

# SEPnet Summer Placement Survey

What software do students use on placements?  
How well do physics courses prepare them for using  
industry software?

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## What is SEPnet?

- The South East Physics Network (SEPnet) is a consortium of physics departments in 9 universities (Kent, Herts, OU, Portsmouth, Queen Mary, Royal Holloway, Southampton, Surrey & Sussex)
- The SEPnet partners work together to deliver excellence in physics through collaboration, teaching and research
- SEPnet includes:
  - an outreach programme to increase student interest in physics working with schools
  - A Graduate School (GRADnet) to develop technical and transferable skills of postgraduate research students
  - A collaborative research programme
  - An employer engagement programme to develop employability skills of undergraduates and postgraduate research students

## What is the SEPnet Summer Placement Scheme?

- An annual scheme offering placements to 2<sup>nd</sup> and 3<sup>rd</sup> (non final) year physics students at partner universities
- Employers who recruit physics graduates and university supervisors offer 8-week summer projects
- Projects are circulated to students who apply direct for roles
- Students receive a £2,000 bursary funded by employers and SEPnet partner departments
- SEPnet Employer Engagement Officers manage placements and visit students/supervisors during the placement
- Students produce a poster about their project
- Students present their poster at the SEPnet Annual Students' Expo in London in November
- In 2014 60 students secured placements (200 registered)
- In 2015 75 students have secured placements (300 registered)

## SEPnet Summer Placements 2014

- 54 students were interviewed and 43 employers from a range of industries including defence, energy, engineering and technology as well as research institutes
- 10 large corporates, 23 SMEs and 10 research/education institutions participated
- Approximately half of the projects comprised data analysis, modelling, programming. Other projects included testing products, website development, creating science demonstrations and research
- The range of projects included topics such as:
  - Study of Efficiency Gains of Integrated Hybrid Solar Panels and Multisource Heat Pumps
  - Development of an Arduino Mobile Robot for Radiation Detection
  - Development of the Quickest Electric Motorcycle

## List of organisations offering placements

Accelogress Limited	LiveWyer	Roke Manor Research Limited
AMEC	Magnetic Shields	Royal Holloway
Ancon Technologies	Met Office	Rutherford Appleton Laboratory
BHAFC	Micron SemiConductors	Selex ES
CGG	MRC Harwell	Symetrica Security Ltd
Crowd Connected	Neur	Things We Don't Know
Culham Centre for Fusion Energy	Newform	Touch Fantastic
Echo Group Ltd	NPL	Tranquility Aerospace Ltd
EnSilica	Observatory Science Centre	University of Hertfordshire
eOsphere Limited	Online Lubricants Ltd	University of Kent
HCL	Oxford Instruments	University of Portsmouth
HR Wallingford	Phoenix Photonics	University of Surrey
IPROS CUBE Ltd	QinetiQ Ltd	University of Sussex
KTN-UK	Queen Mary, University of London	Weald Technology Ltd
Kurt Lesker	RAL/CERN	
Lein Applied Diagnostics	RAL/ISIS	

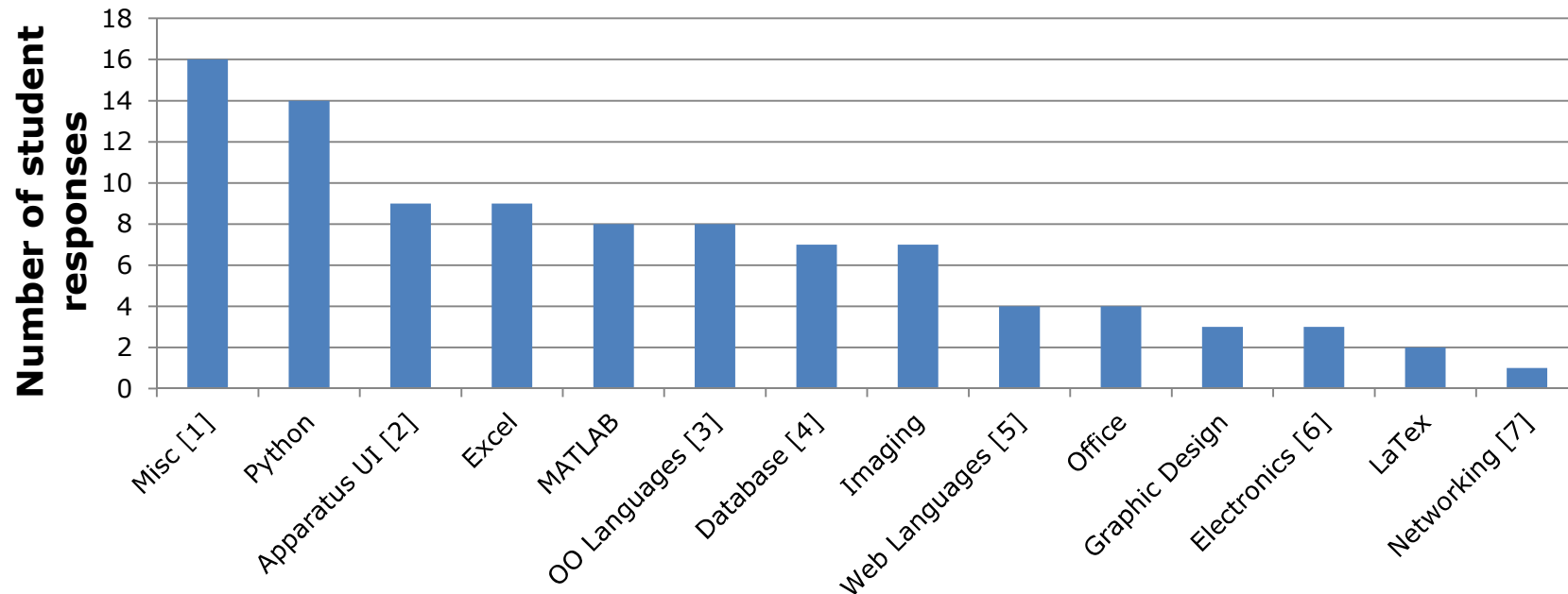
## SEPnet Summer Placements 2014

- Employers were asked how they rated students' software skills from 1-4
- Students were asked:
  - what software programs they had used previously
  - what they used on placement
  - how easy they found them to learn
- SEPnet university UG programme directors were asked to confirm which software languages and programs are taught
- Feedback from employers, students and UG programme directors is included in the following tables and graphs

What programming languages are taught in SEPnet university undergraduate physics courses?

University	Language and Programs			
	Year 1	Year 2	Year 3	Year 4 (MPhys)
<b>Hertfordshire</b>	MATLAB	MATLAB Python	MATLAB Maple	Python
<b>Kent</b>	Fortran/UNIX/ Python	MATLAB	MATLAB	MATLAB LabVIEW / IDL LightTrans
<b>Open University</b>	Maxima	Maxima	Graphing software	
<b>Portsmouth</b>	MATLAB/Maple/ LabVIEW	MATLAB/Maple/ LabVIEW	Python & LaTeX	
<b>Queen Mary</b>	C++/Mathematica		LaTeX, MATLAB	
<b>Royal Holloway</b>	Mathematica	Python	C++/Linux/SQL/ LabVIEW	
<b>Southampton</b>	Python	?	Python	?
<b>Surrey</b>	Fortran	Fortran/ MATLAB	BLAS/ LAPACK/ LabVIEW	Maple
<b>Sussex</b>	Maple, Python	Python/ Swift (optional 6 week masterclass)	LaTeX/Graphing software/ Swift (optional 6 week masterclass)	C++

## What types of programs/software did students use on placement?



[1] In-house and industry specific software

[2] LabVIEW

[3] Object Orientated eg Java, Ruby, C++, C#, (Python is listed separately)

[4] IDL, MySQL

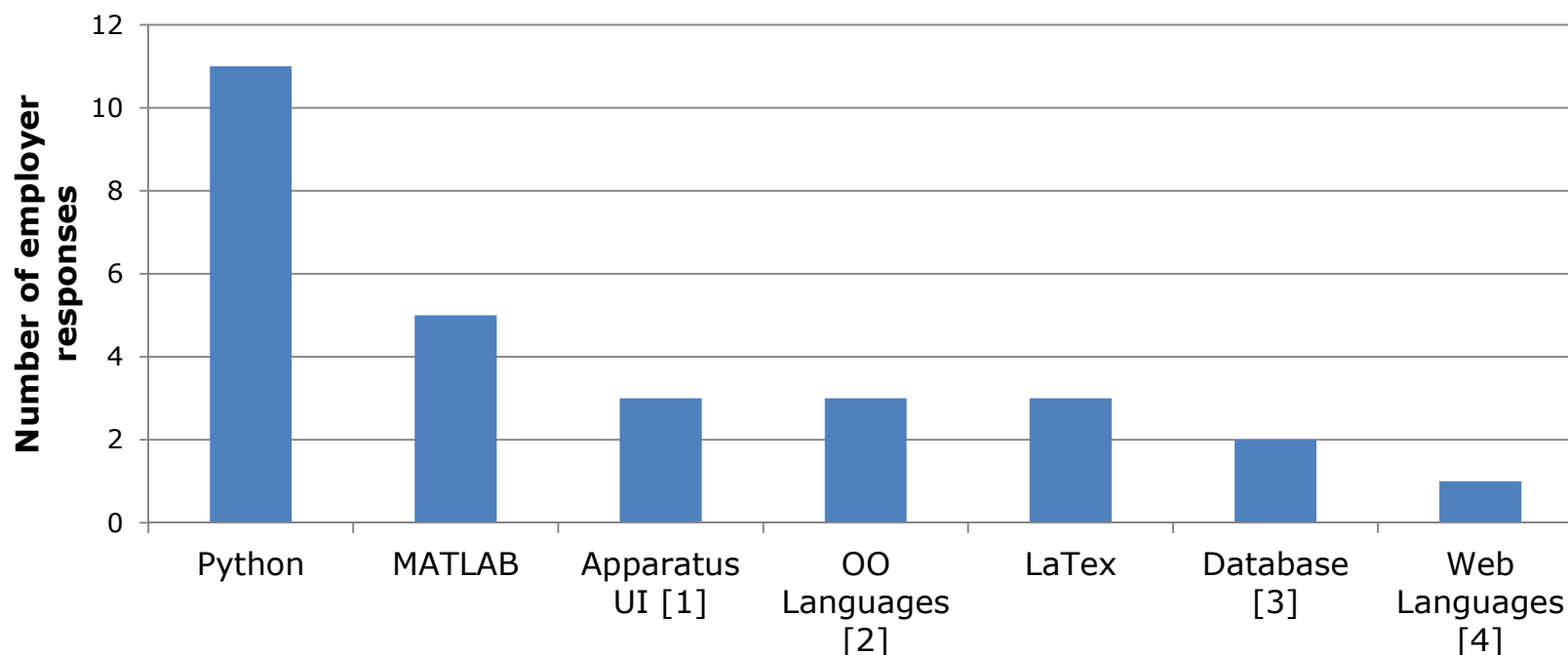
[5] JavaScript, HTML, Visual Studio

[6] To control eg Raspberry Pi, Arduino

[7] CRITEX



What relevant types of programs/software had students used before their placement?



[1] LabVIEW

[2] Object Orientated eg Java, Ruby, C++, C#, (Python is listed separately)

[3] IDL, MySQL

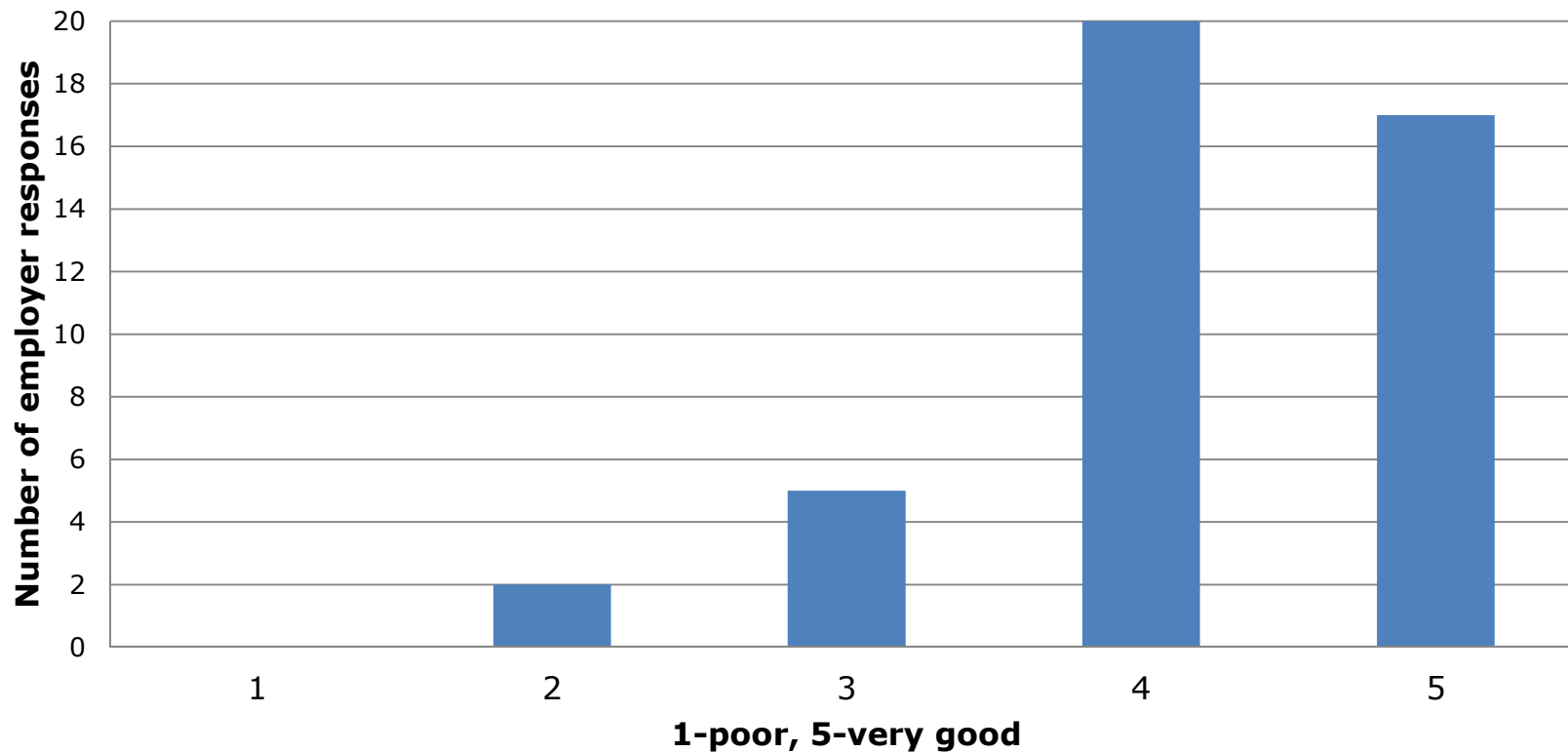
[4] JavaScript, HTML, Visual Studio

## What programs had students use before starting their placement?

- Most students had no previous direct relevant experience but learnt very quickly on the job
- However, nearly all students had used standard office suites i.e. Microsoft Office and
- most undergraduates have exposure to Apparatus UI software to control machinery during laboratory sessions
- (although few software employers would rate these skills necessary for their line of work, this is an essential component of an undergraduate physic course)
- All employers provided support via manuals, teaching aids or training courses

How well do physics courses prepare students to use industry software?

**How would you rate the student's software skills?**



## How well do physics courses prepare students to use industry software?

- Most employers said students were able to use a broad range of software packages and were able to quickly learn to use new software
- Those that rated software skills lower acknowledged that they did not expect the student to have previous relevant software experience
- One employer commented *'a key observation is the lack of any formal training on databases and data management during the physics degree'*
- Some employers selected students based on their knowledge of certain programmes and coding experience.

## Feedback from a recent SEPnet Employer Advisory Panel meeting

- Use of industry software changes over time so it is better to teach students the principles of computing
- Students should be taught one good programme
- Employers and students are keen that there should be more opportunities to learn computer programming as well as gaining access to particular software languages such as C++ and MATLAB
- *'Students should do computing as they need this. It would be more valuable if they had knowledge of programming – it should be taught in the 1st year'* (large corporate).

## Conclusions

- Many physics graduates pursue roles which require a good knowledge of software programs and data management
- It is difficult to prepare students to use industry software for placements BUT
- Students learning coding and programming skills are equipped to learn industry programs quickly
- Placements provide students with an ideal opportunity to apply their skills and use industry software
- More cohesion is still needed between the academic curriculum to ensure the most relevant programming languages are taught
- Students who are taught coding early increase their chances of finding a placement which, in turn, will improve their chances in the graduate job market.