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# Mapping cyber-enabled roles to the CyBOK

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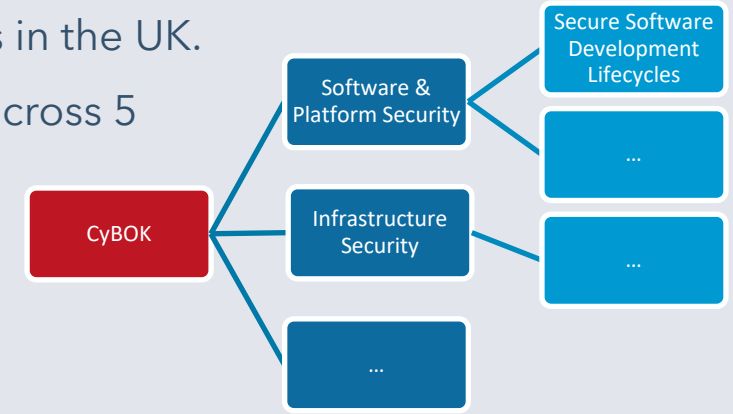
Where opportunity creates success

# Context

- Skills gaps and shortages stifle growth, economic output, and productivity.
  - Cyber Security skills gaps/shortages amplify the broader and ever-present problem of cyber-attacks.
- The issue has been highlighted in multiple government reports:
  - Cyber security skills in the UK labour market 2022 - GOV.UK (www.gov.uk)
  - Cyber security skills in the UK labour market 2021 - GOV.UK (www.gov.uk)
  - Cyber security skills in the UK labour market 2020 - GOV.UK (www.gov.uk)

# Context

- The Cyber Security Body of Knowledge (CyBOK) aims to systematise knowledge that is recognized as being related to Cyber Security.
- One of the key aims of the CyBOK is to support educators in designing cyber security curricula.
  - It is used as a tool to help certify degrees in the UK.
- It consists of 21 knowledge areas divided across 5 knowledge groups…




Sam Attwood and Ashley Williams. 2023. Exploring the UK Cyber Skills Gap through a mapping of active job listings to the Cyber Security Body of Knowledge (CyBOK). In Proceedings of the International Conference on Evaluation and Assessment in Software Engineering (EASE '23), June 14–16, 2023, Oulu, Finland. ACM, New York, NY, USA, 6 pages

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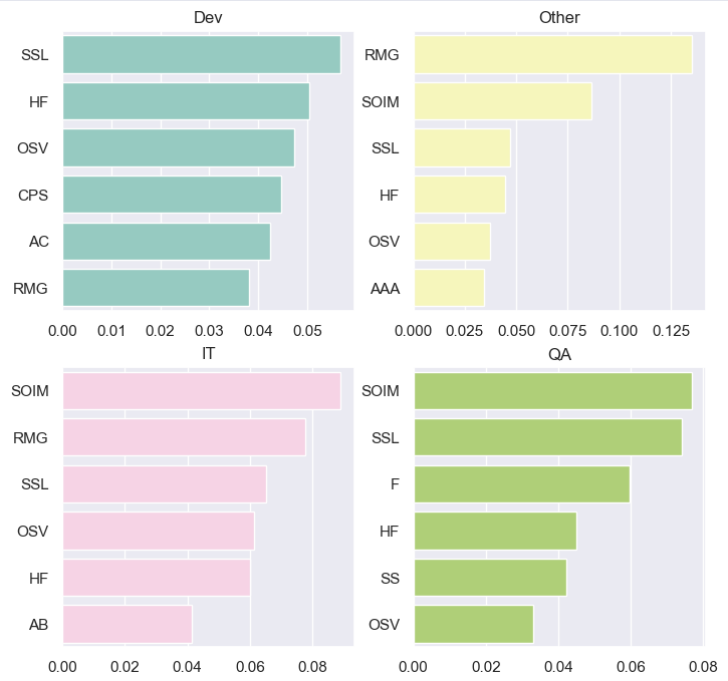


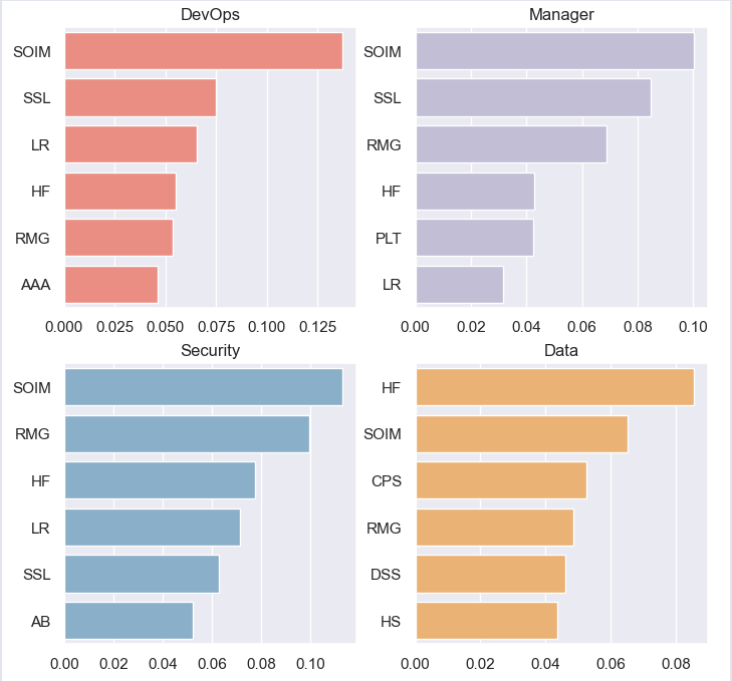


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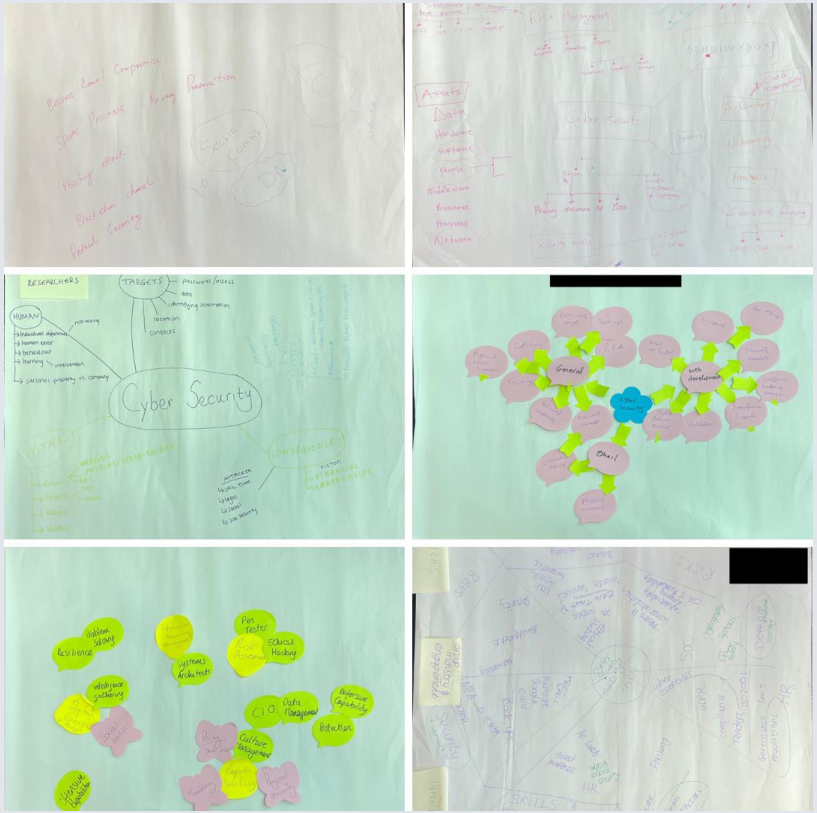
# Method

- We held a mapping workshop at the UCLan Engineering Innovation Centre. 19 cyber-enabled practitioners attended.
- At the workshop, participants first mapped their own understanding of cyber security, and then mapped their roles to the CyBOK areas.
- We then analysed (qualitative) these mappings and produced several resources based on them.


# Initial mappings




- Initial mappings demonstrate the differing depth and breadth of Cyber Security knowledge across the different groups.
- A group of ‘Software Developers’ highlighted items such as ‘Security Headers’ and ‘Wordpress Hardening Techniques’.
- All but one of the initial mappings featured a ‘Phishing’ item.

# Mapping worksheet

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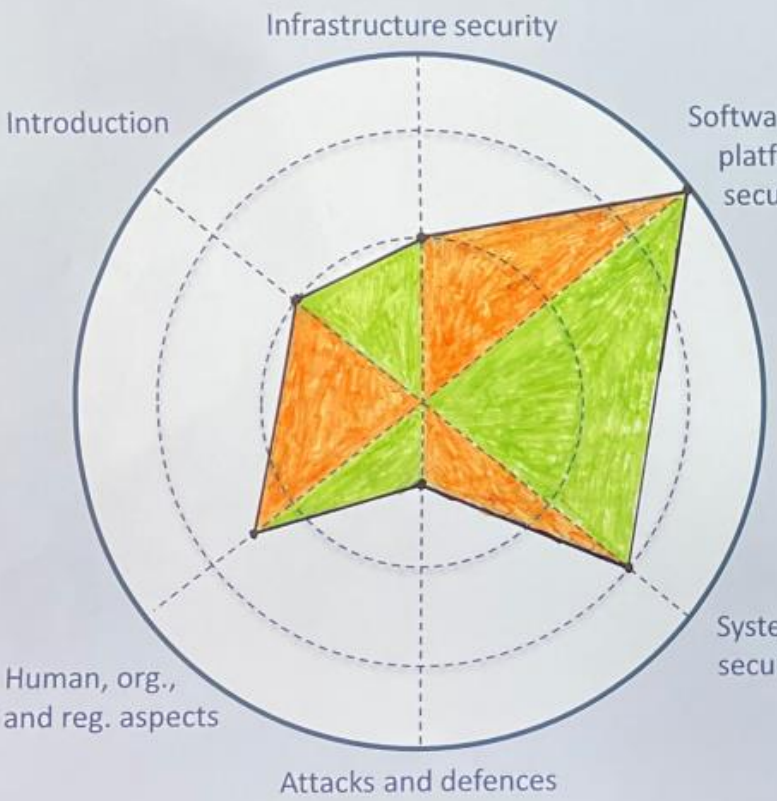


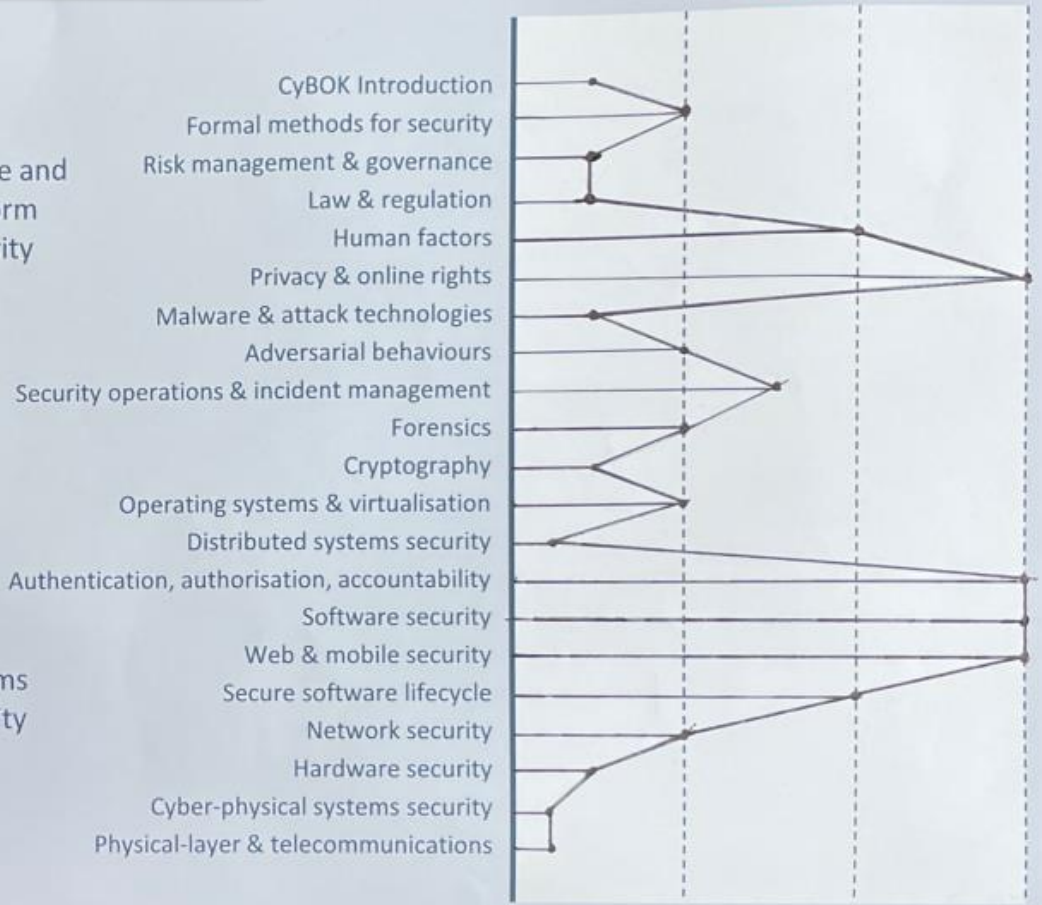

The Researchers (Psychology)

# Mapping worksheet

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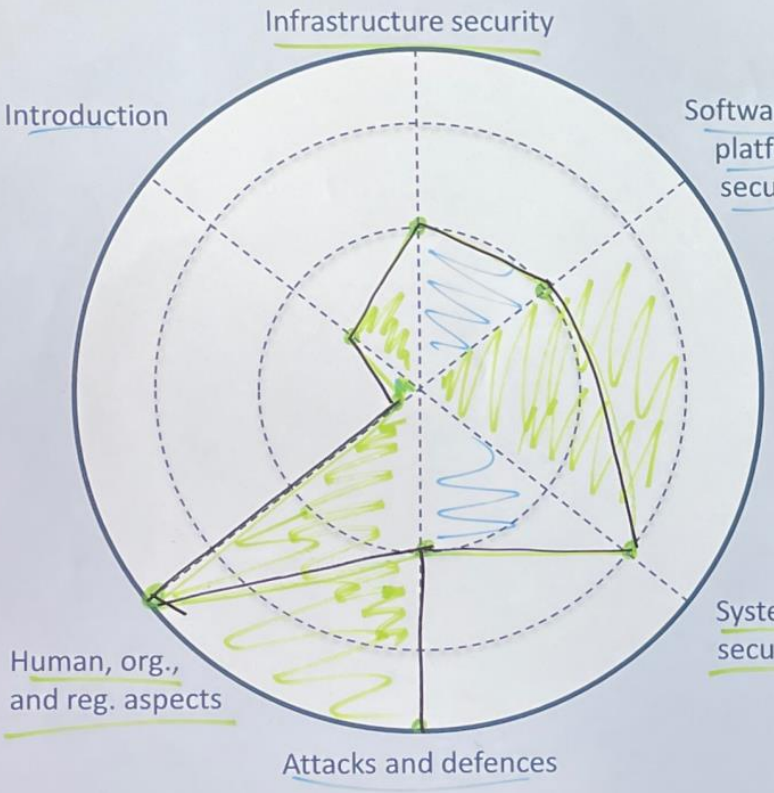


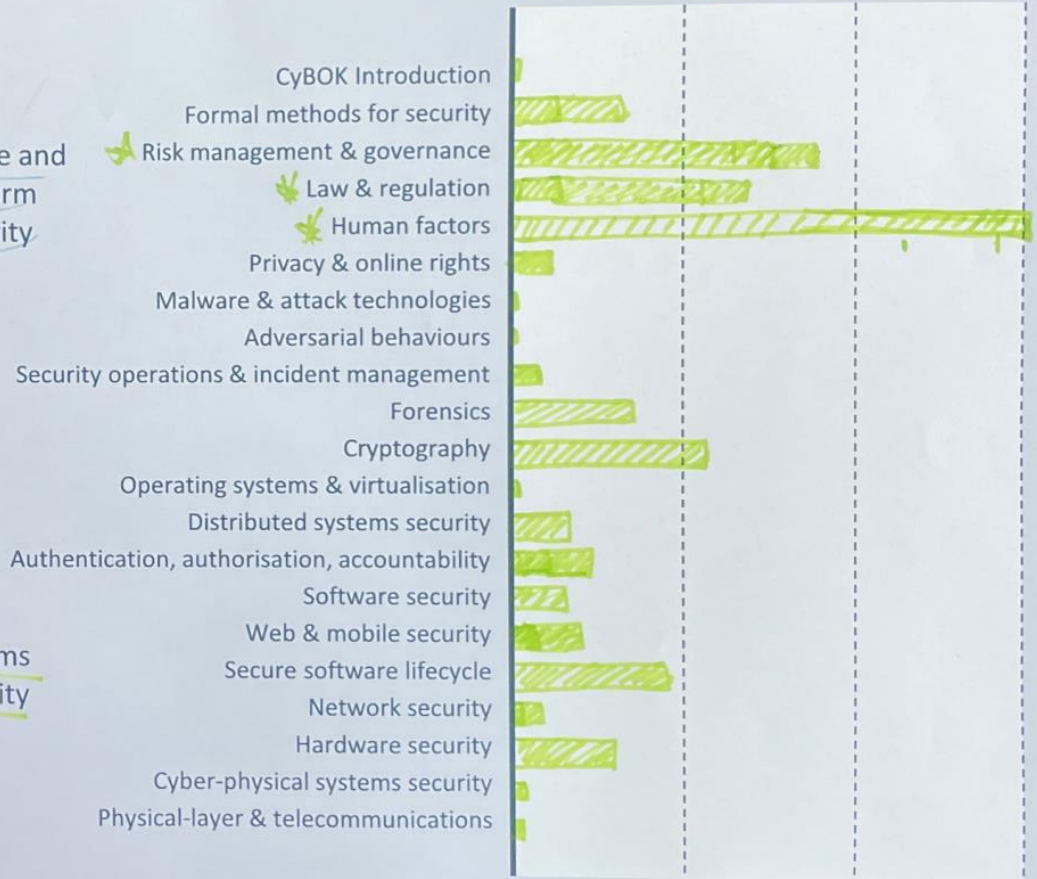

# Mapping worksheet

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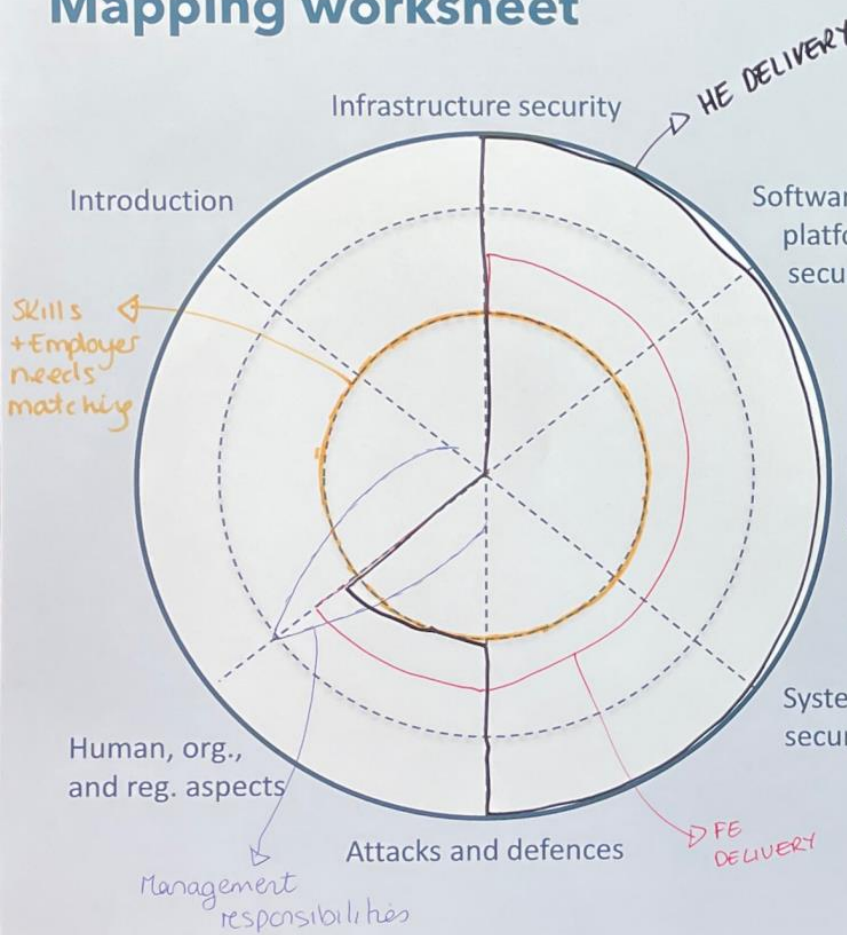



Software and platform security

Intro + Human

Systems security

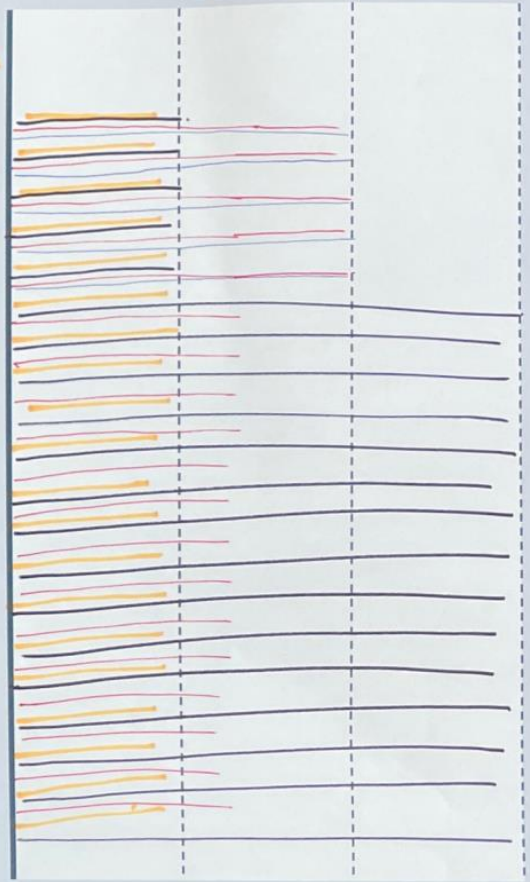
Software + Platform

Infrastructure

A+D

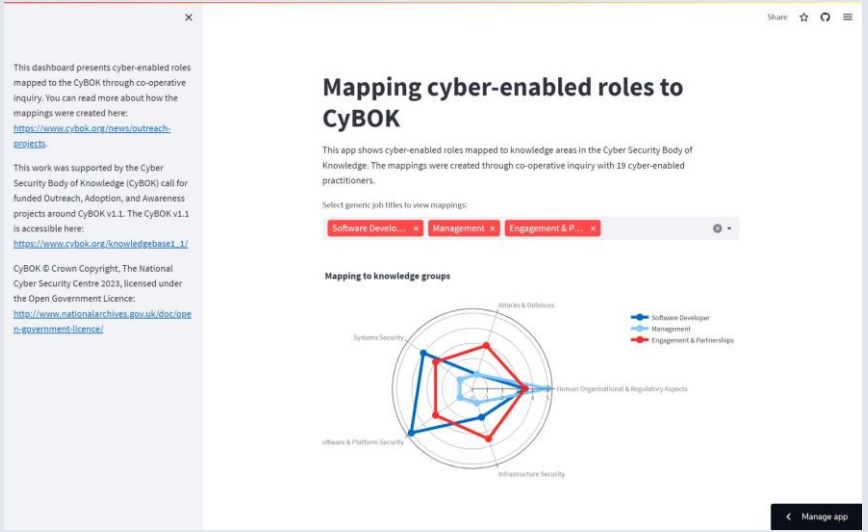
SS

CyBOK Introduction
Formal methods for security
Risk management & governance
Law & regulation
Human factors
Privacy & online rights
Malware & attack technologies
Adversarial behaviours
Security operations & incident management
Forensics
Cryptography
Operating systems & virtualisation
Distributed systems security
Authentication, authorisation, accountability
Software security
Web & mobile security
Secure software lifecycle
Network security
Hardware security
Cyber-physical systems security
Physical-layer & telecommunications

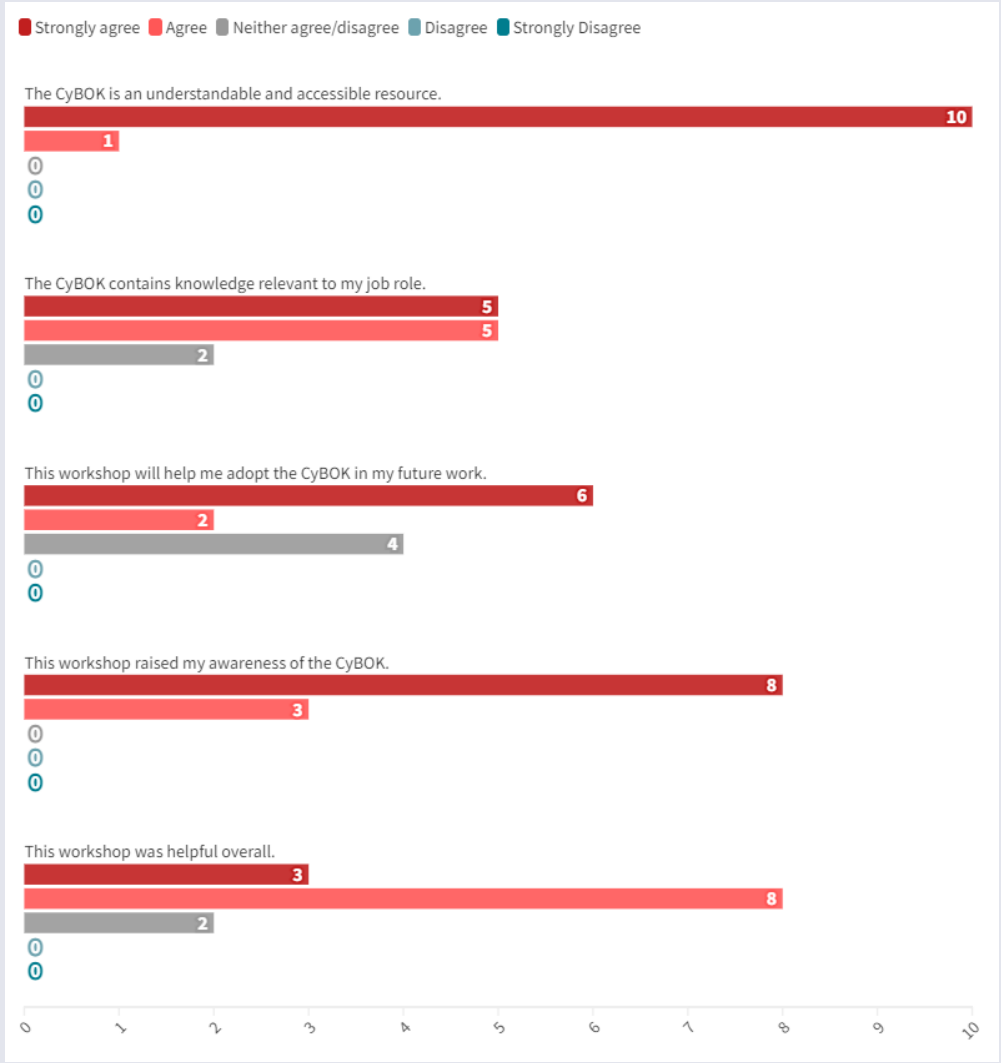


# Resources (from mappings)

- We have created 2 resources based on the mappings to the CyBOK. The purpose of these is to share our findings with a wider audience:
  - A short mapping booklet (PDF).
  - An interactive mapping app.




Mapping cyber-enabled roles to CyBOK · Streamlit (cybok-maps-coinquiry.streamlit.app)


Strongly agree
Agree
Neither agree/disagree
Disagree
Strongly Disagree
The CyBOK is an understandable and accessible resource.
10
1
0
0
0
The CyBOK contains knowledge relevant to my job role.
5
5
2
0
0
This workshop will help me adopt the CyBOK in my future work.
6
2
4
0
0
This workshop raised my awareness of the CyBOK.
8
3
0
0
0
This workshop was helpful overall.
3
8
2
0
0
0
1
2
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4
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8
9
10

# What's next?

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In summary, further work is needed to build on the preliminary mappings that have been produced. We recommend the workshop resources that we have developed and trailed are used to co-produce mappings with a greater quantity and variety of cyber-enabled practitioners.

# Follow & Feedback

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