs. However, **public knowledge and appreciation of this essential role is low**, perceptions of vaccine development focusing on scientists in research labs and clinicians administering the vaccine. There is little appreciation of the need for mass-production in factories and the engineering processes involved. This knowledge gap became especially evident during the COVID19 pandemic. The bioprocessing industry is currently in **need of qualified personnel**, yet **students considering their career options** are often unaware of these opportunities.

Strategy

Our strategy is to establish interactive long-term partnerships involving:



For the outreach work in schools, Vax-Hub was awarded the 2022-23 UCL Institute for Health Engineering (IHE) **Community Engagement and Patient and Public Involvement (PPI)** award

'A very interesting, timely, and topical project. The project targets young people, which is great as children then share this knowledge with their households, thus further disseminating the project's aims. Good project evaluation has been done'

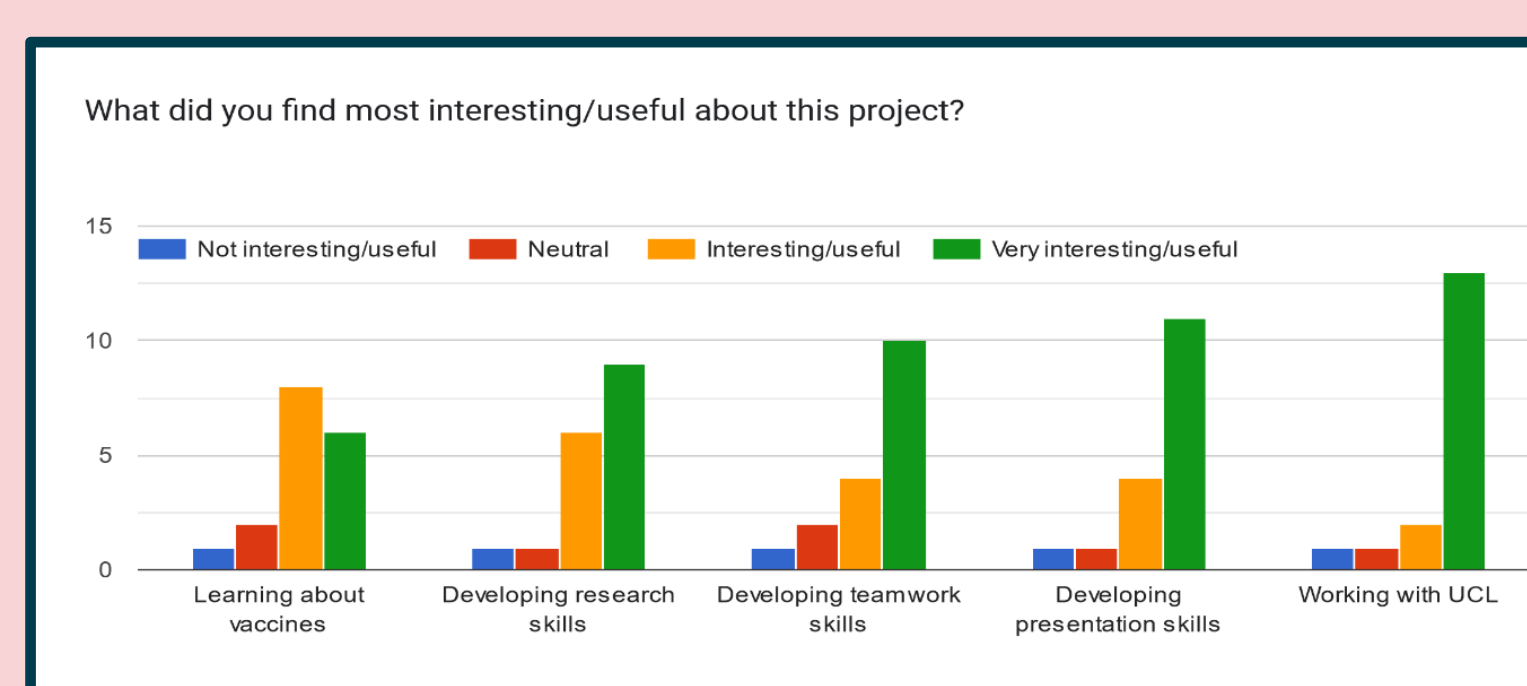
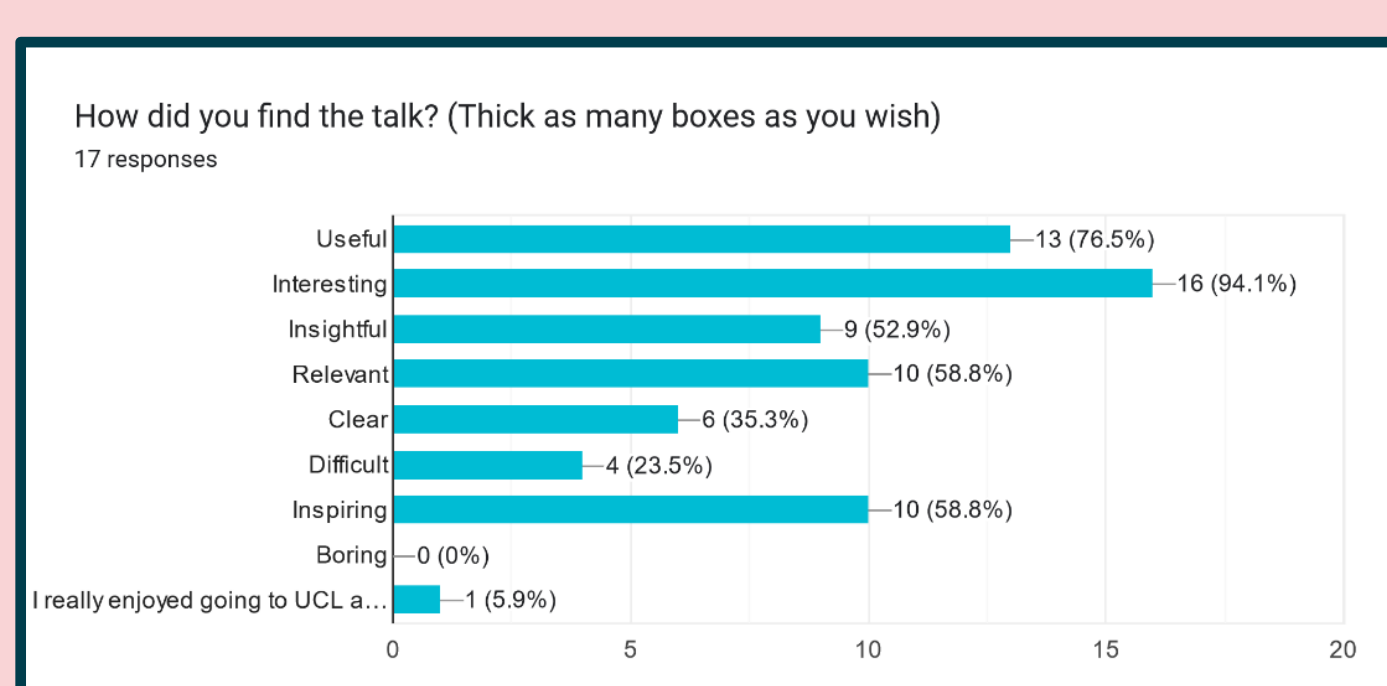
Pilot Programme at Langdon Park School (East London)

- ✓ CPD for a science teacher at UCL
- ✓ **Masterclass + lab experience** for students at UCL (Y12)
- ✓ **Talks** to +360 students (Y9 & Y10) at the school
- ✓ **Group project competition** for approx. 20 students (Y9 & Y10)

Outcomes:

"I would like to express my appreciation, for arranging such an inspirational event. Thanks to the Vax-Hub team, the students have experienced an amazing opportunity to help build their confidence, as well as develop very important skills"

- Yasemin Ozcan, Science Specialist Teacher



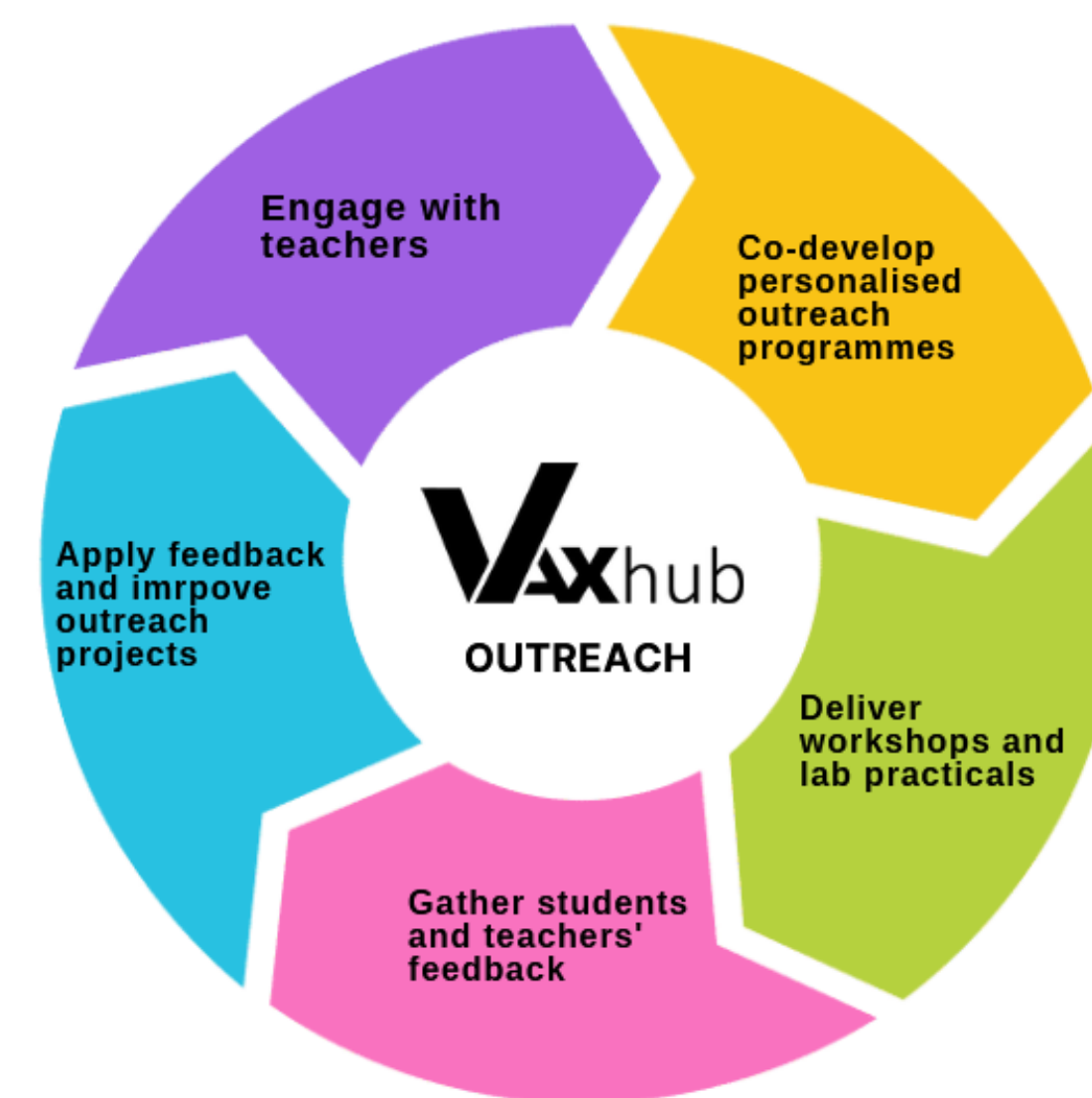
Feedback from students

- *"It was a very memorable experience"*
- *"I enjoyed researching about different vaccines and what happens in our body after taking them"*
- *"It was a fun experience and hope to do more in the future. It also helped me with my confidence by presenting in front of many professors"*

94 % of students stated that they would take part in another project!

Aims

- **Inform us** of the current **general understanding of vaccines** among young people
- **Raise awareness** of the role of **biochemical engineering** in vaccine production
- **Provide practical laboratory experience** complementary to taught materials
- **Inspire** the next generation of bio-scientists and bio-engineers!



Participation in 'Cheltenham Science Festival' in June 2023
Upcoming participation in 'Festival of the Girl' in October 2023

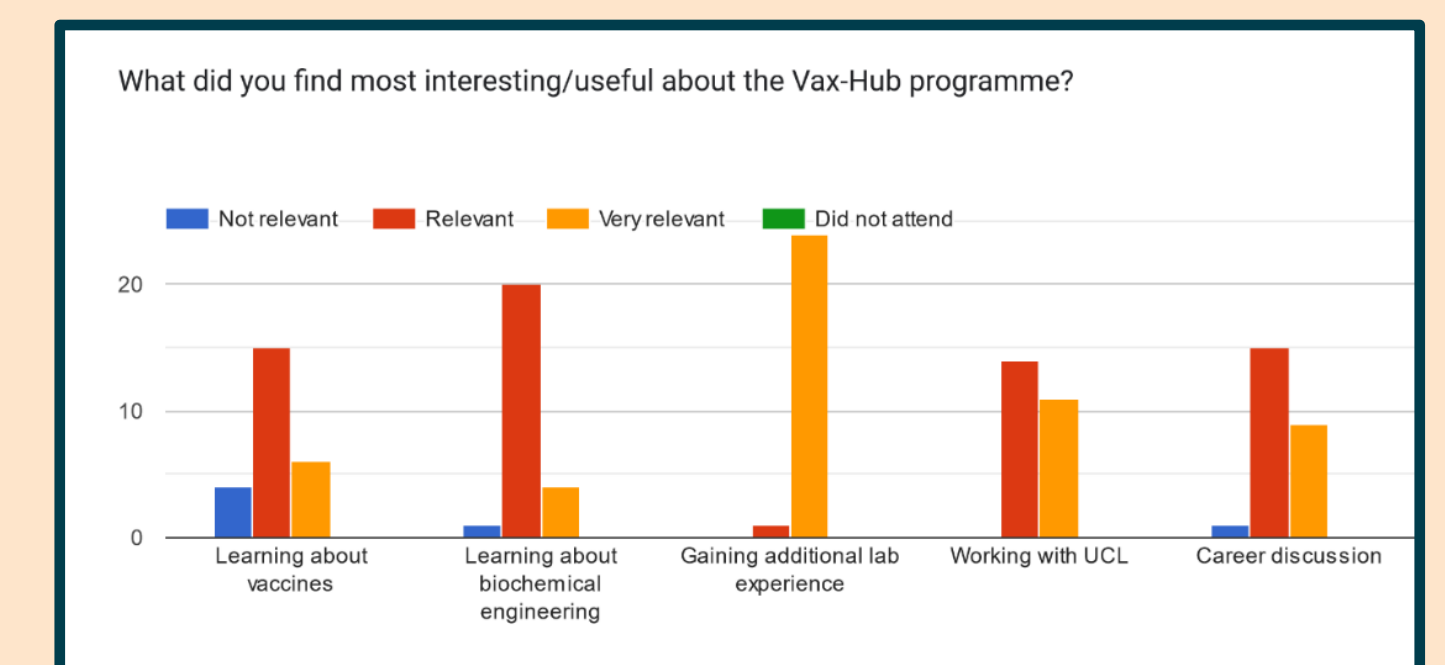
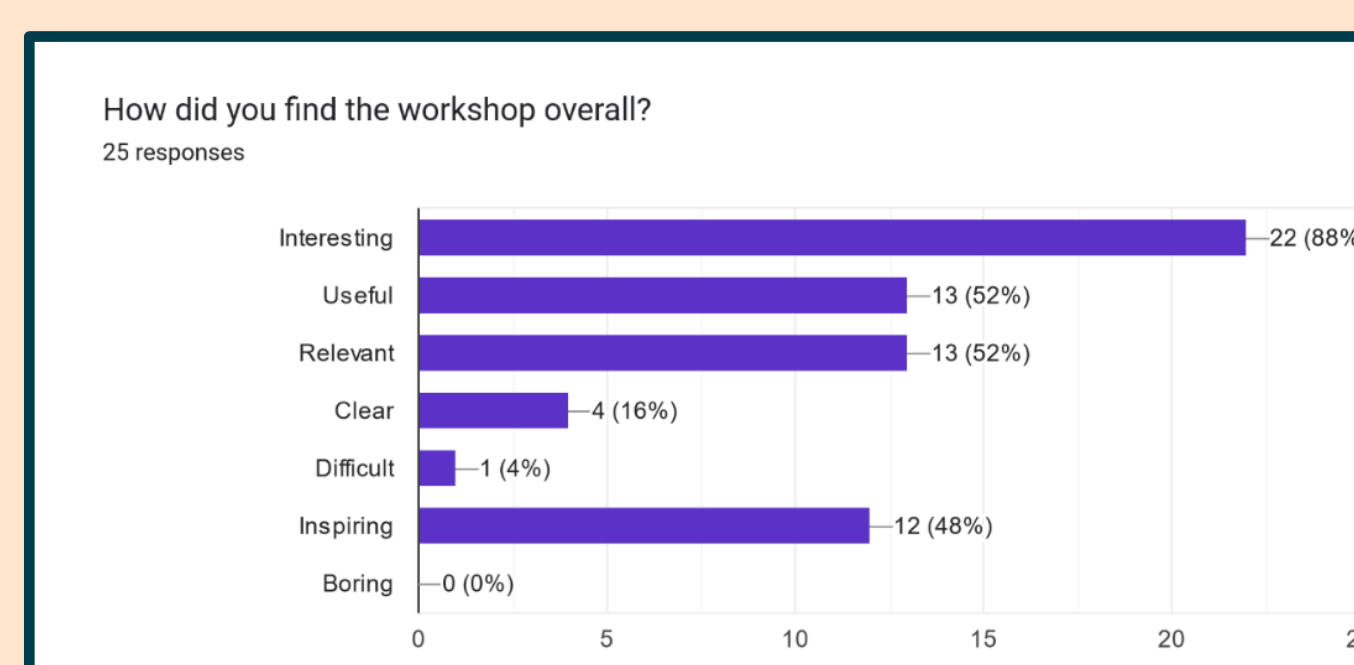
Pilot Programme at North Hertfordshire College (Stevenage)

- ✓ **Workshop** on vaccine and biochemical engineering for Y13 B-Tech students
- ✓ Funded visit to the **exhibition 'Injecting Hope'** at the Science Museum
- ✓ **Training on aseptic culture** techniques at the college (*The college has been using materials supplied by Vax-Hub to demonstrate techniques to other local schools*)
- ✓ **Dengue vaccine bioprocessing lab experience** in the UCL Pilot Plant
 - Upstream processing session
 - Downstream processing session

Outcomes:

"The Future Vaccine Manufacturing Research Hub (Vax-Hub) never stops to amaze our students by not only bringing cutting edge science, but also by bringing them to their unique labs to manufacture a vaccine to the Dengue virus. Thank you so much"

- Rana ElFarra, Project Lead for SITEC



Feedback from students

- *"I enjoyed actually going around the lab and understanding how people in a professional setting do things in practice"*
- *"Very enjoyable, the people were so nice and I felt it really benefited my confidence and experience in a professional environment"*

100% of students stated that they enjoyed the lab practicals!

We are keep expanding our school network..

The CPDs for science teachers were offered for the second time in June and July 2023, resulting in the start collaborations with two new schools: Mulberry Secondary School and Alexandra Park Secondary School.

Moreover, Vax-Hub has entered the **Enthuse Partnership Programme**, which was created to empower schools and colleges to share practise and work collaboratively over the next two years by:

- Addressing underachievement in STEM subjects
- Inspiring excellence in the STEM curriculum
- Raising aspirations for STEM careers and further study



Acknowledgements

Funding from the UK Department of Health and Social Care (DHSC) managed by the UK Engineering & Physical Sciences Research Council (EPSRC) Future Vaccine Manufacturing Research Hub co-hosted at University College London and the University of Oxford with UK university partners is gratefully acknowledged (grant Reference: EP/R013756/1).

Financial and in-kind support from the consortium of industrial users and sector organisations is also acknowledged.

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