UWE Bristol

Children as Engineers

Paired Peer Mentors in Primary Schools

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Paired Peer Mentors

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Year 2 student Engineers BEng/MEng

Engineering knowledge

Public Engagement skills

Year 2 Initial Teaching Education students

Inquiry-based science education

Engineering Design Process

Children as Engineers

Key Stage 2 Primary School Children

Research Evidence

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Year 2 student Engineers BEng/MEng

Year 2 Initial Teaching Education students

Key Stage 2 Primary School Children

- **Improving public engagement skills is a key aim for engineering professional bodies (EPC, 2014)**
- **Recruitment into engineering is needed to meet the employment gap**
- **50% of primary school teachers identify low confidence and subject knowledge in engineering (ENGINEER, 2014)**
- **Initial Teacher Education is key opportunity to embed experience in curriculum**
- **Evaluation of the ENGINEER programme indicates that children are able to apply the process to novel situations (Cunningham 2012).**
- **Girls particularly liked connecting STEM disciplines with relevant real-world problems (High Level Group on Science Education, 2007).**

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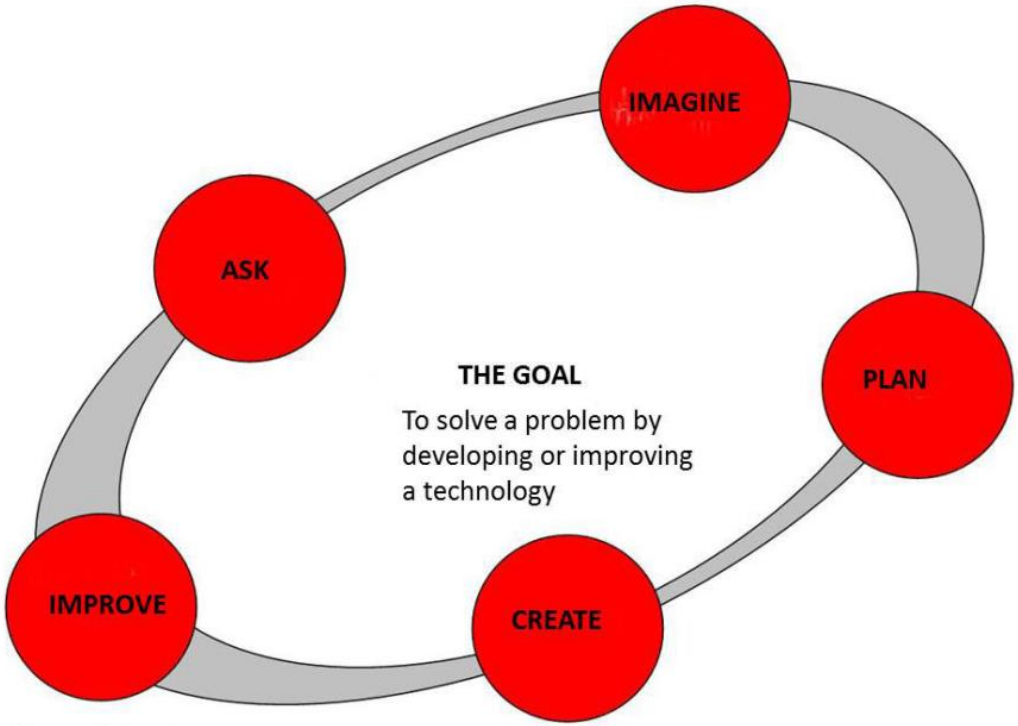
Engineering Design Process challenges

- Force and Balance
- High Flyers
- Mechanics
- Sinking and Floating
- Electricity



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eNgineer

www.engineer-project.eu

Project timetable

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Timeline	Project	Resources
June 2014	• Development of programme • Preparation of public engagement training • Development of evaluation materials • Recruitment and DBS checking of students	• 11 engineering students • 11 teaching students
October 2014	• Pre-evaluation of students • Co-creation and adaptation of case study materials by students	• ENGINEER materials
November 2014	• Delivery of hands-on practical challenges to schoolchildren • Schoolchildren develop projects and present to community	• 4 schools • 300 children
December 2014	• Post-evaluation of students • Researching conference for pupils, teachers and community of practice	• University outreach stands (UWE BoxED)
Jan-June 2015	• Evaluation, report writing and dissemination	

Engineer and teacher training

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Researching conference

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Researching conference

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Researching conference

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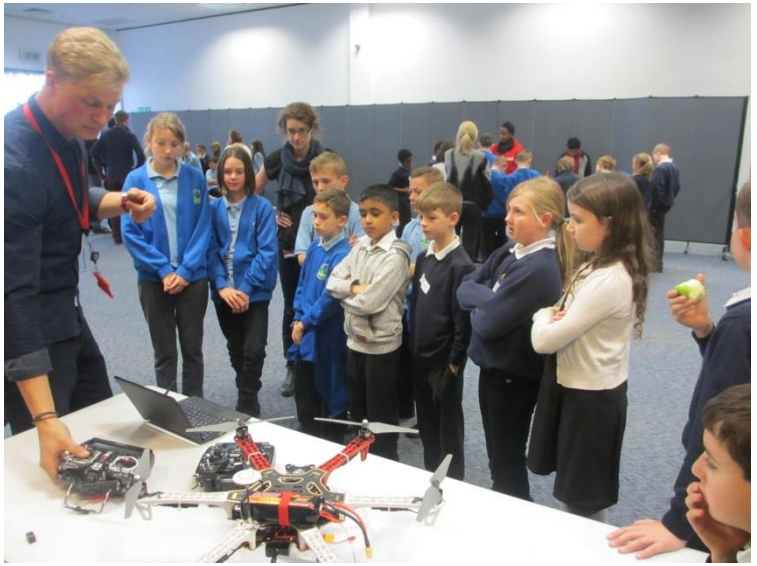

Researching conference

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Children's responses

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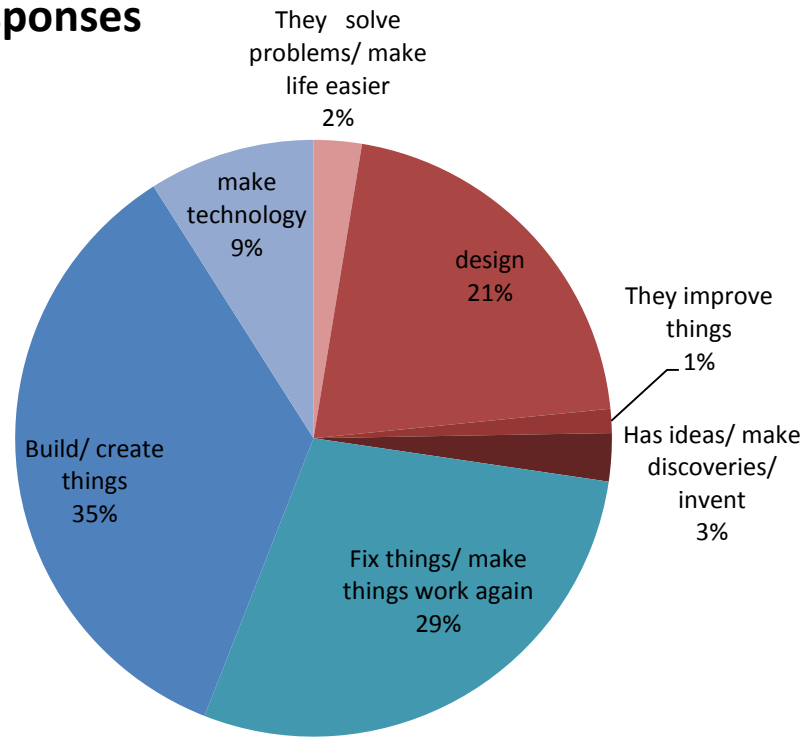
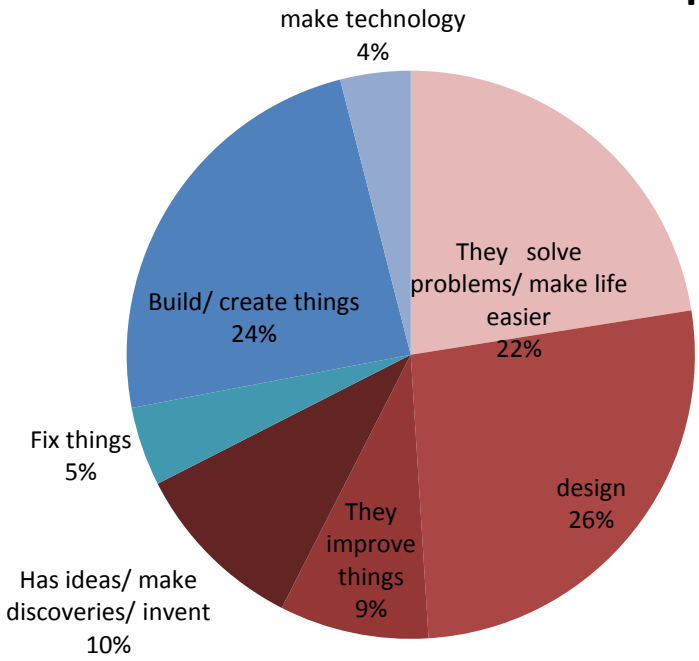
Pre responses



What do engineers do?

Post responses



Evaluation

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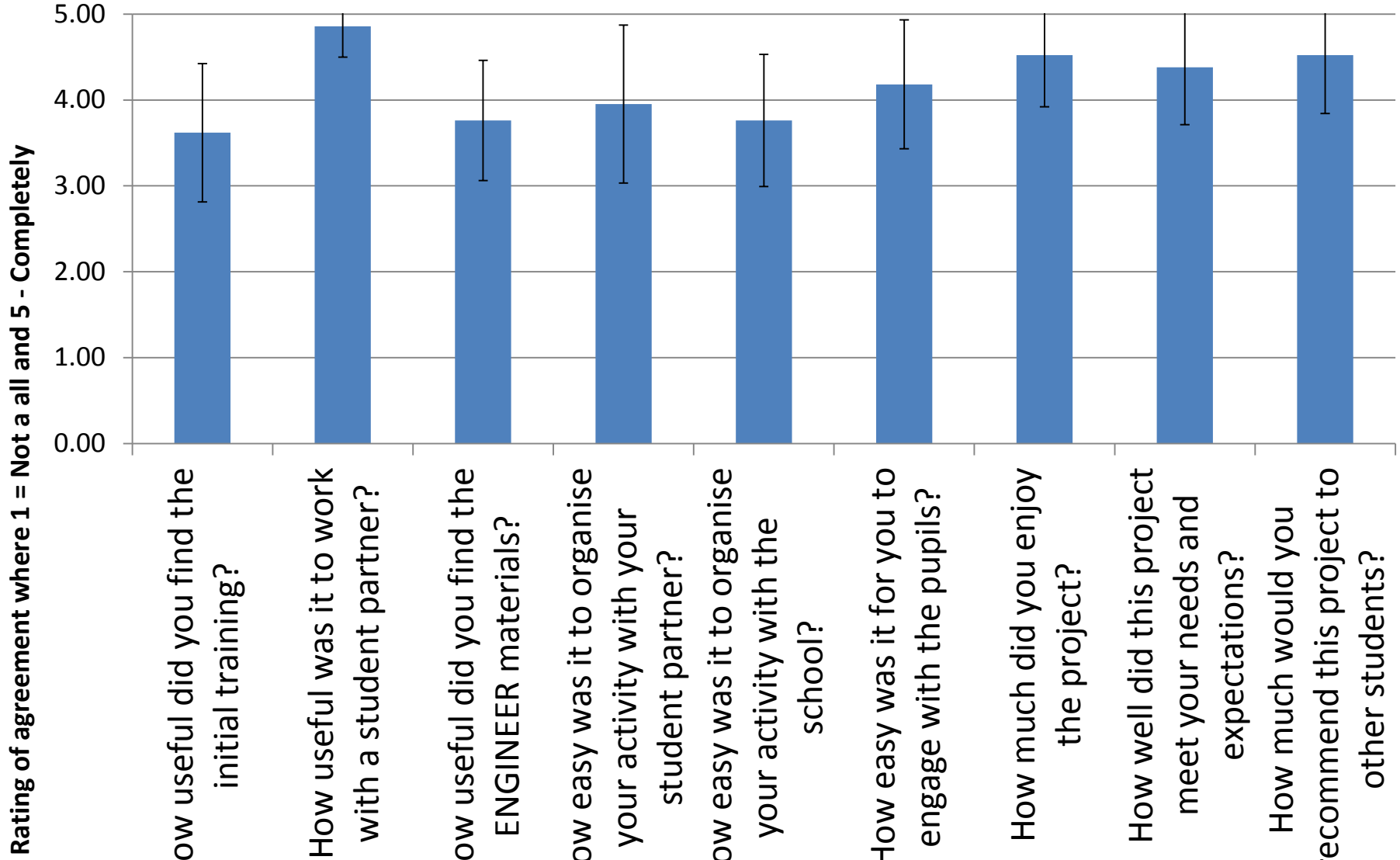

Evaluation

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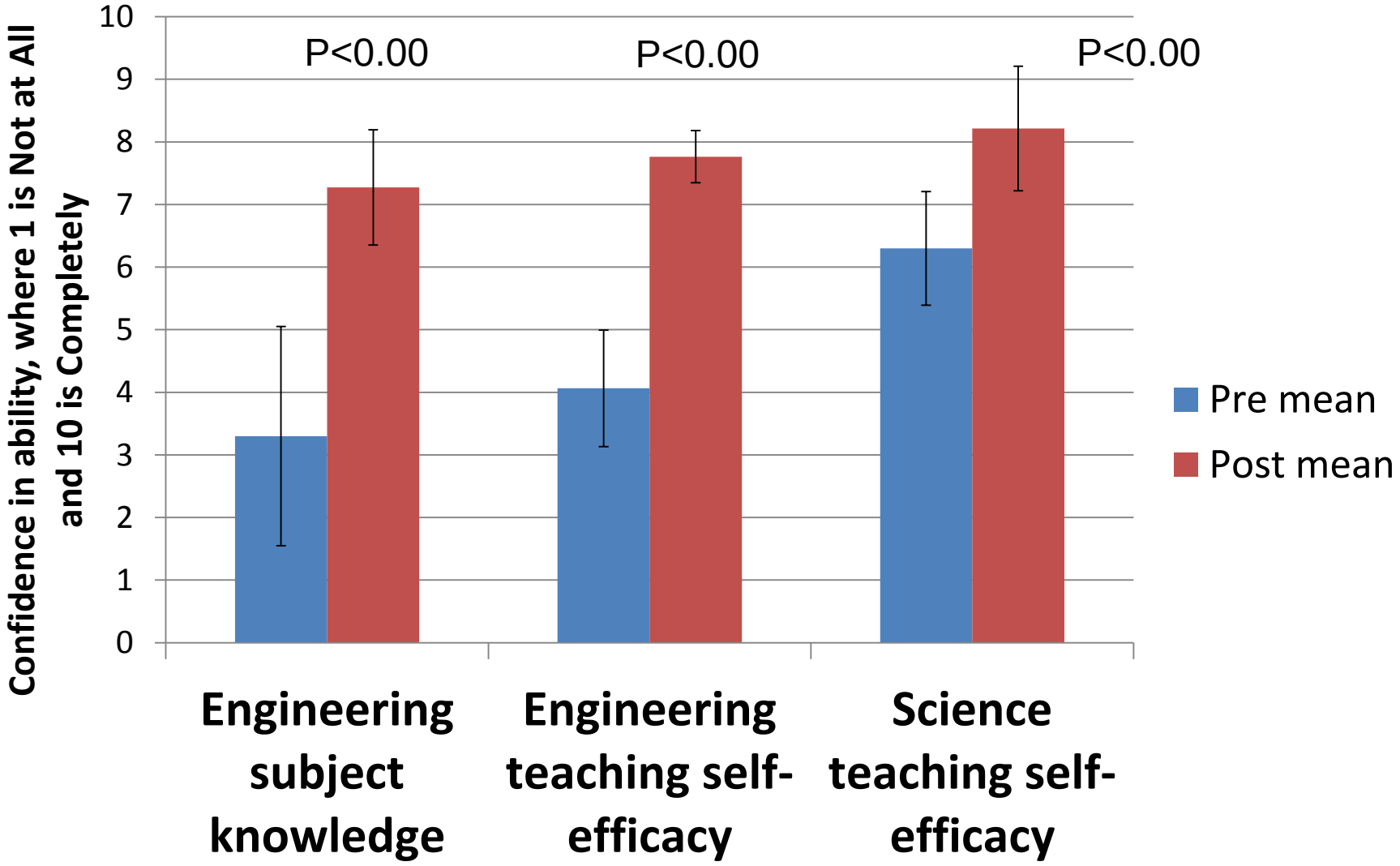

Evaluation

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Theme	Code	References
Impacts on children	Children's enjoyment	30
	Gender issues	4
	Impressions of engineering	21
	Learning	15
	Responses to paired peers	10
Personal development	Improved skills	16
	Opportunities for further engagement	3
Reflections on the project	ENGINEER materials	25
	Improvements for the future	17
	Paired peers' enjoyment	17
Working in partnership	Comments on the engineers	12
	Comments on the partnership	19
	Comments on the teachers	11

Evaluation

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Engineer: *I've really enjoyed this project because not only did I feel like I was teaching a class, I felt like I was teaching a generation.*

Teacher: *It was interesting working with someone different, it meant we could divide up the planning work into individual strengths, for example I did planning the structure of the day and extra resources and they experimented with how best to make the product (a Super Sucker) with the resources we had.*

Evaluation

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Engineer: *The pupils enjoyed the whole designing and creating process. They also seemed to enjoy the teaching through an activity instead of just talking. I had one pupil say it was their favourite lesson they have done. The teachers were pleased with how much the children enjoyed the activities.*

Teacher: *They loved the idea that they were engineers and one child wrote on the poster: "I love Science now because it is very fun and not that difficult but my science has improve." Another, "I thought it was epic I gonna be a engineer. Thanks" and many more lovely comments. They enjoyed the idea of having the engineer there as well which inspired some of them to aspire becoming an engineer.*

Dissemination of model

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Dissemination of model

- EPC Community of Practice
- Primary Engineer
- Cambridge Primary Review Trust

Research impact

- Journals
- Education Community
- Science Communication Community

Any questions?