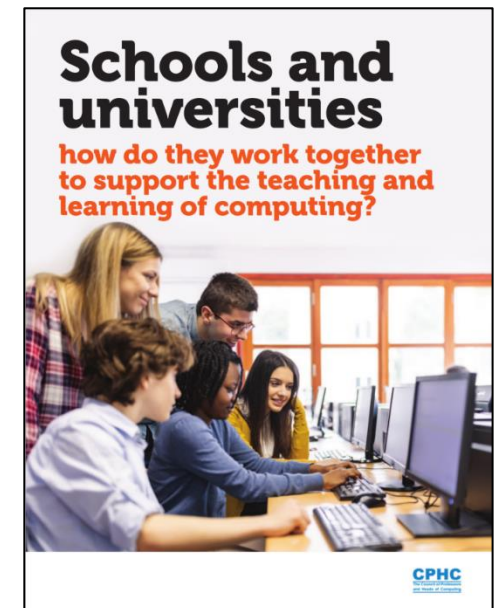
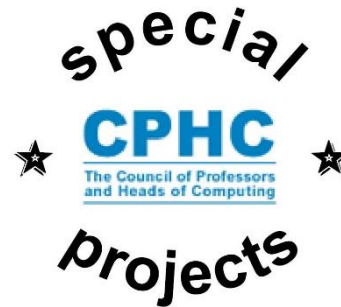


CPHC Conference 2022

2022 Activities

University of Bath, 20th & 22nd April 2022
Sally Fincher, Immediate Past Chair CPHC



Introduction

- CPHC exists to advance public education in the core subject of Computer Science.
- And, in pursuance of that, to:
 - consider matters affecting research, scholarship and learning in Computing within Universities, and their interaction with professional practice;
 - promote quality and professionalism in Computing;
 - formulate and express the views of senior academics in Computing on such matters and make recommendations to appropriate bodies;

2022: three major activities

- Distinguished Dissertations
- Schools and Universities report
- Special projects

2022: three major activities

- All of which “consider matters affecting research, scholarship and learning in Computing”

2022: three major activities

- Distinguished Dissertations
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2022: three major activities

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- Schools and Universities report
- Special projects

Distinguished Dissertations (Iain Philips)

- The CPHC/BCS Distinguished Dissertation competition aims to make more visible the significant contribution made by the UK – in particular by post-graduate students – to computer science.
- Any dissertation is eligible that is submitted for a doctorate in the British Isles in what is commonly understood as computer science.

Dis dis links

- <https://www.bcs.org/events/awards-and-competitions/distinguished-dissertations/previous-winners/>
- <https://www.bcs.org/events/awards-and-competitions/distinguished-dissertations/>

Dis dis process

- Nominations
- Reviews requested
- More reviews requested
- Selection (dis dis dis)

Dis dis futures

- COVID delays. New chair to be appointed.
- 2021 and 2022 competitions to run.
- Referee process now hard given all the other activities we have.
- Computer Journal will provide more exposure to the winners.
- Some review of process needed.

2022: three major activities

- Distinguished Dissertations
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2022: three major activities

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Schools and Universities report (Jane Waite)

- In September we published “*Schools and Universities: How do they work together to support the teaching and learning of computing?*” a report originating from the nascent Outreach Network – an activity that has been put on hold during the pandemic.
- This was work carried out jointly with undertaken in concert with the Computing at Schools (CAS) Research & Universities Working Group



Computing at School

Schools and universities

how do they work together to support the teaching and learning of computing?



CPHC
The Council of Professors
and Heads of Computing

Twenty minutes to introduce the report, highlight opportunities and barriers and to start the discussion potential actions!

Link on <https://cphc.ac.uk/>

Direct link

https://cphcuk.files.wordpress.com/2021/09/bt_130886_cphc_schools-and_universities_final.pdf

Who conducted the survey and why?

- Jane Waite (CAS Research), Sally Fincher (CPHC), Peter Donaldson (Glasgow University), Faron Moller (Technocamps) and Irene Bell (Stranmillis University)
- To better understand the landscape of university and school engagement in the teaching of computing.
- To gather practitioner voice on the **benefits** and **barriers** of engagement.
- To derive actionable recommendations (opportunities) to improve engagement.
- To take action.

(Undertaken in Spring 2020)

Presentation today

- Benefits and barriers for schools of working with universities
- Benefits and barriers for universities working with schools
 - through outreach
 - through undergraduate module placements (e.g. undergraduate ambassadors scheme)
 - through school based CS education research
- Summary of opportunities

What are the benefits for schools of working with universities?

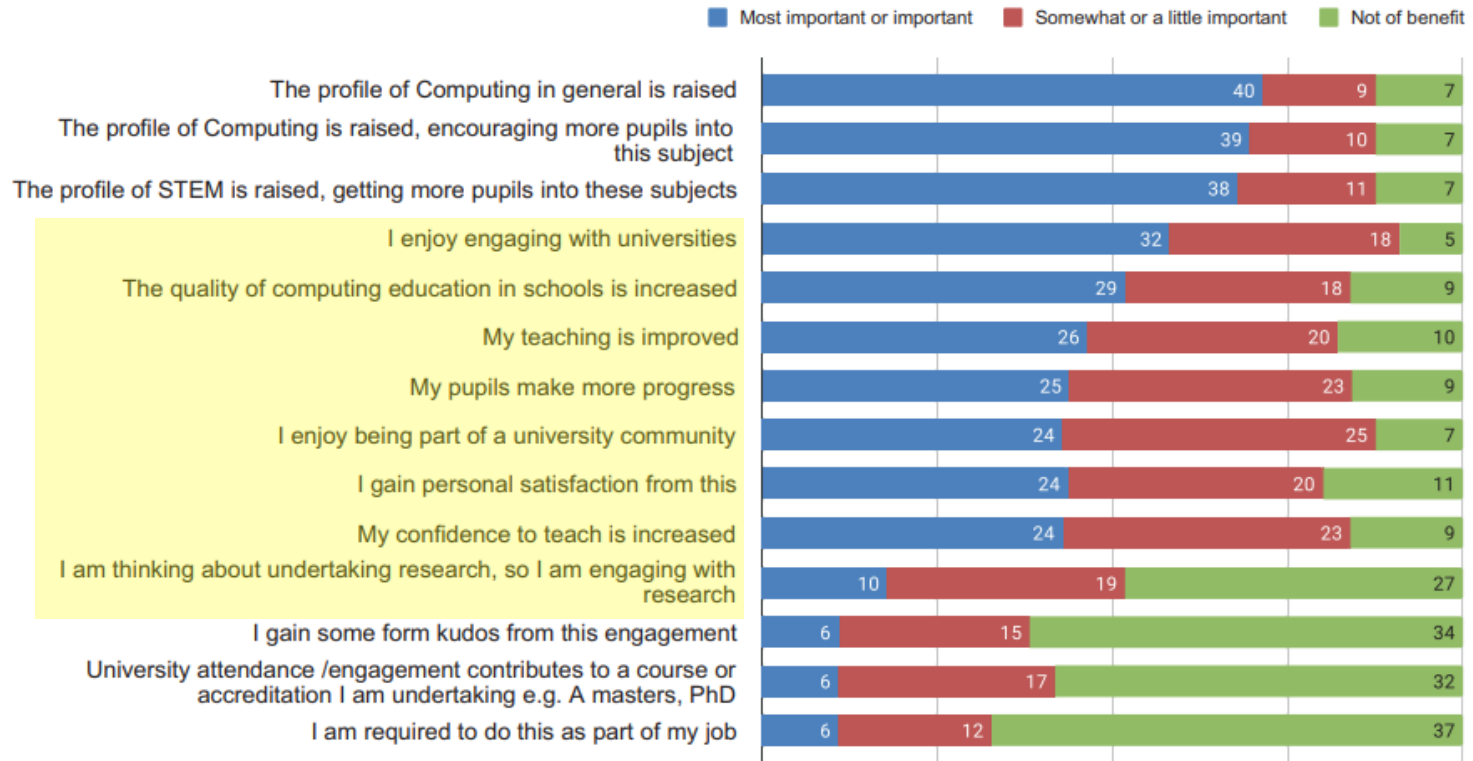


Figure 11: What are the benefits of working with universities for schools? (Click here for an interactive version of the chart)

What are the barriers of working with universities for schools?

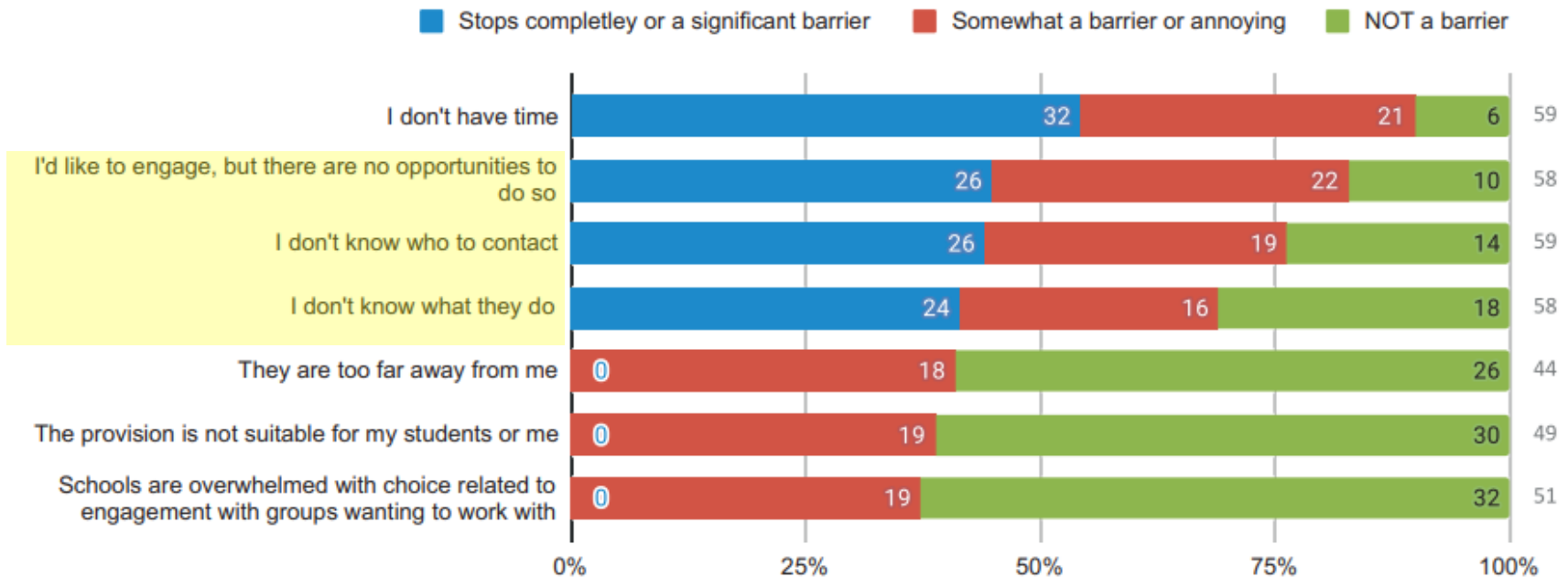


Figure 12: What are the barriers to engaging with universities for schools? (Click here for an interactive version of the chart)

What are the barriers of working with universities for schools?

"I wish Universities would work with schools to understand and celebrate the value of A level CS. Many undergraduate courses repeat the content in the first year and students are actively told not to study the A level. It's very frustrating." [Participant 58]

"When CAS Network of Excellence⁸⁴ ended, opportunities to engage with universities alongside teachers decreased – the already weak bond between HE and schools was weakened further." [Participant 15]

What are the benefits of outreach with schools for universities?

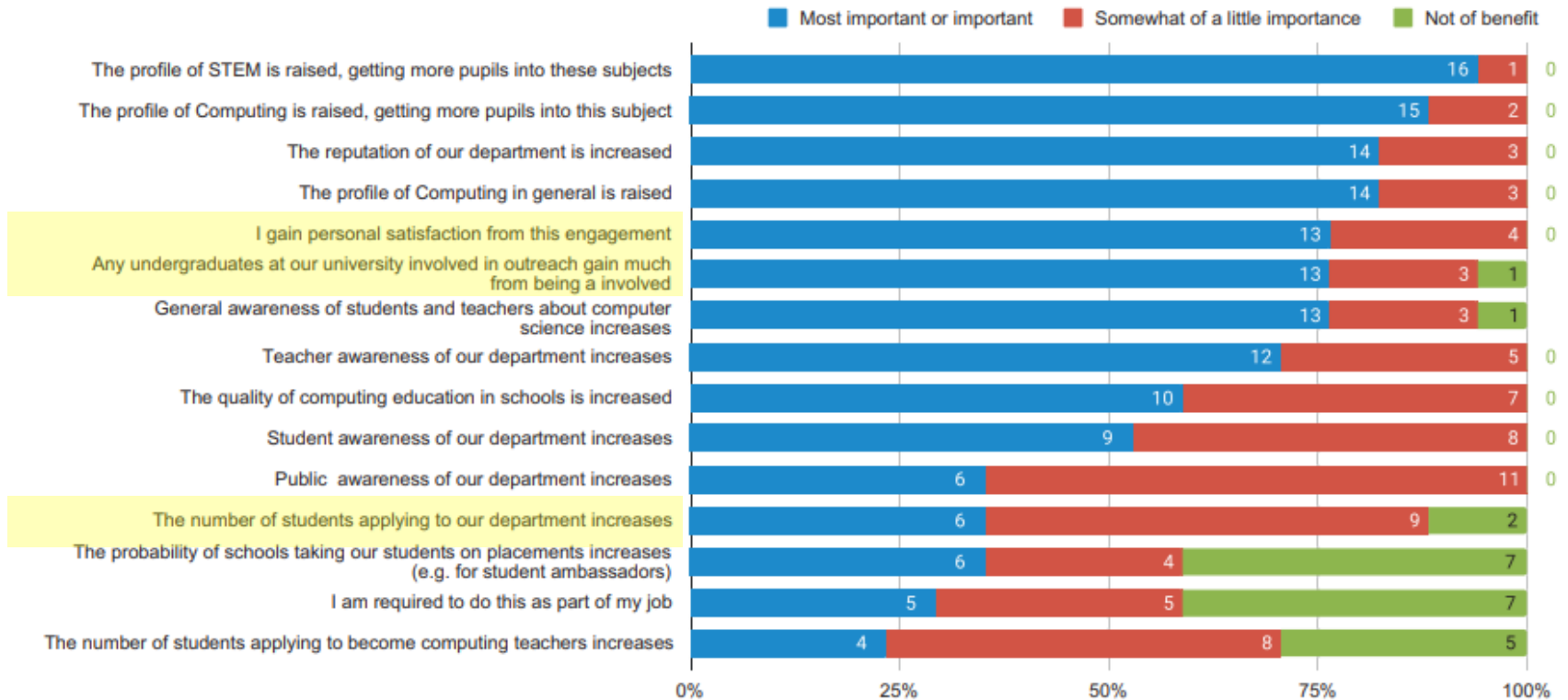


Figure 2: What are the benefits of outreach with schools for universities? (Click here for an interactive version of the chart)

What are the barriers of outreach with schools for universities?

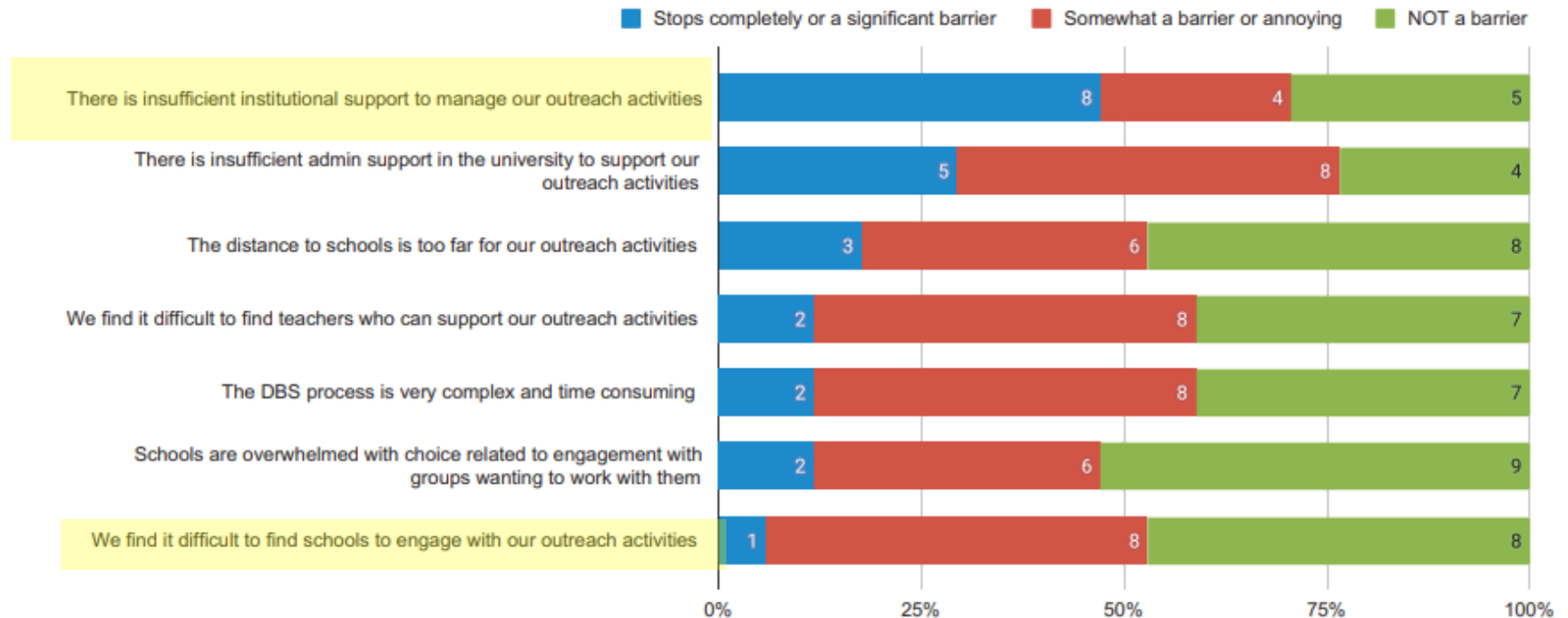


Figure 3: What are the barriers to outreach with schools for universities? (Click here for an interactive version of the chart)

What are the barriers of outreach with schools for universities?

“Finding schools that want to engage with us is not a problem: finding *target* schools that want to engage is more of a problem, but not a major one. Institutional support and infrastructure is a problem for outreach in general: we have no centralised system for outreach so what technical infrastructure there is for managing outreach is varying degrees of ad hoc. Infrastructure within the department is a problem: much of our outreach is inbound and our building is highly unsuitable and far too small for running events. Our outreach is well supported by our academics, researchers and students. “ [Participant 125]

What are the benefits for CS departments who run undergraduate modules with school placements?

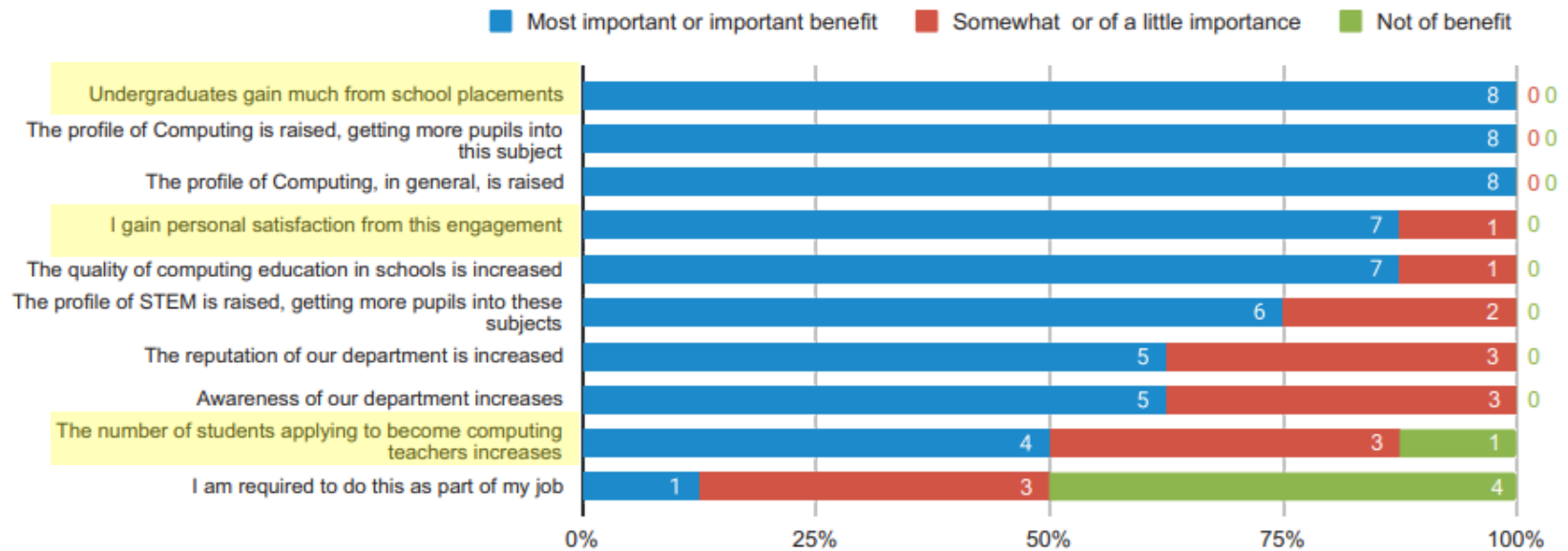


Figure 4: What are the benefits for computer science departments who run undergraduate modules with school placements? (Click here for an interactive version of the chart)

What are the barriers for CS departments who run undergraduate modules with school placements?

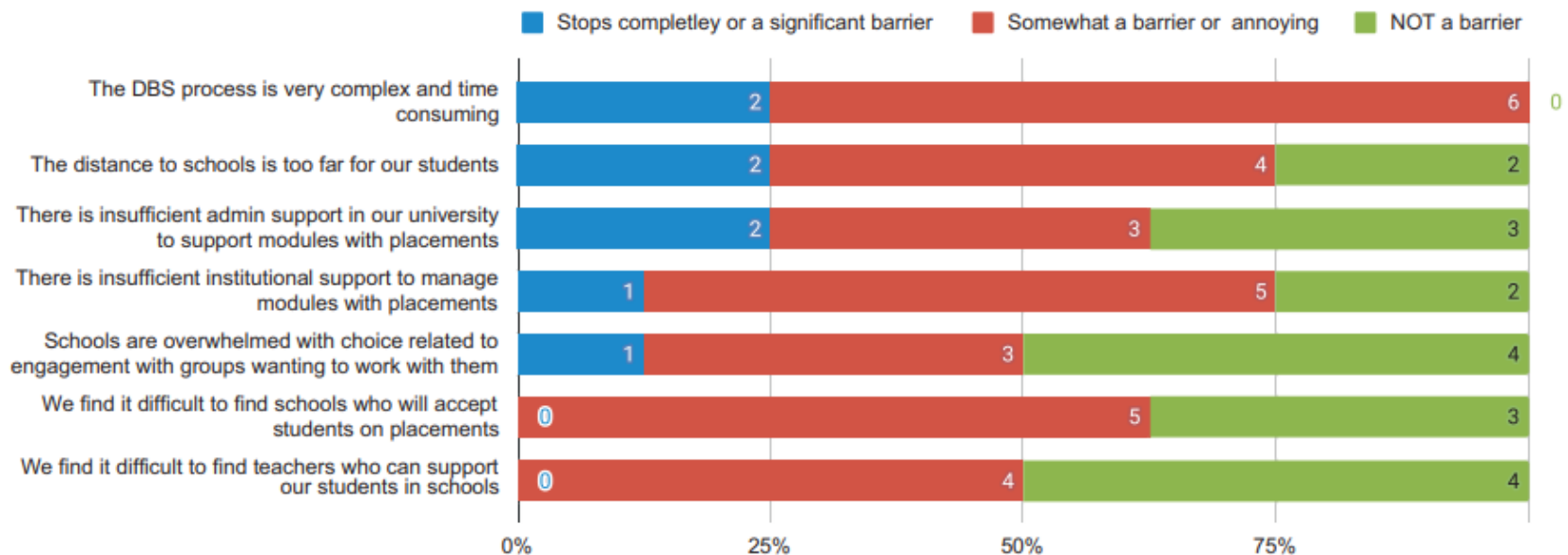


Figure 5: What are the barriers for computer science departments who organise school placement based modules in working with schools? (Click here for an interactive version of the chart)

What are the benefits and barriers for CS departments who run undergraduate modules with school placements?

"Everyone wins from this course. The students view it as a hobby, quite different from their other courses, and take real ownership of their work, much as some students do of their Honours project. The teachers recognise their own shortcomings in (nearly always) not having recent industry experience and so highly value having young enthusiasts who often have been in high-profile companies in their preceding summer placement or who are undertaking exciting project work. The pupils regularly are reported as asking the teacher *when's XXX coming in again?* – partly one assumes because XXX made a change, of course, but surely also because XXX was worth listening to! And finally, I, the course coordinator, learn a lot from the class sessions, the discussions for which roam freely having started from fixed points coming from the students' journal writing." [Participant 113]

"The administrative process is the most challenging. We rely on academics investing personal time to make it happen." [Participant 143]

What are the barriers to researchers for engaging with schools on CS education research?

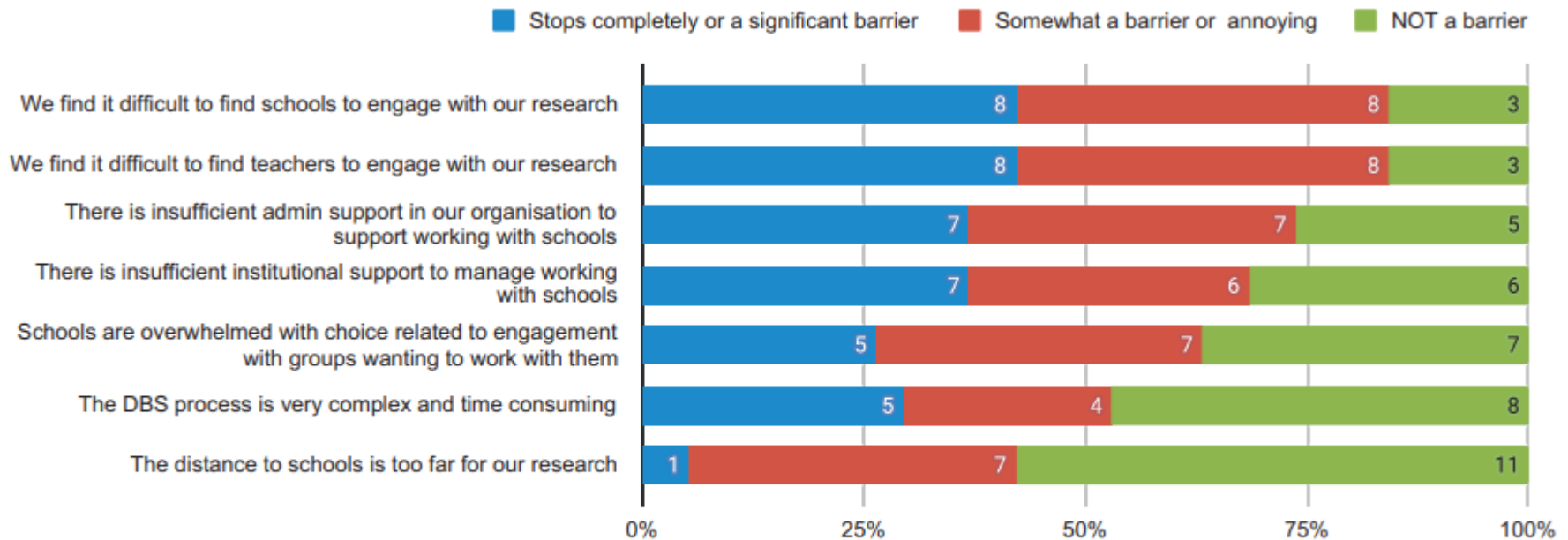


Figure 6: What are the barriers to researchers for engaging with schools on computing education research?
(Click here for an interactive version of this chart)

What are the barriers for conducting CS Ed research in schools?

"The need to raise the status of CSE <(Computer Science Education)> and CSE research in HEI <(Higher Education Institution)> Computer Science Departments. Not treated seriously at present." [Participant 115]

"As a Senior Lecturer (Scholarship) the only real barrier is funding to release me from teaching."
[Participant 115]

"I suspect teacher's engagement with research is very much dictated by their workload. Also timing can be an issue if the long term scheme of work or covering of a particular topic does not fit in with the timescales imposed on the researcher." [Participant 66]

"The biggest barrier we face (pre COVID) is time: time to work with teachers, and time for CS in the classroom. The second barrier we face is a lack of high quality, rigorous curricula."
[Participant 35]

Discussion - How can we act on these opportunities? What are the priorities?

CS Universities

1 review how prior learning in computer science is accounted for in undergraduate modules

2 promote the positive impact of outreach and ambassador modules in schools to prospective and current students

3 review how all computer science students are taught to explain, support and teach others about programming

4 ensure that staff are properly recognised (in workload allocation models, or similar) for outreach and education modules

5 provide appropriate administrative support to run outreach events

6 provide appropriate administrative support for computing education modules

7 promote the importance of computing education research by highlighting when material presented is research-led

8 create professional development offerings in computing education research

CPHC

9 promote the positive impact of university ambassador schemes

10 continue to grow initiatives that highlight computing research and support teacher engagement

11 work with the ambassador programs to increase the profile of the schemes

12 broker introductions between local schools and universities who want to run schemes

2022: three major activities

- Distinguished Dissertations
- Schools and Universities report
- Special projects

2022: three major activities

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Special Projects

- Special Projects are a new activity of the Learning Development Group (LDG)
- They are small grants (up to £5,000) for projects focussed on the investigation and introduction of new ideas in the learning and teaching of computing. Projects must provide some clear benefit to the wider UK disciplinary community. Projects may (but are not limited to) present new knowledge, develop or share a resource, or other good practice in learning, teaching, or assessment.

Two rounds

- The application procedure is relatively lightweight with two application deadlines per year, September and March

September 2021

- 15 applications were received
- 5 projects were funded

September 2021

- Making LaTeX Accessible
(University of Aberdeen)
- Through the eyes of experts: teaching usability inspection methods with expert-cued resources
(University of Sunderland)
- Exploring the Landscape of Degree-Level Apprenticeships
(University of Glasgow)
- Analysing SQA data to understand uptake and completion of Computing Science at exam level in schools in Scotland
(Edinburgh University)
- Evaluating student perception of challenge within computer science university education
(Abersytwyth University)

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Making LaTeX Accessible

Nir Oren, Morgiane Richard, Ben Martin,
Murilo Baptista, Matthew Collinson

April 2022

Project Overview

- Accessibility requirements are now enshrined in law
- LaTeX and Beamer are a popular approach to preparing lecture material (slides, lecture notes, assessments, ...)
- The PDF files generated by LaTeX are not accessible, with screen readers unable to parse e.g., their mathematical content.

Approach

- Multiple solutions have been proposed to make LaTeX accessible, but none has been widely adopted. Reasons include
 - Requirement to recreate materials using another markup language
 - Imperfect conversions requiring significant manual effort
- In this project we are evaluating these different solutions with users – both material creators and those relying on accessible materials, to identify workload involved and quality of output.
- Potential solutions to be investigated include (Pandoc) Markdown, LaTeX packages such as Accessibility/Axessibility, and tools such as Coursebuilder.
- We are currently preparing material to run the evaluation.

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Through the eyes of experts: teaching usability inspection methods with expert-cued resources

Lifechanging

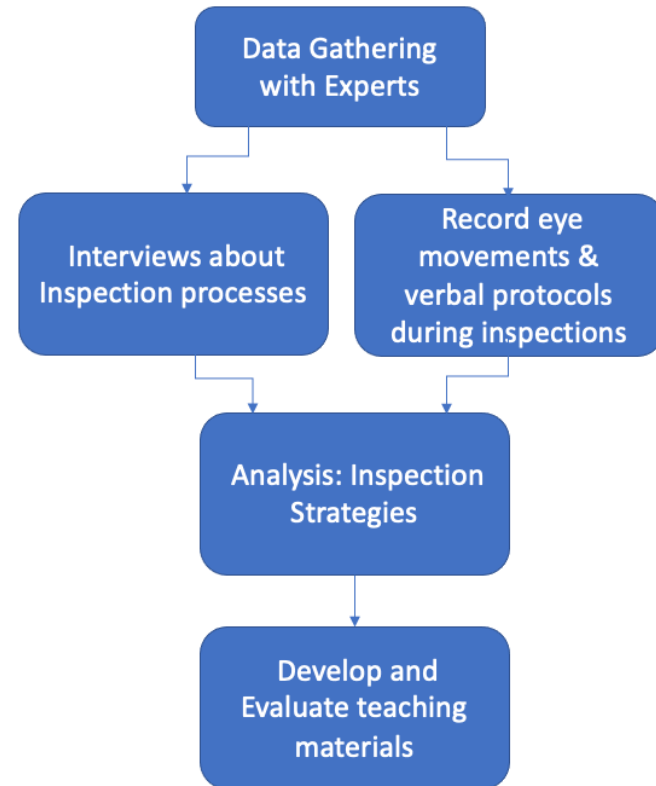


**University of
Sunderland**

Sharon McDonald, Dominic Button and Alastair Irons

Project Aims and Background

- Student Inspections are often characterised by:
 - A higher proportion of false positives and poor problem yield
- A causal factor:
 - Novice evaluators lack “know-how” or tacit knowledge
- Aim:
 - Can tacit knowledge development be supported by expert cued teaching resources?



Progress Report

Completed/Ongoing

- Conducted 6 out of 10 “expert” interviews and inspections of:
 - Website
 - Interactive planning tool
- Collected data has been transcribed and analysed.
- Currently developing teaching materials for deployment post Spring Break

Changes to Plan

- We reached saturation in our analysis of expert strategies
- We are modifying our plan to to include:
 - Recorded student inspections (pre-resource engagement)
 - Use these as an additional cue to help learners observe differences in approach.

Findings and barriers

Findings

- Rather than using a single named method, Expert strategies are eclectic combining resources from different approaches
- Strategy cues extracted for:
 - Preparation Activities
 - Problem Discovery strategies
 - Problem Analysis strategies

Barriers

- Expert Recruitment
 - Took longer than expected mainly due to the inspection component
 - Experts happy to talk about the process; less happy to inspect.
- Eye tracking Methodology
 - We used Monitor and Glasses
 - Glasses are easy for deployment but present difficulties for analysis

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University
of Glasgow

THE AWARDS
2020 | UNIVERSITY
OF THE YEAR

Exploring the Landscape of Degree-Level Apprenticeships

Sebastian Dziallas

WORLD
CHANGING
GLASGOW



Aims

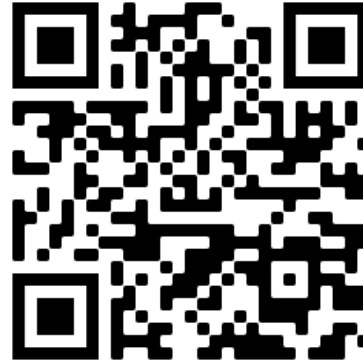
- The aim of this work is to capture the breadth and variety of approaches to degree-level apprenticeships across the UK, with a particular focus on the following aspects:
 - identifying practices and curricular structures used in the context of different programmes (e.g. day release, cohort-based approaches, summer programmes, etc.),
 - investigating employers' motivations for participating in degree-level apprenticeships and the extent to which they differ across programmes,
 - exploring students' individual learning trajectories and paths to these programmes.

Timeline

- This work will take a three-pronged approach and comprise surveys with academics and employers, which will be augmented with follow-up interviews, as well as in-depth interviews with current students at a smaller number of institutions.



Call for Participation



We have just launched the survey for academics!

<https://bit.ly/cphc-apprenticeship-survey>

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Analysing SQA data to understand uptake and completion of Computing Science at exam level in schools in Scotland

Fiona McNeill and Eleanor Mitchell

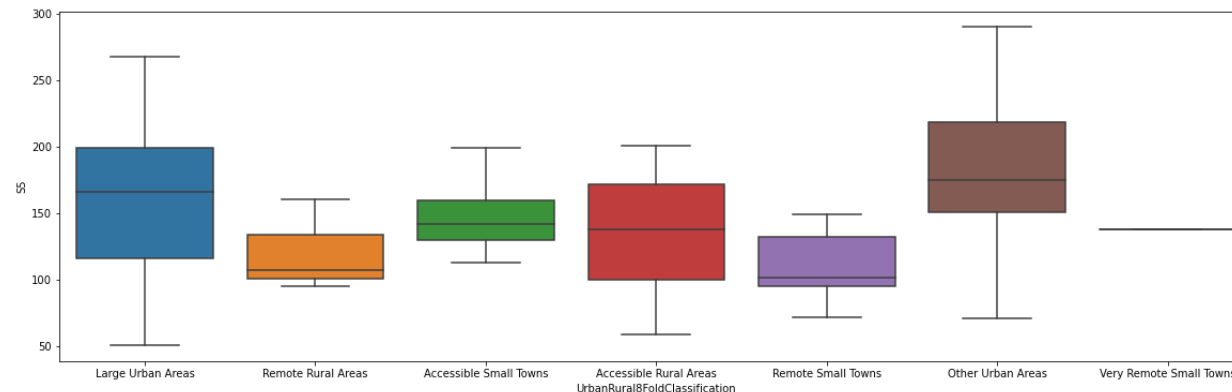
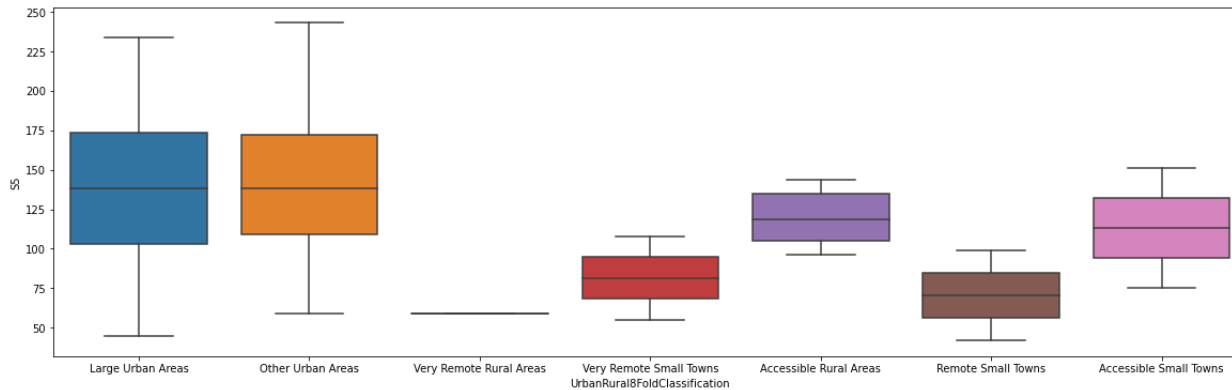


Scope of project

- Uptake of Computing Science (CS) is falling dramatically at all school qualification levels across Scotland, but root causes not well understood.
- This project uses data from Education Scotland and Scottish Qualification Authority (SQA) to examine if and how uptake differs across:
 - Socio-economic categories (SIMD bands)
 - Different local authorities (LA)
 - Urban/rural/remote areas
 - Gender
- The results will help to direct efforts to increase the uptake and completion of CS education.

Early Data Findings

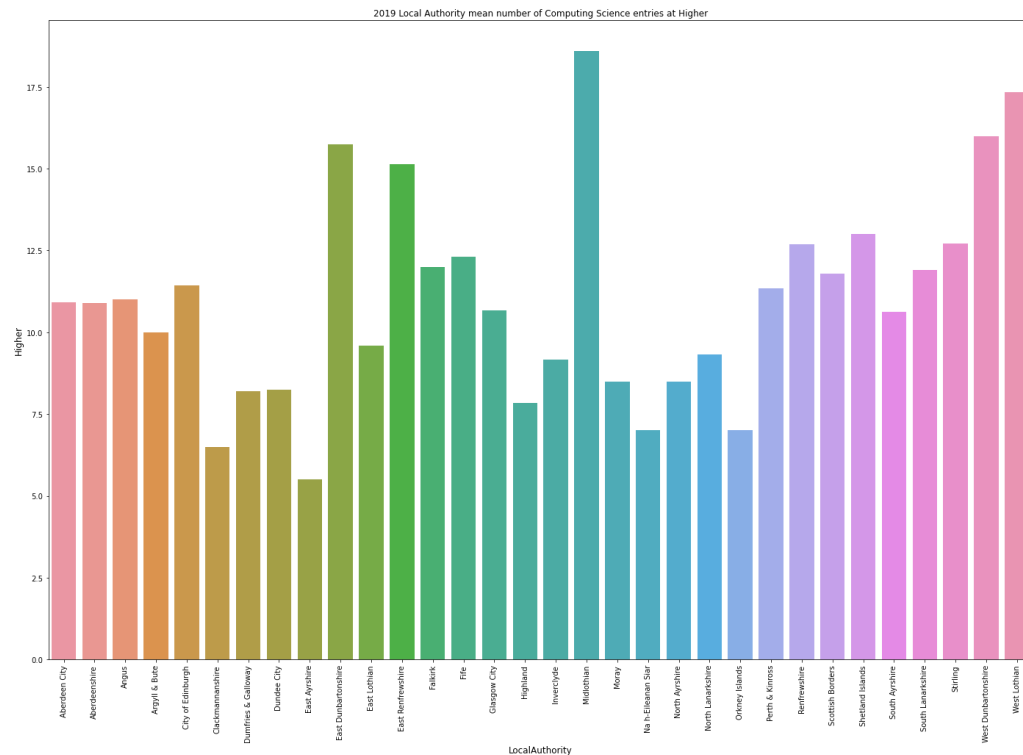
- Distribution of S5 pupils taking Computing Science Higher in 2019 split by rural/urban areas in schools where there are more pupils in the disadvantaged SIMD quintile (top) compared to schools where there are more pupils in the least disadvantaged SIMD quintile (bottom)



Note that the order of the rural/urban areas on the x axis differs between the 2 graphs

Early Data Findings

- Graph of mean number of Computing Science entries at Higher level in 2019 shows considerable variation in uptake by LA



Next steps

- Dig down deeper into data to explore specific questions such as:
 - What is the likelihood of a pupil taking CS in an LA?
 - How does being in SIMD 1 or SIMD 5 affect your chances of taking CS?
 - How does being in a more remote area affect your chances of taking CS?
- Examine whether other factors might be confounding the data such as
 - redrawing of SIMD categories in 2020
 - impact of the COVID-19 pandemic
 - suppression of small numbers of pupils to prevent identification
- Try to get access to more data - currently only 2 years of data available and no gender split or outcome results.

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Evaluating student perception of challenge within computer science university education

Dr Emmanuel Isibor, Dr Hannah Dee and Dr David Hunter
Department of Computer Science, Aberystwyth University

Abstract

This project will evaluate the meaning of “challenge” as perceived by students within computer science university education.

Key objectives are:

- ❖ Characterising what makes some modules too challenging.
- ❖ Characterising what makes some modules insufficiently challenging.

The Work so Far

- ❖ Data has been collected at three time points each semester (for most modules): weeks 3, 6, and 9, enabling us to see if perceived challenge changes over the course of module delivery during the 2021/2022 academic session.
- ❖ We are now beginning to analyse quantitative and qualitative challenge data from these polls

March 2022

- 12 applications were received
- 4 projects were funded

March 2022

- A Theoretical Computer Science *Commons* in the hybrid era
(Durham University)
- Exploring Approaches to Combat Contract Cheating, Ghosting and Collusion Amongst Computer Science Students
(Northumbria University)
- Intrinsic Value of Computer Programming: Academics' practices and students' perspectives
(University of Glasgow)
- The UK ACM SIGCSE podcast series
(University of Manchester)



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