

# Evaluation of 'RAF WISE' Work Experience Programmes, *RAF Cosford 2009-2012*

Jill Collins

Women in Science, Engineering and Technology  
Centre for Science Education  
Sheffield Hallam University



**RAF  
Work  
Experience**



# Contents

## Executive summary

1. Introduction
2. Overview
  - 2.1 Background
  - 2.2 RAF-WISE Work Experience Project partners
  - 2.3 Partnership with WiSET, Sheffield Hallam University
  - 2.4 Accreditation of RAF-WISE - CREST Awards
  - 2.5 Current context setting - Work Experience and Careers Advice
3. Content on programme and participants
  - 3.1 RAF Work Experience Programme
  - 3.2 The Application Process
  - 3.3 The Application Forms
4. The Workbook
5. Results of research into the RAF-WISE Work Experience Programme
  - 5.1 Methods used
  - 5.2 What do participants like about it?
  - 5.3 What did participants do after the experience?
  - 5.4 Impact measurement
6. New information gathered from 2012 RAF WISE participants
7. Benefits of RAF-WISE to the participants, the RAF and Wider STEM Community
  - 7.1 General feedback
  - 7.2 What Participants say about the RAF
8. Next Steps
9. Conclusions and Recommendations

## References

## Appendices

## List of Figures and Tables

Figure 1	National Work Experience Placements by Gender, 2004
Figure 2	When you got back to school, who did you tell?
Figure 3	Overall - what are you doing now?
Figure 4	Which 3 subjects do you enjoy most at school?
Figure 5	Do you know what an engineer does?
Figure 6	Do you know what the RAF does?
Figure 7	Have you ever met an engineer?
Figure 8	What 3 words would you use to describe a career in engineering?
Figure 9	What do you think are the 3 most important things in any career?
Figure 10	In what job or career areas might you want to work?
Figure 11	Would you consider a career in the RAF?
Figure 12	Have you done (or will you do) work experience through your school?
Figure 13	How would/do you describe it [RAF-WISE] to other people?

## Tables

Table 1	Example of RAF-WISE programme
Table 2	Number of past participants surveyed
Table 3	Word frequency

## Acknowledgements

The survey and evaluation report has been made possible through the support, encouragement and input from colleagues at Sheffield Hallam University and the Royal Air Force. Thanks are due to Squadron Leader Glynis Dean and her team at RAF Cranwell; the WiSET Team at the Centre for Science Education and colleagues in the Student and Learning Service who helped recruit the student interns. The reliability and enthusiasm of the three student interns - Jenny, Liz and Manal - is greatly appreciated and their input invaluable.

# Executive Summary

In 2009 the RAF established a programme of residential work experience at RAF Cosford aimed at encouraging 24 young women to consider careers in engineering and more broadly into STEM related specialisms. This programme has gone from strength to strength, with the activity being repeated in 2010, 2011 and 2012.

This report is based on feedback gained from individuals who have participated in the RAF WISE-Experience over a 3 year period with a response rate of over 72% and provides robust evidence of the participants' views. When following up graduates after their course, the Higher Education Statistics Authority aims for a response rate of 80% and this is achieved using a variety of methods, including online surveys, emails and other methods (HESA 2009). HESA set this target for higher education establishments in order to collect data which is reliable. The response rate for RAF telephone survey, conducted on a small scale in comparison, therefore provides some useful information on which to draw conclusions.

The partnership approach to developing STEM activities (Section 2.3) provides a model which draws on the strengths of outside organisations that can support the RAF in this area of work. Relationships with equality and diversity specialists already working in the field of STEM and STEM specialists who actively promote activities with under-represented groups have proved particularly fruitful (for example, WISE, WiSET, STEMNET, CREST). This helps avoid duplication of effort and supports dissemination of good practice across the sector. A summary of the partners and other organisations involved in the project delivery is contained in Section 2.2

There is currently a wide variation in the way that work experience placements are organised and the means by which careers education, information, advice and guidance is delivered. The level of support for young people is inconsistent and structured models of work experience, such as RAF WISE, are increasingly important. The programme has careers education, information and advice embedded within it and can support educators in their efforts to ensure that girls are aware of STEM options in particular.

The survey feedback was overwhelmingly positive, it is hard to find any negative comments, although there are some that provide constructive criticism. Table 3 in the report gives examples of the terms used by the participants to describe their experiences, there were no negative responses overall. (Section 5.2).

At least 60% of participants contacted indicated, at the time of the telephone survey, that they intend to or have progressed onto STEM subjects and careers. Figure 3 'What are you doing now?' on shows that approximately 63% (33 girls in total) are taking: A Levels (including STEM subjects), Vocational STEM course, Work/Apprenticeship in STEM and Higher Education course in STEM. (Section 5.3)

63% of girls are continuing to keep STEM options open after the RAF WISE work experience, this may indicate that at the very least this type of activity can help address the 'leaky pipeline' where females often drop STEM subjects (particularly Physics) after GCSEs. Research (Murphy and Whitelegg, 2006) indicates that single sex activities, in this case work experience in engineering, can support the promotion of non-traditional careers to girls in particular.

The programme has evolved over the years to provide an inclusive and rich learning experience which is delivered with STEM at its heart. It has been recognised as an example of best practice, been shortlisted for a National Careers Award and showcased at national work experience and equality and diversity events. The curriculum links to STEM subjects and career learning embedded in the model are well established and the impact on participants is evident.



The participants had a range of stated career interests prior to starting the work experience week but the majority indicated that they were already interested in STEM or were keen to try it (54 of the 76 application forms analysed indicated that they were interested in or wanted to explore STEM, or specifically wanted to try STEM activities in the RAF). The report (Section 3.3) covers this in more detail and outlines the implications for the RAF in managing the tension between maintaining engagement of those already interested in STEM and the RAF with the desire to reach out to new groups of potential candidates.

Sustainability has been built into the model since its inception, with top down support from the outset. Gender Equality training delivered by the UKRC at RAF Cranwell in the early stages of development and subsequent support at national and station level has provided strong leadership and a clear message about the importance of work experience in STEM.

The RAF has not been afraid to target under-represented groups in an effort to attract a more diverse workforce. This is a bold move which, judging by the responses of the work experience participants, is a worthwhile activity. The staff at RAF Cosford are committed to making sure that the programme is a high quality one, revising and enhancing aspects of the programme periodically. Continuity of this standard has been achieved through ensuring that the trainers at the base are clear about the rationale for the programme, putting systems in place for handover of responsibility under the leadership of the Station Commander. The commitment and enthusiasm for the programme delivery is clear each year on the final day when instructors, chaperones, ambassadors and senior management are all on hand to witness the presentations made by the girls.

The residential nature of the work experience programme means that participants are made aware of the RAF way of life and can observe how things happen in that context. The combination of an engineering experience in an RAF environment gives many girls the opportunity to try something completely new and different, which they often cite as a positive outcome when completing applications for future courses and careers (Section 7.2). The range of employability skills (such as teamwork, co-operation, leadership and reliability) are very evident in the model and transferrable to many careers.

The CREST Award was carefully selected as the method for measuring success and offering the participants a 'qualification' to take away at the end of the week. The original plan was to develop an activity at Bronze level but the enthusiasm and commitment of the STEM Ambassadors and trainers at RAF Cosford has resulted in all recent cohorts consistently achieving the Silver standard. The CREST Award activity encourages the participants to relate their experience to STEM subjects and to demonstrate their understanding of the theories involved, as well as the application, and this is something they can build on when they return to school. The CREST Certificates are awarded by the Station Commander (or a senior manager) on the final day after the girls have delivered their presentations about their experiences.

Some participants have made applications independently through the WISE website whilst others have come from local schools (Section 3). It is useful to have a range of recruitment methods and the RAF work experience team is already aware of the need to create a 'level playing field' for applicants where possible. Some applications are very polished and (understandably) teachers have supported their students in the form filling process. Other applicants are less fortunate and do not have the same support systems in place, it is therefore important that the content of the application is considered carefully, rather than favouring those who can phrase it most eloquently. The level of support and coaching in completing the application forms may have implications in respect of fairness and equality of opportunity.

The RAF-WISE work experience week for girls aged 14-19 was the first of a suite of similar activities now delivered by the RAF. The programme was specifically developed to be inclusive, so that individuals from different backgrounds could access the activities - being able to apply for a place and to get the maximum benefit from it, regardless of their prior learning and experience. Career related messages are woven through the programme, from the interaction with positive role models who support women and girls, to the use of a workbook which encourages them to reflect on their own learning, their preferences and how they can use the experience to make plans for the future. The model has developed organically and with care, using lessons learned from 'partners' and other organisations to incorporate best practice.

The evaluation data shows that the RAF WISE programme has delivered positive outcomes for almost all of the girls who have taken part. For those that have decided not to pursue STEM courses and careers there has been an acknowledgement that the experience itself proved valuable, both in terms of personal growth/increased confidence and as an opportunity to 'test out' some career ideas. Some individuals have decided against STEM but are considering or keen to pursue careers in other roles in the RAF.

Many of the girls found the workbook useful and some still use it for help when writing CVs and to remind them of what they have achieved. Only two participants from 2009 said that they did not remember the workbook which, after 3 years, is notable. Many (15 in total) said they thought it was good and 11 specifically said it was "good to look back" or that they used it to "reflect" on the experience.

The fact that all of the girls remember and can describe their RAF-WISE experience in such detail (after 3 years in some cases) is a testament to the high quality of this programme. The participants appear to value the uniqueness of the experience RAF-WISE has afforded them.

## 1. Introduction

The Royal Air Force (RAF) has been engaged in focused activities to encourage more young women into Science, Technology, Engineering and Maths (STEM) occupations since 2007.

This report is an evaluation of the RAF-WISE work experience programme delivered at RAF Cosford between 2009 – 2011. The report is divided into seven main subject areas: an overview with background and supporting information; a summary of the programme and feedback on the application process; a description of the workbook; a section on the research being undertaken to assess outcomes of RAF-WISE work experience; information received from participants for the first time in 2012; an exploration of the benefits for the RAF and STEM 'community'; and conclusions and recommendations.

It should be noted that the author of this report has been involved since the project was first designed; this will provide some useful insights and add value, the report is therefore written from the viewpoint of a 'critical friend' rather than that of an external evaluator.

# Overview

## 2.1 Background

The RAF-WISE work experience is one of a suite of activities undertaken by the organisation to encourage young people who are currently under-represented to consider a career in the RAF. A study entitled 'Gender Representation - the Next Recruitment Challenge' (Dean, Guy and Cullen, 2007) was written by an in-house team and presented to the RAF Personnel Board in 2007. The study articulated that the RAF's life blood is a steady flow of the most talented young people the country has to offer and that it must seek to remain an employer of choice in order to continue to attract the best.

The RAF study concluded that although headline numbers of females entering the Service were improving, there was growing evidence of gendered occupational segregation and recommended the development of a 5 year strategy with the primary objective of improving female recruitment into those under represented occupations. The Board accepted the study recommendations and directed the development of a detailed and costed action plan.

Following a period of investigation into current practice in the recruitment of females into STEM trades and professions, decisions were made about how best to increase the number of applicants from under-represented groups.

The first residential work experience at RAF Cosford was established in 2009, designed to encourage 24 young women to consider careers in engineering and STEM related specialisms. This programme has evolved since that time, with the activity being repeated in 2010, 2011 and 2012.

Since the development of the first work experience week aimed at girls, the RAF's wider equality and diversity remit has been taken into account and efforts have been made to broaden the groups that might take part. The particular issues of under-representation of people from BAME (Black and Minority Ethnic) groups and those from lower socio-economic backgrounds have provided a focus for recruitment into the work experience programmes on offer (Dean, Collins, Morton, Guy 2011). The efforts to encourage people from a range of different backgrounds reflect the RAF's equality and diversity statements, which are set in very positive terms on the 'community support' web pages<sup>1</sup>. The statement on the RAF website also echoes the sentiments behind the recruitment strategy for the work experience programmes, it acknowledges that individuals may find themselves in more than one group (eg BAME girls under-represented in engineering) and that groups are heterogeneous. In response to this, care has been taken to acknowledge the evidence (Institute of Physics, 2012) that girls can find it harder to access careers in engineering and that other factors can significantly affect some groups.

Further residential work experience programmes (all of which last one week) have been developed with different groups of young people, for example the Generating Genius project, focusing on academically able BAME young men and women<sup>2</sup>, the Avionics week with Air Cadets and the Logistics week with girls at RAF Halton. Lessons learned in earlier versions of the STEM work experience week can be reviewed in the external evaluation report "Project RAF WISE" (2009). The RAF Halton Evaluation in 2012 also provided some useful insights for future programme development.

The Generating Genius programme is aimed at young people (originally Black Caribbean boys but latterly widened out to include girls) from 'challenging' backgrounds. An evaluation of the Generating Genius programmes will take place in 2013. The recruits from the RAF Halton logistics programme are drawn from the Girls Venture Corps Air Cadets (GVCAC) and the intake for the work experience week reflects the fact that some of the GVCAC members are from a range of backgrounds (BAME/White British, living in rural/urban areas, etc). The work experience programmes have differing groups of young people at their heart, the overarching aim of the RAF to deliver high quality activities which will engage and encourage them to consider STEM options is clear.

Although the programmes have evolved since the first "RAF WISE" work experience week in 2009, the main tenets remain the same:

- Hands on activities
- Meeting positive role models
- Team building and fitness tests
- Completing a bespoke workbook

---

<sup>1</sup> <http://www.raf.mod.uk/community/support/equalityanddiversity.cfm>.

<sup>2</sup> <http://generatinggenius.org.uk/>

- Having exposure to the different elements of a military lifestyle
- Meeting some new recruits as well as high-ranking RAF personnel
- A final day celebration event with families, teachers and other guests invited



A group of work experience participants with a female role model

It has sometimes been suggested that the residential weeks at RAF stations at Cosford, Cranwell and Halton are not 'work experience' placements as such but more of a 'work taster'. However, while most traditional placements offered to school aged learners are not residential, the RAF work experience provides a fairly accurate portrayal of what a new recruit would encounter during the early stages of induction, having to cope with challenges like home-sickness, living at close-quarters with unfamiliar people and following instructions from senior personnel. In that sense, the work experience programmes are as close as possible to the actual experience of a new RAF recruit.

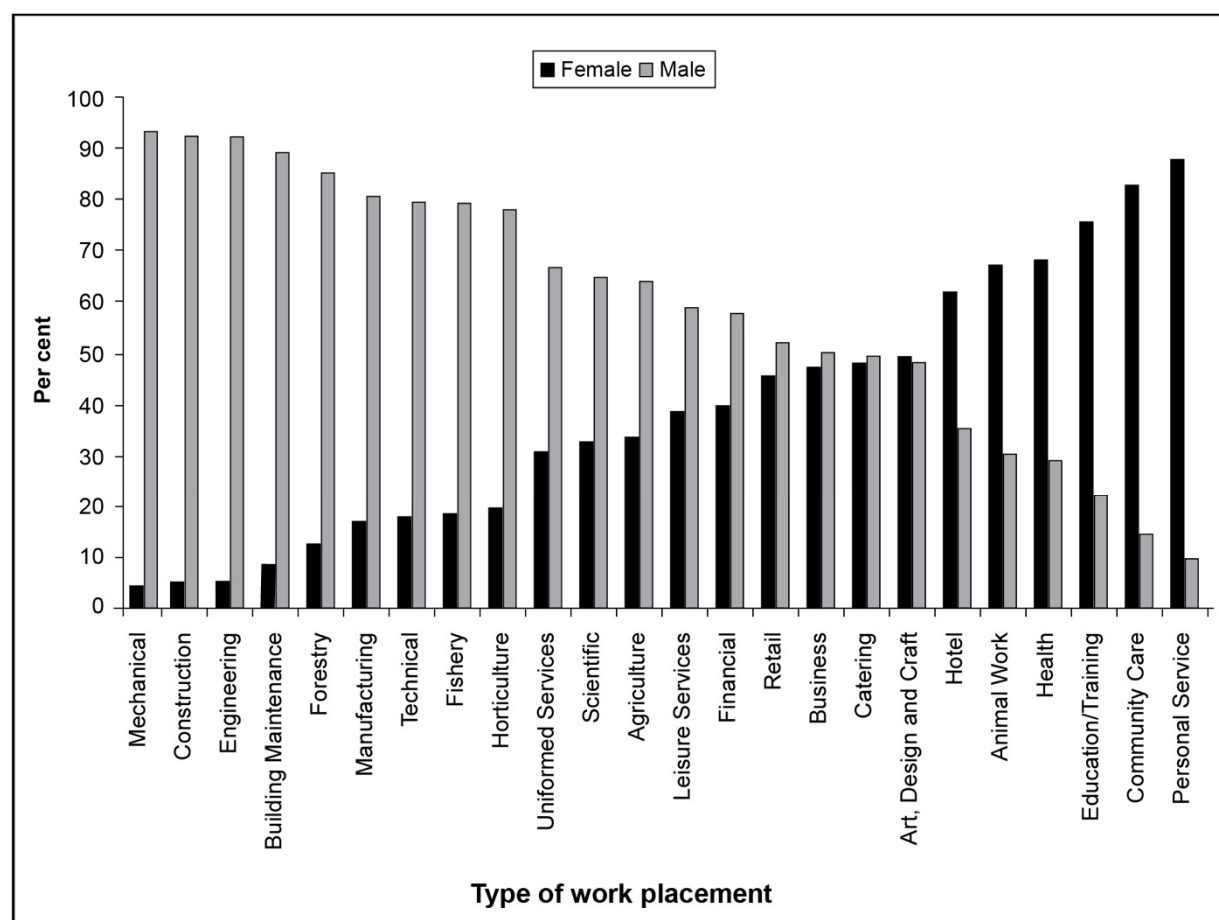
Many of the underpinning elements of the RAF WISE week are based on the 'Wider Horizons' work experience programme which was created between 2004-2007 as part of the JIVE (European funded) project to increase the number of women and girls in science, engineering and technology. At that time evidence from a report commissioned by the Equal Opportunities Commission (EOC, 2005) confirmed that occupational segregation within work experience placements was a major factor in influencing career awareness and choice within young women (and young men):

*Work experience has a potentially important role in disrupting such trends by providing young people with broader, diverse and/or non-gender traditional experiences and ideas about the adult workplace. Yet, evidence has suggested that uptake of work experience placements reflects and potentially perpetuates gender stereotyping. (EOC, 2005 page iii)*

The EOC report highlighted that from a total of over 10,000 nationally, only 5% of placements in engineering, construction and 'mechanical' were undertaken by females. In the research sample itself there were 31 boys who undertook engineering placements and no girls. The converse was true of areas such as childcare. National data for work experience placements has not been consistently available since that time, partly due to the new funding arrangements. Research undertaken during the period when Diplomas for 14-19 year olds were being developed indicated that the trend was continuing (Department for Children, Schools and Families, 2009), and that the number of 14 year old girls choosing engineering and construction diplomas, which included a period of work experience, was very low.



**Figure 1**



Source: National LSC 2004, one term returns

From 'Gender Equality in Work Experience Placements for Young People' Equal Opportunities Commission 2005

There are encouraging signs of increased engagement in Physics as a subject with Engineering UK (2013) reporting that the number of students studying it at A Level (in England, Wales and Northern Ireland) rose by 5% in 2012. Similarly, the report indicates that there has been an increase in the number of young people taking BTEC First qualifications in Engineering, rising by 30.4% in 2010/11. Apprenticeships in engineering and manufacturing technologies have also seen a rise in participation rates, up by 29.3% from the previous year in 2010/11. However, according to the report, the number of women in these sectors remains stubbornly low:

*Over the last 10 years, accepted applicants from UK engineering and technology students have grown by 21.5%, reaching 21,344 in 2010/11. Only 10.8% of these applicants came from women. (Engineering UK, 2013)*

In the light of the continued under-representation of women in the sector, the incentive for creating programmes which engage girls and encourage them to consider engineering and technological specialisms in the RAF would appear to be as relevant today as it was in 2009.

## 2.2 RAF-WISE Work Experience Project Partners

The RAF work experience programmes have been developed with the support and involvement of partners for a number of years. A short description of each organisation follows, to provide some context for the rest of this report.

## WISE

WISE (Women in Science, Engineering and Construction) helps organisations to inspire women and girls to pursue science, technology, engineering and mathematics (STEM) as pathways to exciting and fulfilling careers. In 2012 the WISE Campaign amalgamated with the UKRC. The Director of WISE was very involved in the early development of the RAF-WISE programme and worked closely with the DRIT Team and WiSET in the design and delivery until 2010.

## WiSET

The Women in Science, Engineering and Technology (WiSET) team, based within the [Centre for Science Education](#) at Sheffield Hallam University, aims to address the under-representation of women in STEM (science, technology, engineering and mathematics). Sheffield Hallam University was a core partner in the UK Resource Centre for Women in SET (later known as the UKRC) and members of the WiSET team, including the Project Manager involved in RAF-WISE, were seconded to work with the UKRC from 2004 until 2011.

## UKRC

The UKRC is a leading organisation for the provision of organisational development services for businesses and organisations wanting to build gender equality and diversity in science, engineering, technology and the built environment (SET). In 2011 it took over the leadership of the WISE Campaign and became UKRC-WISE. In late 2012 it took on the WISE name

## CREST

CREST Awards are delivered by the British Science Association, a registered charity that exists to advance the public understanding, accessibility and accountability of the sciences and engineering in the UK. CREST Awards Science, technology, engineering and maths (STEM) enrichment activities to inspire and engage young people aged 5-19 years. The area CREST Co-Ordinator attends the final day of the RAF-WISE week to assess portfolios of evidence for the CREST Awards.

## STEMNET

STEMNET creates opportunities to inspire young people in Science, Technology, Engineering and Mathematics (STEM). This enables young people to develop their creativity, problem-solving and employability skills, widens their choices and supports the UK's future competitiveness. Some staff at RAF Cosford are trained as 'STEM Ambassadors' under the STEMNET framework and contribute to the delivery of activities during RAF-WISE week.

The timeline on the next page gives an indication of the points at which each of the organisations became involved and some key events.

<b>2007</b>	'Gender Representation - the Next Recruitment Challenge' written by in-house team and presented to the RAF Personnel Board
<b>January 2008</b>	RAF Directorate of Recruitment and Initial Training (DRIT) team contacted WISE, WiSET and the UKRC.  WISE, WiSET and the UKRC were in the process of developing and delivering work experience programme for the Royal Navy (delivered in July 2008).
<b>October 2008</b>	DRIT Team confirmed that RAF Cosford to host work experience for girls into engineering in 2009.
<b>November 2008</b>	UKRC Gender Equality Training delivered to senior managers at RAF Cranwell
<b>January 2009</b>	DRIT team and colleagues at RAF Cosford started planning of activities, logistical arrangements (accommodation, transport etc)
<b>May 2009</b>	UKRC Gender Equality Training delivered to instructors and key staff at RAF Cosford
<b>July 2009</b>	RAF Cosford hosted the first RAF-WISE Work Experience programme
<b>April 2010</b>	CREST Award activities built into the programme and documentation added to the workbook  RAF received the Opportunity Now 'Inspiring the workforce of the future' Award
<b>July 2010</b>	RAF Cranwell hosted the first RAF 'Generating Genius' week
<b>August 2010</b>	Workbook adapted and used by girls on work experience with the Ministry of Defence in Portsmouth
<b>October 2010</b>	RAF Halton hosted the first Logistics Work Experience week  RAF Cosford hosted Avionics Work Experience programme, using the workbook for the first time
<b>March 2011</b>	Article published about RAF-WISE in 'Centrelink - The Magazine of the Centre for Education and Industry'
<b>April 2011</b>	RAF DRIT Team attended National Career Awards ceremony, shortlisted in the 'Working with 14-19 Year Olds' category
<b>October 2011</b>	RAF and WiSET delivered paper at the Education Employers' Taskforce Conference, University of Warwick
<b>September 2012</b>	WiSET Project Manager delivered paper about RAF WISE survey and research at the European Conference on Educational Research in Cadiz

## 2.3 Partnership with WiSET, Sheffield Hallam University

The WiSET Project Manager has a background in careers education and guidance and has been involved in work experience programmes for over 25 years, often witnessing at first hand the effect of good (or poor) quality work experience on young people aged 14-19. The opportunity to be involved in a completely new suite of RAF activities has been incredibly rewarding and provided evidence for research activity. The development of RAF-WISE has informed practice and supported work with other organisations interested in delivering similar programmes.

In January 2008, the RAF DRIT team made contact with the Project Manager responsible for work experience in the WiSET team at Sheffield Hallam University and with WISE. WISE and WiSET were already working with the Royal Navy on a work experience project to attract girls into STEM delivered in Portsmouth and the model was used as the basis for work with the RAF. Discussions at that time focused on the basics: where the programme might be delivered; who would need to be involved; how their commitment could be obtained; which activities could be used and what success might look like.

In the early stages, meetings took place and lessons learned from previous projects undertaken through the UKRC, WISE and WiSET were used to inform the development of the RAF-WISE work experience programme. It was important to ensure that staff coming into contact with participants at RAF Cosford were clear about the reason for girls-only activities and were made aware of support/behaviour that can lead to a successful outcome for the individuals involved and for the organisation as a whole. The UKRC Gender Equality training was organised by the WiSET Project Manager and delivered at RAF Cranwell in November 2008. The training was subsequently rolled out at RAF Cosford for instructors in April 2009. Alongside this, the project team worked with station staff to identify the hands-on activities that would be offered and who would be responsible for delivery, which individuals would be chaperoning the girls, and how suitable role models would be identified.

Discussions took place on many issues and at all levels, including how the accommodation would be organised, how the girls' teams would be divided, what would go in the goody-bags the girls would receive, whether there needed to be any special rules, who would act as chaperones/role models, and a host of other questions. A new relationship between WISE, the UKRC, WiSET and the RAF developed where the expertise of each organisation was acknowledged and the need for honesty about targets and remits of the different individuals involved was taken into account. Since that time, the Director of WISE has changed and the UKRC has a different approach to its work with organisations (on a much smaller scale with a reduced team).

In the early stages of the RAF WISE project development the WiSET Project Manager was also undertaking work on behalf of the UKRC 'Services to Businesses and Organisations' Team. At that point her remit was to look at the culture of the organisation and to work with the DRIT Team to support the implementation of single sex activities.

From 2008 until 2011, the Department for Children, Schools and Families contracted the Centre for Science Education at Sheffield Hallam University to deliver the STEM Subject Choice and Careers Project. The WiSET Project Manager was responsible for ensuring that the equality and diversity elements of the project were fit for purpose and communicated to internal and external audiences. This included the creation of the STEM Equality and Diversity Toolkit, looking at issues which might affect people entering STEM careers in relation to gender, ethnicity, religion/belief, age, disability, sexual orientation and socio-economic status. The activities in this strand of the STEM Subject Choice and Careers Project supported the links with the RAF in several ways, not least because the DRIT team was developing programmes for BAME young people and could contribute to, and benefit from, the networking events accessed through the project.



## 2.4 Accreditation of RAF-WISE - The CREST Award

All of the girls since 2010 have received a CREST Award during RAF-WISE. The British Science Association CREST Awards scheme is a project-based awards scheme for the STEM subjects which "links the personal passions of students to curriculum-based learning". The inclusion of an award which recognises the participants' efforts and acknowledges their understanding of STEM has always been an important feature of the work experience programmes, including those at RAF Halton and with Generating Genius at RAF Cranwell. The CREST Award offers the opportunity of linking STEM to an RAF activity, usually making a glider from basic materials and testing to see how far it will carry a bottle of water. This serves to remind participants that the RAF WISE work experience is strongly linked to STEM and that successfully recording the process will lead to a STEM specific award. At the beginning of each week of work experience the participants are informed about the CREST Award and made aware of its significance in terms of the rest of the programme, particularly the evening activities which include recording their learning.

The feedback from the first two years of this study show less explicit comments about the CREST Award, although in 2010 one person mentioned it and several participants mention 'making the gliders' (which was part of the CREST activity) as one of the most memorable things, illustrated by the following quote:

*Making experimental planes from paper, wood and sellotape, glue and wires. Afterwards we threw them off a long building to see which one carried most water. We did loads of things, like a trust exercise where we blindfolded each other and gave directions to see if we trusted each other. There was an assault course with a wooden brick to see if you would drop it.*  
(2010)

The 2011 cohort were clearer about the value of the CREST Award in their responses to the survey and three individuals mentioned that they had particularly enjoyed undertaking the CREST activities.

When the CREST activity was designed there was a clear intention to create an authentic RAF style exercise, which would appeal to girls but would not be explicitly aimed at them (by, for example, softening the image and messages). The glider activity has been used with girls, boys and mixed groups with similar levels of success.

The celebration on the final day of the work experience week focuses on the teams (6 groups of 4 people) making PowerPoint presentations detailing what they have learned from the experience. Families, station staff, teachers and others are invited to hear the presentations. At the same time the CREST Co-ordinator for the area assesses the information which the girls have completed in their workbooks (to a standard CREST Award format) about their STEM project work and what they have learned from it. After the girls have completed their input the Station Commander and Squadron Leader Dean present the CREST Awards and make some closing comments, showing their appreciation to all involved.

The CREST Award allows a focus for much of the programme and station staff, chaperones and the girls are aware that they are aiming to achieve Silver standard by the end of the week. The presentation of certificates on the final day is another means of reinforcing the messages about the RAF and its commitment to promoting STEM careers to a wider audience. Positive feedback has been received at these events from parents and other family members, as well as teachers and other observers.

and not the fuselage's. Whenever, as a whole group we needed to make decisions and people were disagreeing, we undertook a vote. This was a very fair way. Firstly, I have thoroughly enjoyed doing this project, and participating as part of a team. I have learnt about the many technical aspects ~~of it~~ that go into building a aircraft. I also feel that with my ~~#~~ Mechanics background that I gained when I did my Maths A-level 4 years early, I ~~have~~ <sup>have</sup> a ~~new~~ <sup>more</sup> knowledge of view of more rounded knowledge and view of the technical aspects of aircrafts. I have also been commended on individually for my enthusiasm to participate and learn, and also to work as a team member.

Example of workbook page showing career learning, employability skills and awareness of technical knowledge used in the CREST project

## 2.5. Current context setting - work experience and careers advice

The national policy situation regarding the provision of work experience and careers education, information, advice and guidance (CEIAG) is an evolving one.

The way that work experience is organised and funded nationally has also been reviewed and the government has accepted many of the recommendations of the Wolf Review (Wolf, 2011). As a result, the delivery of work experience is undergoing significant changes with key stakeholders (notably Education Business Partnerships) and the traditional links with the RAF are likely to alter. It may well be that many schools no longer offer work experience to 14-16 year olds during term time, and the approach taken by the RAF in delivering work experience weeks in half term/holidays may be more appropriate in engaging pupils in that age group. Mann and Oldknow (2012) summarise the potential effect of the policy changes, raising concerns about the reduction in schools engagement with employers (down by 40% between 2009-10 and 2011-12).

The funding arrangement for schools to provide CEIAG, which was previously 'ring-fenced' by government, has changed since the coalition government was established. A new All Age Careers Service is being developed and the provision for young people is currently very inconsistent (Watts, 2011) with wide variations and approaches to this issue in different areas of England.

The RAF shows a commitment to the delivery of a high quality, well structured, approach to work experience which provides young people from a variety of backgrounds with a sound introduction to the world of work (specifically the RAF). The programmes ensure that individuals are prompted to think and learn about their own skills and preferences and how these might allow them to make career decisions based on a higher level of self awareness than might have been possible. They are also made aware of some of the trades and professions of engineering and technology which can remain 'hidden' for many young people.

The RAF approach to delivery of these programmes is well regarded in the wider 'work experience community'. In the last four years the team has given presentations at national conferences, had articles printed in specialist work experience / other careers publications and been shortlisted for a national careers award. The inclusion of the CREST Award in the work experience week is recognised as good practice (other national organisations are increasingly seeing the value of including CREST activities as part of their offer). The fact that this work is embedded in a broader programme of engagement of children and young people (for example, educational outreach programmes, delivering activities at the Big Bang Fair) further enhances its credibility with schools and stakeholders.

In 2012 the Department for Education published a guide which makes it clear that schools are responsible for ensuring that pupils in years 9 to 11 should have access to independent and impartial careers guidance. In reality, there appears to be much confusion about what this means and how it is implemented in schools. Professor Tony Watts (2012) highlights some of the ambiguities in the guidance, particularly in relation to careers education and the lack of direction in terms of curriculum links. He pinpoints the requirement to provide a 'programme of activities' rather than to a curriculum as a weakness in the guidance, and reinforces the need for careers education which is delivered through the curriculum, based on international research. Whilst the RAF work experience programmes appear to fit within the definition of a 'programme of activities', the CREST Award and the workbook elements in particular link to curriculum areas of Science, Technology and Maths taught in all schools. Careers education links are explicitly highlighted in the workbook, to provide a basis upon which participants can use their RAF activities to their future planning.

In addition to changes affecting careers education, information, advice and guidance, public funding for equality and diversity programmes has been reduced; in the context of women/girls in STEM this has particularly affected WISE and the UKRC. Both of these organisations have been involved in the development of the RAF work experience programmes from the outset and in recent years they have faced significant funding cuts and a reduction in staff. The RAF has always aligned itself with key equality and diversity organisations and continues to work with them (including WISE and the UKRC) in supporting the gender and STEM campaign.

The on-going relationship between the RAF and the Women in SET (WiSET) team at Sheffield Hallam University has proved to be mutually beneficial, with the RAF receiving advice based on the team's history of developing innovative work experience programmes. The WiSET team has been able to use the evidence base created through the RAF project feedback to inform some of its wider work. The team makes frequent reference to its work with the RAF formally, informally, in publications and on its website, and this has resulted in positive recognition for both parties. The member of the WiSET team responsible for development of the RAF programmes is on the CREST Stakeholder Group<sup>3</sup> the Career Academies UK Programme Leadership Team<sup>4</sup> and the Council of the newly formed Career Development Institute<sup>5</sup>. Other members of staff represent the team on committees for various STEM initiatives, careers groups and professional bodies and the lessons learned from working with the RAF are frequently referred to.

Links have developed with other organisations which specialise in equality and diversity, such as Opportunity Now, Race for Opportunity and Generating Genius, have already been referred to. The RAF is able to use its inclusive work experience programmes for under-represented groups and the work with these specialist organisations as evidence when applying for awards. The RAF has had exposure to new networks and to those involved with policy and delivery of work experience/CEIAG, partly through attendance at conferences and exhibitions.

---

<sup>3</sup> <http://www.britishecienceassociation.org/crest-awards>

<sup>4</sup> <http://www.careeracademies.org.uk>

<sup>5</sup> <http://www.thecdi.net>

In the last two years RAF staff have delivered papers at the Education Employer Taskforce conference and provided information through an exhibition at the Institute of Career Guidance conference. Existing links with the education specialists at organisations such as BAE Systems give further credibility to the programme of work related and career related activities in which the RAF is engaged.

The value of working with partners such as WISE, the CREST Awards team, STEMNET and organisations and experts linked to careers advice/work experience should not be underestimated. Working with partners has resulted in communication about the positive activities the RAF is undertaking to promote STEM Careers to a range of under-represented groups, especially girls. The partners have their own networks and spread the message further afield, through their own channels of communication, resulting in a viral effect.

### 3. Content of the Programme and Participants

#### 3.1 The RAF Work Experience Programme

This report has already highlighted that the first RAF Work Experience took place in 2009 after a period of scoping out and preparation, drawing on lessons learned from other work experience projects such as Navy-WISE and Wider Horizons (which had been led by WISE and WiSET respectively). The overall plan was to develop a programme of hands-on activities which would engage the girls and it was acknowledged early on that this would need to be planned carefully, with the buy-in of RAF Cosford staff at all levels. A programme of training for the Instructors and others who would come into direct contact with the girls was put in place, to help them think about how to deal with young women as opposed to the usual (mainly male) cohorts they were used to.

It can be challenging for individuals to understand how the practice of single sex activities aimed at under-represented groups can be a fair one and issues which arose in the early stages of programme planning had to be dealt with sensitively and consistently. The team from RAF Cranwell, WISE, the UKRC and WiSET worked together to ensure that individuals could seek clarification as to why activities had been designed in a particular way or why specific approaches were being taken to the work. Where possible, station staff were consulted and encouraged to raise concerns so that a process of culture change was gradual and not imposed upon them. Levels of confidence of those involved in leading, organising and delivering the RAF WISE week appear to have increased year on year. Feedback from the DRIT team at RAF Cranwell suggests that colleagues at RAF Cosford can undertake the planning and delivery of the week with less intervention than before. The established local links with STEMNET Ambassadors, the CREST Co-ordinator and staff at the RAF Museum further enhance this process.

As previously stated, the programme of activities has evolved since the first RAF-WISE in 2009 but the basic tenets and ethos remain unchanged. Undertaking an evaluation after the first programme was a brave step. The programme was completely new to the organisation at that point and if the feedback had been negative it could have had a detrimental effect on the overall strategy. The evaluation report gave useful and constructive feedback resulting in some of the hands-on activities being adapted or replaced to increase the level of interaction and reduce the amount of instruction. In the current programme the girls are given guidance on how to safely complete a task and the purpose of the exercise before undertaking it to provide context and meaning. The mixture between RAF specific activities, such as the fitness tests, and the general STEM input is monitored so that the level of theory and practical work is balanced.



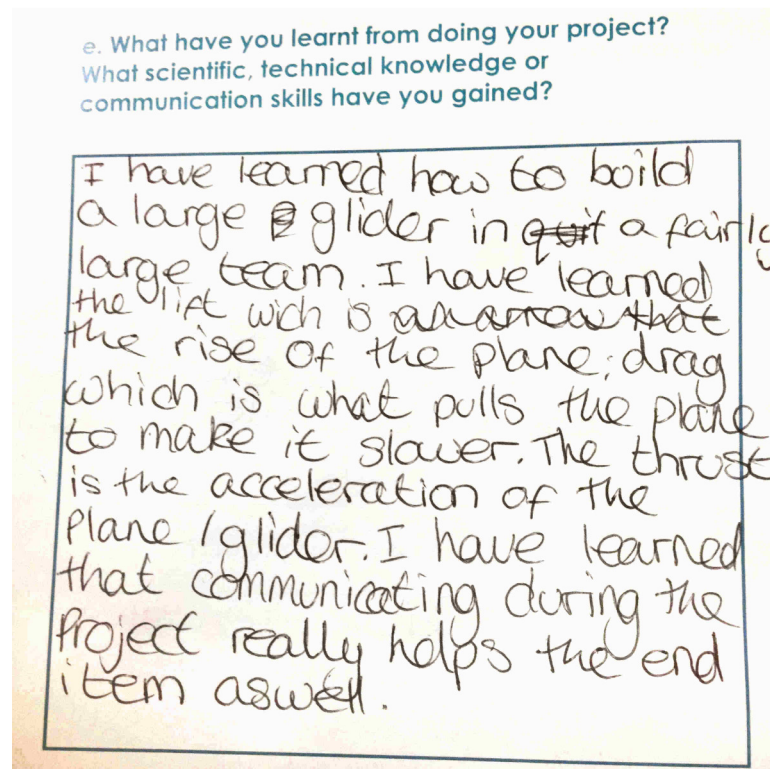
On arrival at RAF Cosford, the girls are introduced to each other, take part in ice-breaker activities and are divided into teams. They meet instructors, chaperones and trainers who are often also STEM Ambassadors, trained through the STEMNET Ambassador programme in the area and who are familiar with delivering activities to encourage more young people into STEM careers.

The original activities put in place included exercises on radio/communications, some electrical/electronics, the removal of a flap from a Jet Provost and outdoor/fitness tests. In the early days it was more of a challenge to make the activities truly hands-on, with some of the instructors being more cautious about what the participants might be able to do. As the programme has evolved and instructors' awareness has grown over the years, the activities have been tweaked and finely tuned to make them more interactive and in some ways more challenging for the girls. The scheme has therefore evolved to give a rich learning experience with a gender sensitive approach.

The activities undertaken during the week feed directly into the CREST Award, which serves several purposes including:

- It provides evidence of learning in the form of a certificate
- It gives a structure to the way the girls record the week (alongside the 'diary')
- It offers a focus for the PowerPoint presentations at the end of the week
- It supports the way the girls link the engineering activities and STEM subjects
- It provides something different for the participants to include in their CVs

The CREST activity provides an opportunity for the staff RAF Cosford who are also STEM Ambassadors to contribute by delivering the activity, putting into action the training they have received as part of the STEMNET Ambassador network.



Example of CREST summary highlighting technical and personal skills gained

At the end of the week an audience of the girls' families, teachers, RAF personnel, and others attend a presentation in the main auditorium at the RAF Museum, where the teams of participants give a summary of their week. The impact of this has not been measured formally but it is clear that the number of individuals present (approximately 40-50 people) and the range of organisations represented at the final presentation event facilitates dissemination of very positive messages about the RAF WISE programme and the organisation's commitment to encouraging females into STEM courses and careers. There are often RAF press officers and others with access to local media in attendance so that these messages are also spread further afield.



A group of girls giving presentations on the final day

### 3.2 The Application Process

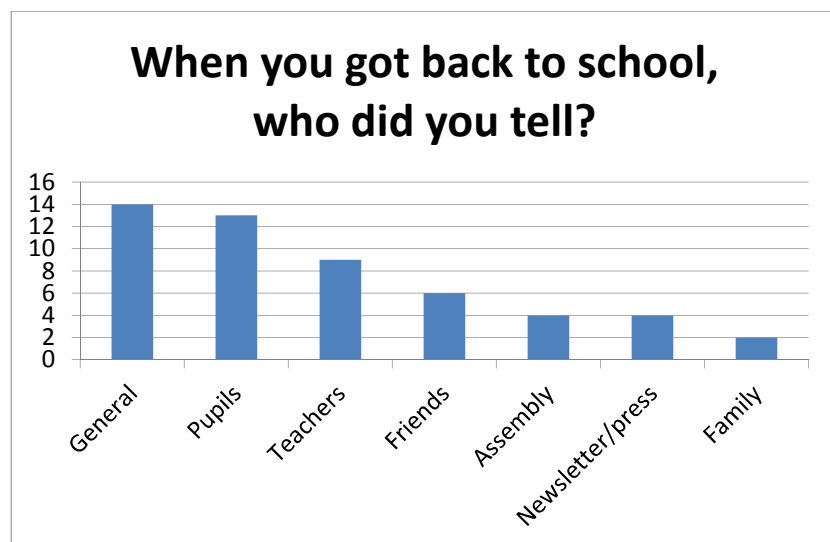
Information about the RAF-WISE programme and the application form has been hosted on the WISE website since the first work experience week was developed. Alongside this, the schools liaison team from RAF Cosford has promoted the programme with local schools each year to support its wider schools engagement activities. In assessing the effectiveness of the application system for this report, some anecdotal information (provided by the team members involved in the programmes) has been included.

In 2009 and 2010 the applications were collated by WISE and a short list was drawn up by the Director of WISE and members of the DRIT Team, led by Squadron Leader Dean. In 2011 the applications were shortlisted by members of the DRIT team alongside two members of staff from RAF Cosford and the Project Manager from WiSET. The change in the recruiting team for RAF WISE in 2011 provided an opportunity to consider the selection process in more depth.

The team was made up of two female junior officers from RAF Cosford, Squadron Leader Dean and Flight Lieutenant Sam Askew and Mary Guy (College Librarian) from RAF Cranwell and Jill Collins (WiSET). The programme was over-subscribed that year and the task of choosing the most suitable applicants proved to be an interesting and time-consuming exercise. Ideas about what constituted a 'fair' selection process prompted a debate within the group. Discussion centred on how the team could choose girls according to their interest and motivation, not their ability to say what they felt the selectors would want to hear. This mirrors the application process for many organisations but the RAF-WISE programme aims to attract individuals from under-represented groups and the socio-economic status is a part of this picture (often linked to the type of school an individual attends and the level of family support). In 2011 some girls were obvious choices, while others were debated by the team in much more detail. This provided important learning for all involved and is another point for consideration when briefing staff who will undertake the selection process.

Over the years the application process has evolved and the profile of the students has changed somewhat. Looking at the schools from which the participants are drawn and taking into account factors such as the names and addresses of applicants (eg sisters), it is clear that the programme has become established locally and that 'word of mouth' accounts for some of the applications being made. Figure 2 below shows that many of the girls had told others about their experience so this is not surprising. The existence of this informal process which runs alongside the application system could have implications for future (inclusive) promotion of the programme and this is commented on in the conclusions section of this report.

**Figure 2**



Note: 'General' relates to telling pupils and teachers for example in groups, assemblies, classroom situations. Responses were interpreted from the survey question 'When you got back from the week did your school/college know about it?'

### 3.3 The Application Forms

A copy of the application form is available on Appendix 3. Looking back at the 76 completed application forms from 2009-2011, it is clear that the girls fall into 3 main categories:

- Those who already intend to enter STEM/RAF careers (24)
- Those who have an tentative interest (44)
- Those who are willing to try something new or have other reasons (8)

The first group includes those who are already committed to STEM to some extent, for example, some having chosen Triple Science at GCSE, others taking the Engineering Diploma or those who have already made contact with the Armed Forces Careers Office. The second group includes those who have indicated that they would like to explore engineering / science / technology through the work experience. Many (25 in total) state that they are keen to try these out in the RAF specifically. The third group includes those who have shown that they want to try something new and have made no specific reference to liking STEM/the RAF in particular. The third group also covers those who have demonstrated that they are interested in the uniformed services generally (eg Army, Royal Navy, Police) and some other individuals who do not fall neatly into any one category.

It is difficult to categorise absolutely because the majority of applicants will tailor their forms to ensure that they are offered a place - which will include information about their interest in STEM subjects, their long term career plans (linked to potential STEM jobs) and hobbies/interests which may link to the RAF/STEM careers. During the preparation of this report the application forms were reviewed and given a rating in terms of the apparent confidence levels of each of the girls.

The sections entitled 'Why do you want to go on this work experience?', 'Hobbies and Interests' and 'What career would you like to follow?' were scanned for key messages. The levels of confidence exhibited in the application form appear to have increased over the years and this may, again, reflect the fact that some schools are aware of the programme and have a more robust programme of careers education and pastoral care than others. It may be that further research into how the schools promote and support the applicants for the RAF-WISE experience would provide some useful insights into the different approaches taken. Development of a teacher resource pack could support those less experienced teachers or careers/work experience co-ordinators and could be located on the RAF and WISE websites. Some examples of responses to the sections assessed follow.

In answer to the question about why they applied for the work experience some responses were more sophisticated than others, however, some appear particularly heartfelt, as the following example shows:

*I was very excited when this opportunity was offered as it is very different from other work experience options. Not only because it is residential but also because it is a group, hands-on experience. A busy office situation may leave me twiddling my thumbs or just making tea. It is a great chance to do things I would not normally get to do. (2009)*

The applicant above goes on to talk about her attributes as a 'team player', her interests in maths and science and how this has led her to the conclusion that an engineering career might be a suitable option. She describes a maths enrichment activity and appears confident in her mathematical ability. Her closing comments on this section of the form highlight the fact that taking part in work experience would be something she could "throw myself into whole-heartedly" whilst increasing her confidence and allowing her to find out more about careers in engineering.

Other examples showed a much more polished approach to the application process and a more refined way of articulating the desire to be selected. The following quote is from an applicant who appears to have undertaken some research and related it to her own interests in order to make the best impression. This could indicate a degree of maturity and confidence in making applications but may not necessarily reflect a genuine interest. The quote gives a picture of the standard and detail of some applications:

*...I'm confident that I will pursue a career that allows me to make use of my knowledge, understanding and passion for maths, physics and technology, and that will allow me to combine mental challenges with physical activity and skill. I am impressed by the breath of options [in the RAF] available, from supporting air operations, to being part of a flight crew, working in the fields of communications, intelligence and logistics or even providing medical, security and personal support. I am fascinated by science, by engineering, by flight - and by space. I love maths, physics and design subjects and thoroughly enjoy working in teams.... (2011)*

This applicant goes on to say she knows very little about the "realities or practicalities" of being in the RAF but, by making this admission, manages to skilfully make a positive impression in the level of research she has taken into RAF careers. She uses phrases like "I would love ...." to emphasise her enthusiasm for facing new challenges on the work experience week and ensures that there the application is littered with technical and aerospace/RAF specific references to demonstrate her knowledge. The application is extremely well articulated and shows a degree of maturity in facing the issue of career choice, she acknowledges she has a long way to go (and lots of options open to her) before making a decision.

When asked about their hobbies and interests, some individuals are able to make a clear link between their leisure activities and the RAF WISE experience. Some girls are able to give an indication of their practical abilities and tenacity, for example, through playing (often more than one) musical instruments and taking part in after school activities.



They appear to recognise that physical activity is important to the RAF too and the more polished applications make reference to various sports they are engaged in (sometimes at county/city level). However, some applicants are unable to demonstrate their commitment to hobbies in the same way. The following quote is from a girl who was probably not coached in completing her application form and was already on a BTEC course in engineering at college. She clearly has an interest in engineering but has not been able to link her leisure activities and interests to her application. The comments perhaps give an example of someone who does not have the cultural capital and support from school staff to draw on in her application.

*Reading, watching films, writing, composing and listening to music. Visiting prehistoric monuments. Watching Spongebob with my younger sister.....! I enjoy working with computer systems.(2009)*

Another participant from 2011 summarises her hobbies in a very factual way but manages to allude to skills and interests which are ideal for the RAF-WISE week :

*I attend Army Cadets weekly and I also play football for U16's girls team. I enjoy helping my dad at weekends repairing plant and machinery. At school I thoroughly enjoy PE and DT. I take part in sports like netball, hockey, rugby and badminton. I also enjoy science at school, mostly chemistry. (Student, 2011)*

The majority of applicants stated that they already had an interest in STEM and in answer to the question regarding the career they might like to follow, most said that they would like to do something linked to the RAF and/or STEM, as these examples show:

*Engineering or computer work. I enjoy engineering at college. My grades show that I am succeeding. I feel it would be an interesting and rewarding career path to take. (2009)*

*I would love to be part of the RAF for the engineering and the fun of being part of a team. I am keen to see the world and the RAF may offer that opportunity to travel. (2010)*

After describing her interest in archaeology and historical studies, listing "ancient structures" she has visited, another applicant demonstrates her motivation and interest in the RAF and STEM by commenting:

*...I am now realising that what fascinates people about these places is the engineering feats and human endeavour behind these historical structures. I am now thinking that I would prefer to work in an engineering discipline, taking us forward by both building on the past and introducing new discoveries and innovative ideas. I have inspiration in older family members who were car mechanics, worked in Ship Building on the Clyde and torpedo factories in WWII and younger relatives in the construction industry and the oil industry. My parents have both worked in Software Engineering and my uncle is head of the School of Engineering at ..... University.(2011)*

When considering the range of applications and their articulation, it should be noted that, in addition to each of the applicants having different levels of support from their schools, the 'social capital' (Norris, 2011) at their disposal prior to and during the application process will also have an impact on their ability to compete. The examples above show some stark differences in the individuals' experiences prior to making their application and it would be inappropriate to offer placements under the assumption that there is a 'level playing field' in existence. Some of the girls have access to clubs and activities through their school which others do not have, one of the main factors in this may be social background. Other issues such as the location of schools (rural -v- urban) and the specialism of the school (eg arts rather than science and engineering) will all have a bearing on what is available to them.

The level of skill of the selection panel can have a major impact. If those responsible for selecting candidates are not aware of and committed to the RAF's intention to broaden the talent pool through work experience programmes this may hinder the plan to widen participation.

The likelihood of reaching a broader socio-economic group may be increased by taking the different starting points into account and by bearing in mind the enthusiasm demonstrated in an application, rather than the writing style, experience and finesse. The section of this report relating to the 'destinations' of past participants may help elucidate this argument further.

#### 4. The 'Workbook'

The workbook has variously been described as a diary, a logbook and a workbook since it was introduced in 2009. It has been updated and the tone and style has changed over the years and versions have been created for BAME boys (and latterly girls) on the Generating Genius work experience at RAF Cranwell and the GVCAC girls on the logistics programme at RAF Halton.

To underpin the work experience programme and to ensure best practice the RAF has worked in partnership with WISE, the UKRC and WiSET to produce a range of workbooks. Drawing on the Wider Horizons work experience booklet as a template, a new and different workbook was developed for the girls to record their thoughts and store information about the week. An innovative approach was taken and it developed into a 'diary' aimed at encouraging the participants to keep a reflective account of their own experience as well as providing some useful information about STEM/RAF careers and how to enter them. The first version of the workbook was quite different to the usual style distributed by schools and work experience organisers (NHS Yorkshire and Humber, 2011). It was deliberately designed to encourage the girls to think about how a career in a male-dominated field in the RAF/STEM careers might affect them. There were two distinct sections. The first was fairly informal and encouraged the girls to record their thoughts and feelings about the week; while the second contained information designed to help the young women in their career planning with a CV section and details about where to find labour market information.

The organisations involved took slightly different approaches to the development of the workbook. WISE's role was to create a product which appealed to young women, both in style of language and in the overall design. WiSET input focussed on the career learning aspects of the workbook, ensuring that it was sequential and fitted with other activities which students may have been undertaking at school (such as creating a CV) and underpinning the associated career related learning (Barnes et al, 2011). The RAF had overall editorial control and embarked upon this different approach during the first year or so with gradual amendments which suited the culture of the organisation. The UKRC's role was to support the work by giving their partner (WiSET at Sheffield Hallam) the authority to develop the product. This was undertaken in line with the UKRC ethos of supporting women and organisations.

Throughout the booklet there are examples of how the information students collate might be used, for example, in career planning, or as part of the final presentation. The purpose of the workbook is explained and students are informed of how they might make best use of it. One of the main aims of the booklet is to provide the young people participating with an opportunity to consider the experiences they have, the people they meet and the challenges they overcome. They are encouraged to relate this information to themselves, to think about the context and content of the week and to consider what it means for them. If an outcome of this is that the individuals decide to explore opportunities in engineering and careers in the RAF then that is a positive.

**Day 1**  
*So, how was your first day?*  
 1. The best part was....  
 The best part was when we worked as a team  
 to get on the other side of a long rope. We had  
 to use our communication skills to ~~tell~~  
 produce a plan and to know what we were  
 doing. we also had to trust the others. We managed  
 to get everyone on the other side in 3 mins. Wooo!!

Example of the workbook content, encouraging reflection about the first day

The booklet starts with fairly informal language in the introductory section, aimed at welcoming participants and highlighting how they might get the most from the experience. The 'diary' pages are intended to give an opportunity for students to reflect on what it feels like to be on work experience with the RAF and what they are learning from it. The following pages become progressively more 'serious' and move into a more formal style of language and presentation, encouraging students to record information for future use, with examples of how they can use details stored there in the future. An example of this is a section on 'Making the most of the evidence!' which contains a table showing 'What you did' and 'What it means' (e.g. 'doing a hands-on activity = problem solving and working accurately, paying attention to detail'). The latter stages of the booklet have more careers information with examples of CVs and websites for further research.

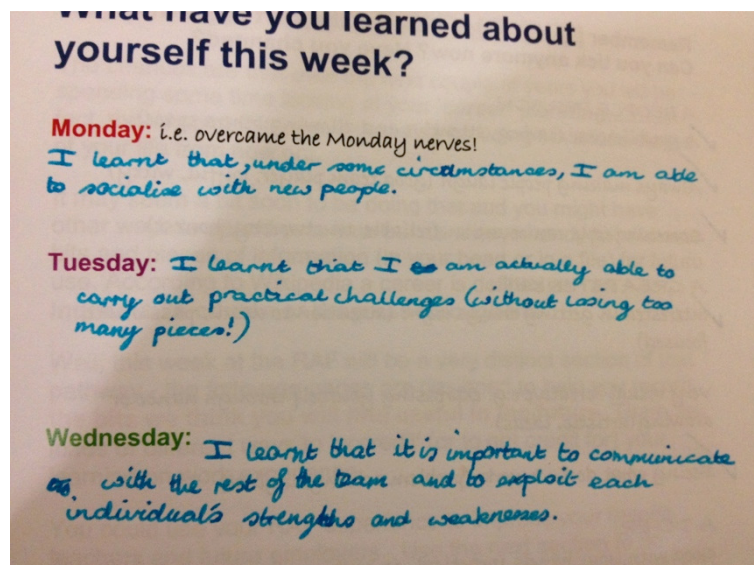
During the process of developing the work experience programme and creating a workbook, it was recognised that there was potential for achieving accreditation so that students could receive certification for their efforts. As mentioned previously, several options for accreditation were considered and it seemed logical and relevant to link the week's activities to the British Science Association CREST Awards (Grant, University of Liverpool, 2006). Subsequently, the CREST Award pages have been added as an integral part of the workbook, this is a practical solution in that it puts all the paperwork in one place and it illustrates that the RAF placement is worthy of a STEM related qualification. This applies to the participants on the 'logistics' work experience week as well as the girls into engineering and the Generating Genius programmes, with the activities adjusted to ensure that they include enough STEM content to justify a CREST Award.

The workbook is a tangible product which can give RAF staff an understanding of what the work experience week hopes to achieve. It is RAF branded and has logos for equality and diversity and STEM organisations, which also sends a clear message about the purpose of the work experience activities. An outcome of the production of a bespoke workbook is that it drives activity, for example, once the daily activities are printed in the workbooks they have to be delivered. The sequential nature of the workbook content reminds RAF staff of the building blocks of the programme and provides a workable structure for those involved.

The generic version of the workbook has been edited to produce bespoke versions for each of the different disciplines whilst ensuring the integrity of the key diversity and STEM messaging. The workbook has been shared with other work experience providers. Overall, the work experience programmes and workbooks have drawn significant praise from participants and influencers and several former students have joined RAF sponsorship schemes with one individual already in the Service.

Recent Select Committee reports and recommendations (2013) indicate that there is growing concern about the lack of consistent and high quality careers education, information, advice and guidance for young people.

By delivering a programme which makes clear curriculum links to activities and ensures that all participants receive the same written information, the RAF is at least creating consistent messages about the options available for young people within the organisation and beyond.



Response to the workbook question 'What have you learned about yourself this week?'

An example of the RAF-WISE programme is shown below in Table 1

**Table 1**

	Morning	Afternoon	Evening
Monday	Girls are welcomed, given kit and initial instructions. Overview of WISE work experience week	Icebreaker sessions (low ropes, group dynamics)	Introduction to CREST activity, laptops and cameras issued for powerpoint evidence
Tuesday	Physical training	Technical activity - removal of flap from Jet Provost	Team building exercise, recording activities in workbook
Wednesday	Presentation preparation time  RAF Museum to build rockets	Designing, making and testing gliders for CREST Award (delivered by STEM Ambassadors)	Team building exercise, recording activities in workbook
Thursday	Presentation preparation  Introduction to survival equipment and ration packs	Technical activity, radio school  Signals Unit activity	Formal dinner in Officers' Mess
Friday	Presentation preparation - families, teachers, station staff and others attend	Families/teachers and girls eat lunch and depart	



## 5 Results of research into the RAF-WISE work experience programme

### 5.1 Methods used

Following the recommendations in the evaluation report for the RAF Halton Logistics programme in 2011, the RAF commissioned WiSET to undertake a long term impact assessment of the work experience programmes. A programme of telephone interviews was designed and developed in partnership with the RAF. The first stage of the evaluation has taken place for RAF Cosford (engineering for girls) and the following work experience programmes will be covered in the longer term once data has been gathered: RAF Halton (logistics for girls) and RAF Cranwell (STEM for black and minority ethnic boys).

The purpose of the survey is to assess the long term impact of the work experience placement on the participants' life, career and work choices; in particular to find out if it has encouraged them to pursue a career in the RAF or in STEM Careers. The survey design included consultation with careers guidance specialists who have had responsibility for 'destinations' surveys and tracking of young people for a number of years. It was decided that the best response rates tend to be from telephone contact, especially when the calls are made by 'peers'. 3 student interns (coincidentally females) from Sheffield Hallam University were recruited to make the calls during evenings (4-7pm) to increase the chances of contact. When different people conduct interviews in qualitative research projects such as this, there are likely to be slight variations in them. In this instance the 3 interns were given the same training, however, their confidence levels and style of recording differed to some extent. For example, one of the interns tended to make bullet points rather than sentences whereas another described the response in the first person and in a narrative style.

The engineering programme at RAF Cosford has been offered to 24-26 girls for 4 years, since 2009, and the survey offered an opportunity to gain feedback from the first 3 cohorts who have undertaken the activities, to assess how the work experience has informed their future planning and career thinking.

Responses have been received from the following numbers of young women:

**Table 2 - Number of past participants surveyed**

	2009	2010	2011
Number on course	26	24	24
Number reached	13	20	19
Response rate	50%	83%	79%

The interview questions were:

- Do you remember the week you did with the RAF in 2009/2010/2011?
- Are you happy to talk about it?
- What do you remember about it most?
- How would/do you describe it to other people?
- When you got back from the week did your school/college know about it?
- Did they ask you to tell them about it/tell other students about it?
- What did you do after GCSEs?
- What are you doing now?
- How did your RAF experience make a difference to the choices you made about work/life?
- How did it affect your views on the RAF?
- How did it affect your views on Engineering?

- Is there anything the RAF should do to change future courses like this?
- What did you think of the workbook you had during the week?
- Is there anything else you would like to add?
- If we need to ask any further questions may we contact you again?

The responses were studied for themes and words that appeared numerous times and linked to existing research on gender and STEM subjects (eg WISE, WiSET, UKRC and the Aspires Projects). The information was then used to gain a picture of satisfaction levels and measures of influence.

During the survey it was sometimes possible to speak to family members about the work experience week, often through the process of explaining why the telephone call had been made. These conversations were not recorded but the willingness of family members to pass on messages and discuss what their impression of the value of the work experience was noted. One parent wanted to undertake the survey on behalf of her daughter (who was not available that evening) and spoke about the increased confidence levels she had observed since her daughter had returned from RAF Cosford. There were other similar conversations which took place but were not formally recorded.

In 2012, a new evaluation questionnaire was introduced, aimed at obtaining initial feedback about the impact of the work experience week (Appendix 2) and this was administered to the whole group at the beginning and the end of the week. There is some value in obtaining a snapshot of the girls' views about STEM subjects before and after their RAF experience and this adds to the overall picture gained from the telephone survey. This cohort will be contacted through the follow up telephone survey this year (2013)

A grounded theory approach has been taken (Charmaz, 2005), one of the main benefits of which is that the organic nature of the development of the RAF project could be mirrored in the evaluation.

**Note:** In September 2012 the author of the evaluation presented a paper at the European Conference on Educational Research (ECER), attended by academics from across Europe and beyond, one of the main tenets of the conference being: "disseminating the findings of educational research and highlighting their contribution to policy and practice". This evaluation draws on and develops elements of the paper delivered at the ECER conference and summary of it is attached (Appendix 1)



Girls receiving instructions on hands-on technical tasks

## 5.2 What do participants like about it?

More detailed information about the responses from participants through the telephone survey, including quotes from the girls, is available in Appendix 1.

The feedback from the survey was overwhelmingly positive. When asked to describe what they remembered about the RAF-WISE experience, most respondents referred to the hands-on activities, particularly the removal of the flaps from the wings of a jet provost aircraft. The fact that this activity was unique and would set them apart from their peers at school and beyond appeared to have some value to the girls, they had a different 'story' to tell. Many participants were encouraged to talk to others about it, through assemblies, tutor groups, and with friends, family and teachers.

A significant number in the survey referred to the fact that the experience had given them an opportunity to test out a career idea and to think about what they might move on to next (54% said it made them think about their career, 23% and 25% said it helped them clarify ideas about the RAF and Engineering respectively). The following example gives a flavour of the value some of the girls placed on the experience and the impact it had on their choices:

*I decided not to be a pilot (my original career path) as I found out I couldn't due to me wearing glasses. The RAF influenced me to do engineering. Having the RAF down on my CV helped me with jobs and to get into a new 6th form college which specialised in engineering (2010)*

Many of the terms used to describe the experience were particularly effusive; the table below highlights the words used most frequently but there were many others which could be clustered as very positive such as 'awesome' and 'epic'. The words used most frequently are summarised on the table below:

**Table 3**

Word	Frequency
Life-changing/once-in-a-lifetime	13
Good	12
Fun	12
Interesting	5
Recommend (to others)	5
People (enjoyed meeting)	5
Amazing	4
Enjoyable	4
Exciting	4

## 5.3 What did the participants do after the experience?

As stated at the beginning of this report, 52 of the 74 participants in RAF-WISE have been contacted and the 'destinations' (ie what the girls are doing now) have been obtained, with varying levels of detail. Some respondents indicated that they were, for example, currently studying for GCSEs but had made applications for specific courses (A Levels/vocational subjects) whilst others were more vague, stating that they were still choosing the second year subject of A Levels (having the option to drop/change some of their A2 levels) Appendix 4 has more detail relating to the destinations of each year group.

Figure 3 shows that overall, 25 girls (or 48%) progressed to take or are planning to take A Levels which include at least one STEM subject. 4 individuals (8% of the total - all from the first cohort) are now studying degrees in STEM subjects and a further 4 girls (8%) are taking A Levels in non-STEM subjects. Over half (33 girls or 63%) of all the girls who have participated in RAF-WISE from 2009-2011 stated that they have moved into STEM courses or careers.

Some of the courses and career paths the participants have progressed to are very clearly STEM, for example at the time of the survey one girl from the 2009 cohort had been offered a place to study Aeronautics/Astronautics at a Russell Group university and another was applying for apprenticeships in Engineering. Of the 2010 cohort, one girl (still at college) was applying for Mechanical or Aerospace Engineering and another was already taking a BTEC National Diploma in Mechanical Engineering. The survey of 2011 participants showed a similar pattern with some indicating that they intended to take STEM A Levels (Maths, Chemistry, Physics and Biology in one example) or a vocational course (example - Advanced Mechanics, Engineering and English at college). The actual number of those taking STEM courses may be higher because some of the participants did not indicate which subjects they had progressed to and simply stated they had progressed to 6<sup>th</sup> form studies.

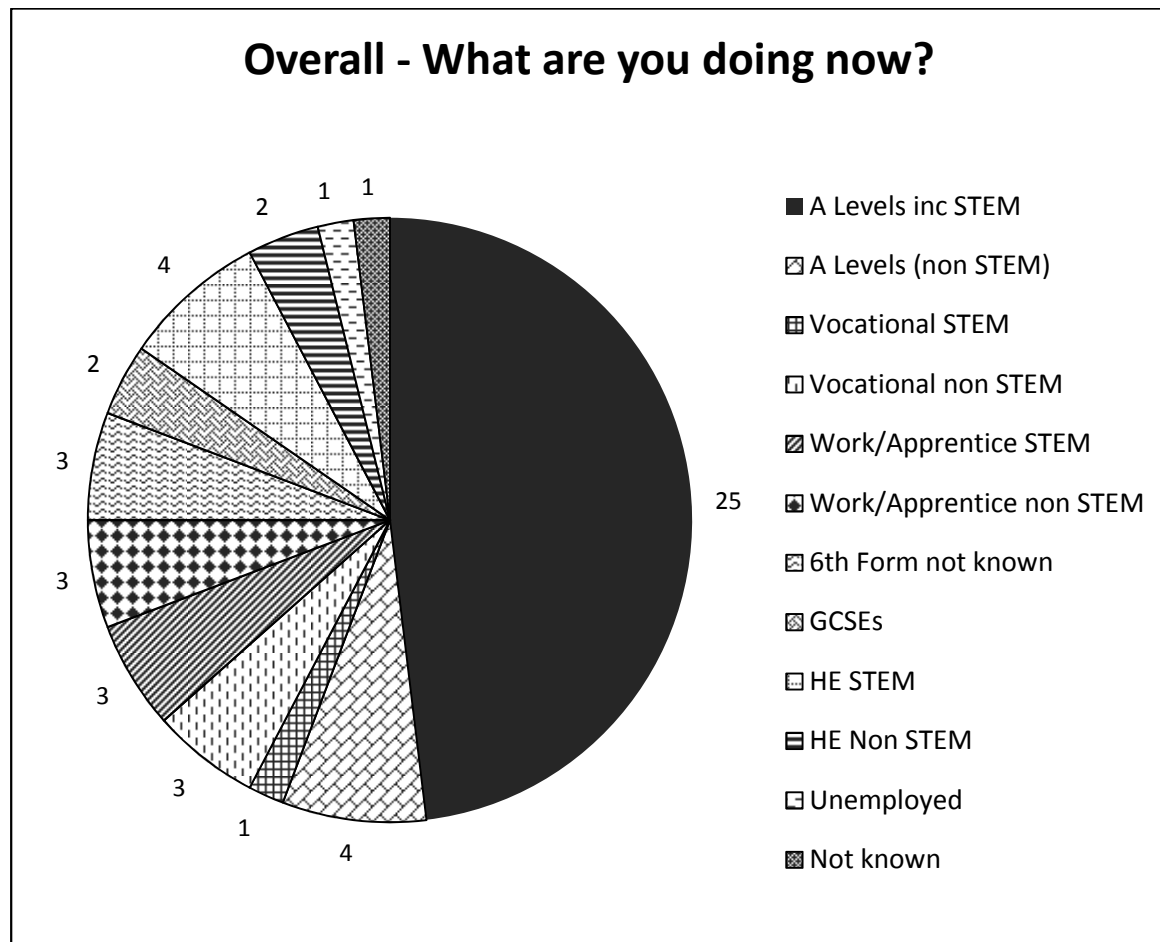
Figure 3 also shows that some individuals chose non-STEM courses and these included subjects combinations such as Law/English Literature and Sociology in one case and a course in Health and Social Care in another. Individuals who have taken these non-STEM subjects may still be considering careers in the RAF, with some indicating that they are considering careers in nursing in the RAF and others saying that they are still interested in the RAF and will decide after A Levels. One girl taking A Levels in History, Psychology, Art and Textiles stated *"I learnt about the work conducted by RAF and I would consider joining them in the future."*



A 2009 participant undertaking an engineering task



Figure 3



## 5.4 Impact measurement

There has been a positive overall effect of RAF-WISE on the participants and that the majority have maintained a link to STEM courses and careers, however, it is difficult to measure impact in any precise way. Looking at the application forms and comparing them with the outcomes gives some clues as to whether the girls have maintained an interest or moved towards/away from STEM and/or the RAF. However, over a period of time since work experience there will have been various other influences on the participants. The RAF-WISE programme forms one part of a complex range of interventions, activities and other influences which might have an impact on the girls' career and lifestyle choice.

It is notoriously difficult to make specific links between 'interventions' and outcomes (Hughes and Gration 2009) but the following case studies offer examples of impact on the girls.

### Case study 1 - Jane

Jane took part in the RAF WISE experience in 2009 and on her application form stated that her reasons for applying were:

*I think it's a brilliant opportunity and would be a very valuable experience to have. It's a chance to meet new people my own age and I'm excited about possibly getting the chance to participate. I enjoy working in a team and getting to do new things. **Engineering sounds like an exciting career and I would love to get some actual experience.** I feel I could learn lots from this week and am very enthusiastic about doing so and I hope that from being on the work experience I will be motivated and inspired to become an engineer or perhaps get another career in the RAF.*

Jane had an interest in science and stated on her original application that she was considering a range of careers:

*I attended an Express Yourself Science conference in year 8 with a previous school and from then on have been set on a career in science but have changed my mind several times - from astrophysics to medical science and then environmental science. I am very interested in science, it is by far my favourite and best subject; physics and biology especially; and I think a career involving science would be really exciting. **Engineering is not something I have considered before but is definitely something I am looking into and am interested in doing at the moment.***

When she was contacted in 2012 Jane's responses to the questions about the most interesting parts of the week were typical - she enjoyed "taking the wing flap off" and visiting the other RAF base. When asked how she would describe the experience she said it was "Insightful, massive focus in engineering. Sense of community among girls and loved how staff took no nonsense". On her return to school Jane spoke to her form group about the experience and felt she would have liked to have spread the positive messages about the week to others at school so that they could take part in the future. At the time of the survey Jane had received an offer at a Russell Group university to study Aeronautics/Astronautics and was planning to take up the place if successful in her A Levels. When asked about how the RAF Experience had made a difference to her choices about careers/life, she indicated that she had "never encountered engineering before" and that it had made her consider it as a career.

(Note: names have been changed on all of the case studies)

## 6 New information gathered from 2012 RAF-WISE participants

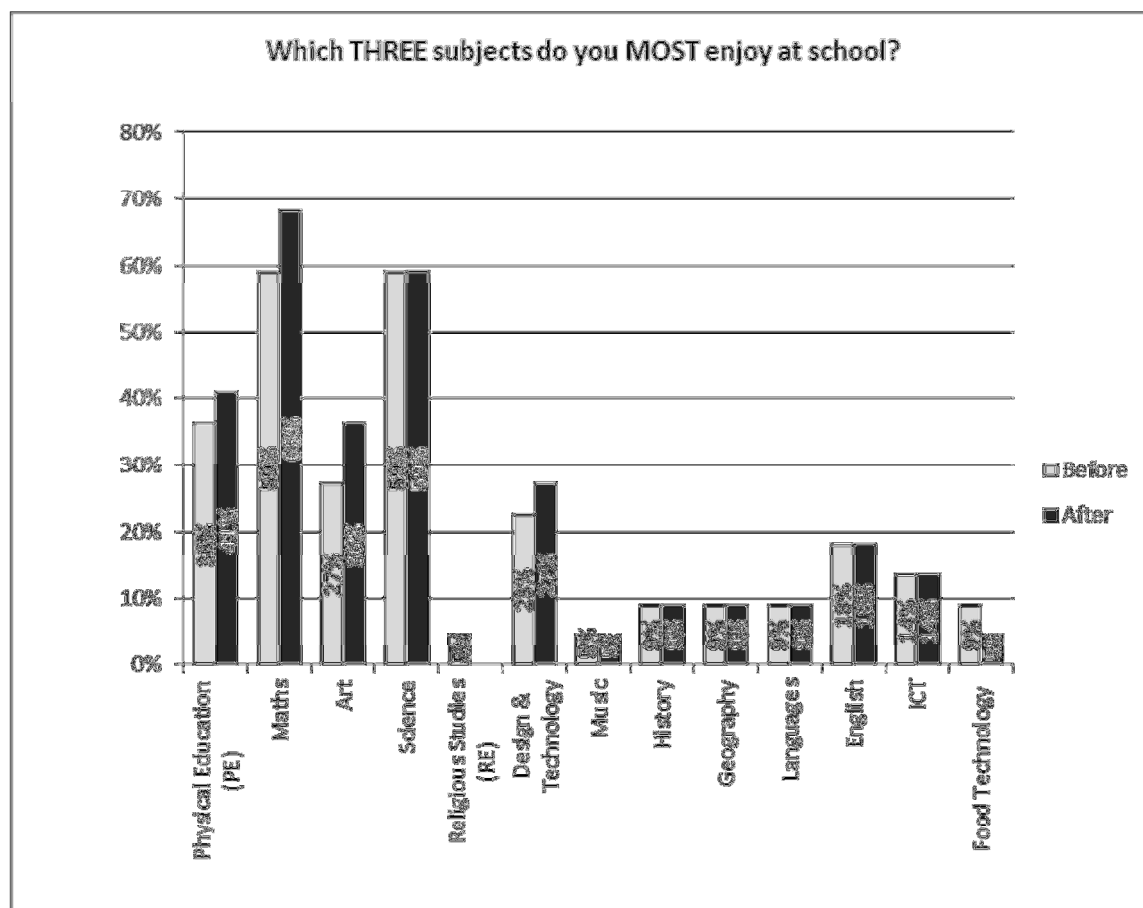
In 2012 a questionnaire was administered for the first time, aimed at obtaining a snapshot of the impact at the end of the RAF-WISE week (Appendix 2). The questionnaire was based on a format used in other evaluation projects undertaken by staff at the Centre for Science Education (including the Big Bang Fairs). Questionnaires were distributed at the beginning and end of the week at RAF Cosford and focused on issues such as the subjects the girls enjoyed, the engineers they had already met (or not), what they considered to be important when choosing a career and what their future plans might be. 22 participants completed the evaluation forms.

Murphy and Whitelegg's (2006) research into girls and physics has provided the basis for many activities designed to increase the number of girls taking the subject at A Level and beyond. The number of girls taking A Level physics remains stubbornly low, at around 20% for at least the last 20 years, according to the Institute of Physics report (2012).

Whilst the number of girls studying biology and chemistry is much nearer 50% (reflecting the fact that half of the population is female) the worrying trend with regard to physics continues to give cause for concern.

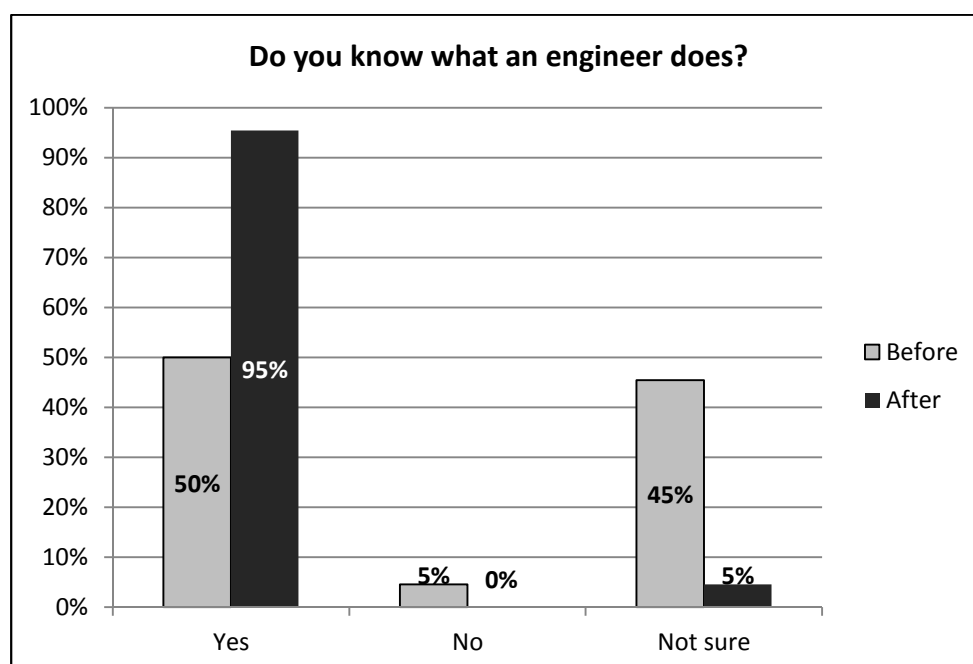
When asked to rank their three most enjoyable subjects at school, the majority of girls in the 2012 RAF-WISE cohort indicated that Maths, Sciences and Physical Education were their top choices, illustrated by Figure 4. There is little change in the responses from the beginning of the week (before) and at the end of the week (after) and it is probably safe to assume that either (a) this cohort was already engaged with the STEM subjects or (b) that the respondents might have also been influenced by the fact that the RAF staff were administering the questionnaire in relation to a STEM work experience and therefore answered in a way which reflected that.

**Figure 4**



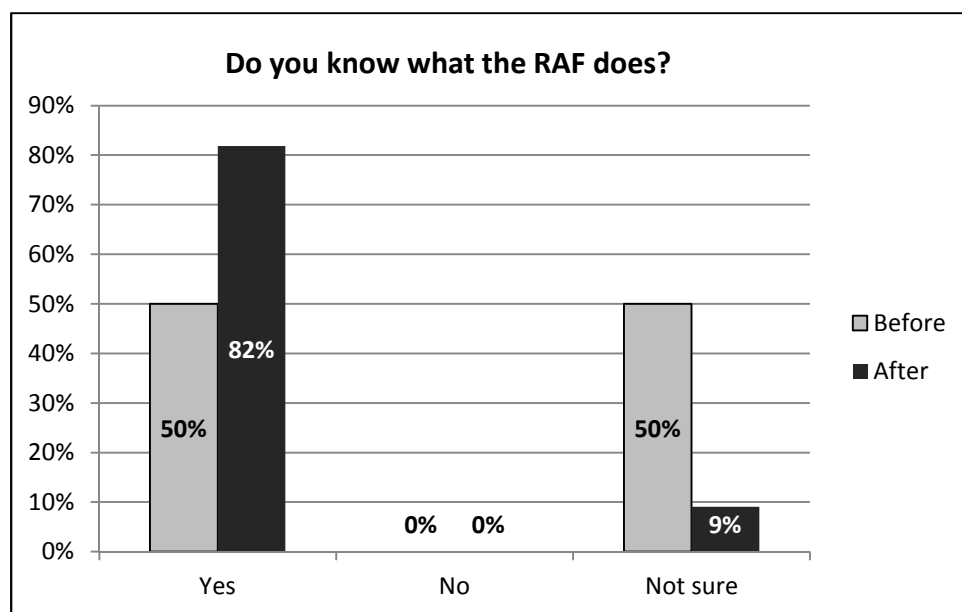
When asked if they knew what an engineer does, 50% of respondents answered 'yes' at the beginning of the week, with 45% saying they were not sure and 5% saying 'no'. By the end of the week the number of participants who knew what an engineer does had risen to 95% with only 5% saying they were not sure (Figure 5)

**Figure 5**



The same question about the RAF elicited a similar response, see Figure 6

**Figure 6**



When asked about whether they had learned about engineering in science lessons at school, nearly half (45.5%) of the respondents said that they had, whilst 45.5% said they had not and 9% were not sure. This may indicate that the links between the curriculum and engineering are not evident to young people in the classroom and perhaps this could be made more explicit to aid their understanding. Other sources confirm this (Harrison, 2010; Turner and James 2010)

A subsequent question followed up the links to the curriculum by asking if the girls had learned about engineering in other lessons. Approximately 45% linked Design and Technology to Engineering whilst just over 30% made the link with Maths.



2. Project process

a. What research will you carry out?

\* we used our knowledge of what we have learned from school  
 \* recognised shapes that have been used for different types of air crafts

b. What alternative ideas or approaches have you considered?

we considered a different amount of shapes used for the body and reflected the shapes to the aerodynamics and how the shapes would ~~be~~ affect it. we chose the triangle shape because it had fit best with the aerodynamics

c. What ideas or approaches have you selected and why?

In the end we chose a triangular cross section body, we chose this because it was a stronger shape and it fitted the aerodynamics well

d. What do you predict as an outcome?

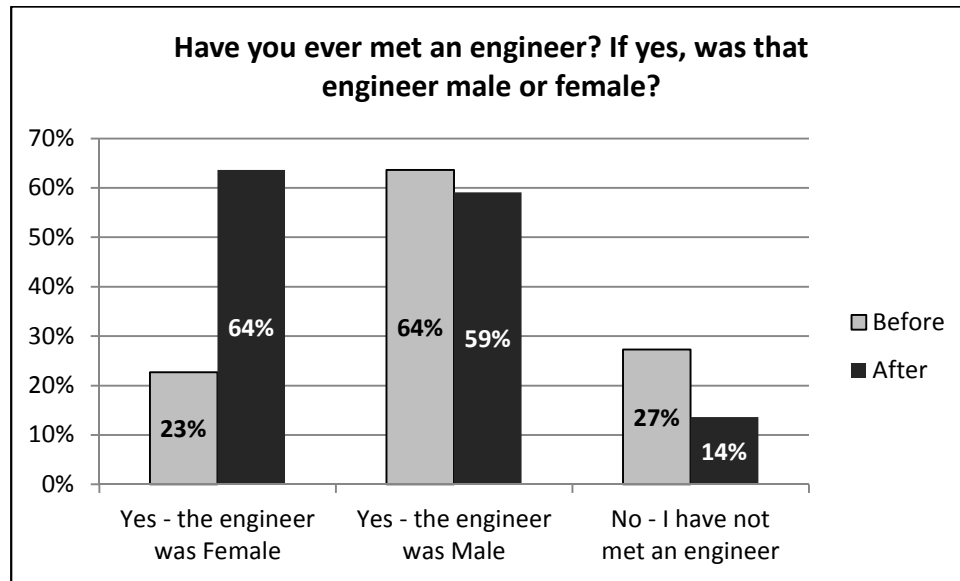
I predicted that the glider ~~is~~ completely wouldn't work

Example of CREST award pages showing that this girl has linked school subjects to the activity and shown her understanding of the project

Most of the girls were aware of the subjects required to become an engineer, with little difference between the before and after responses. The most marked difference was the fall from 73% of the girls at the beginning of the week thinking that Design and Technology was important, compared to 59% by the end of the week.

The responses to the question about whether or not the participants had met a female/male engineer before were perhaps better than expected in that only 23% agreed that they had met a female engineer before the RAF WISE Experience compared to 64% afterwards. The programme includes exposure to female role models and it is perhaps surprising that 14% said they had not met an engineer at the end of the week, see Figure 7. The RAF team could consider how the role models are introduced, reinforcing that have been chosen specifically because they are female engineers (who love their jobs, are successful at work and have a good work/life balance for example).

**Figure 7**



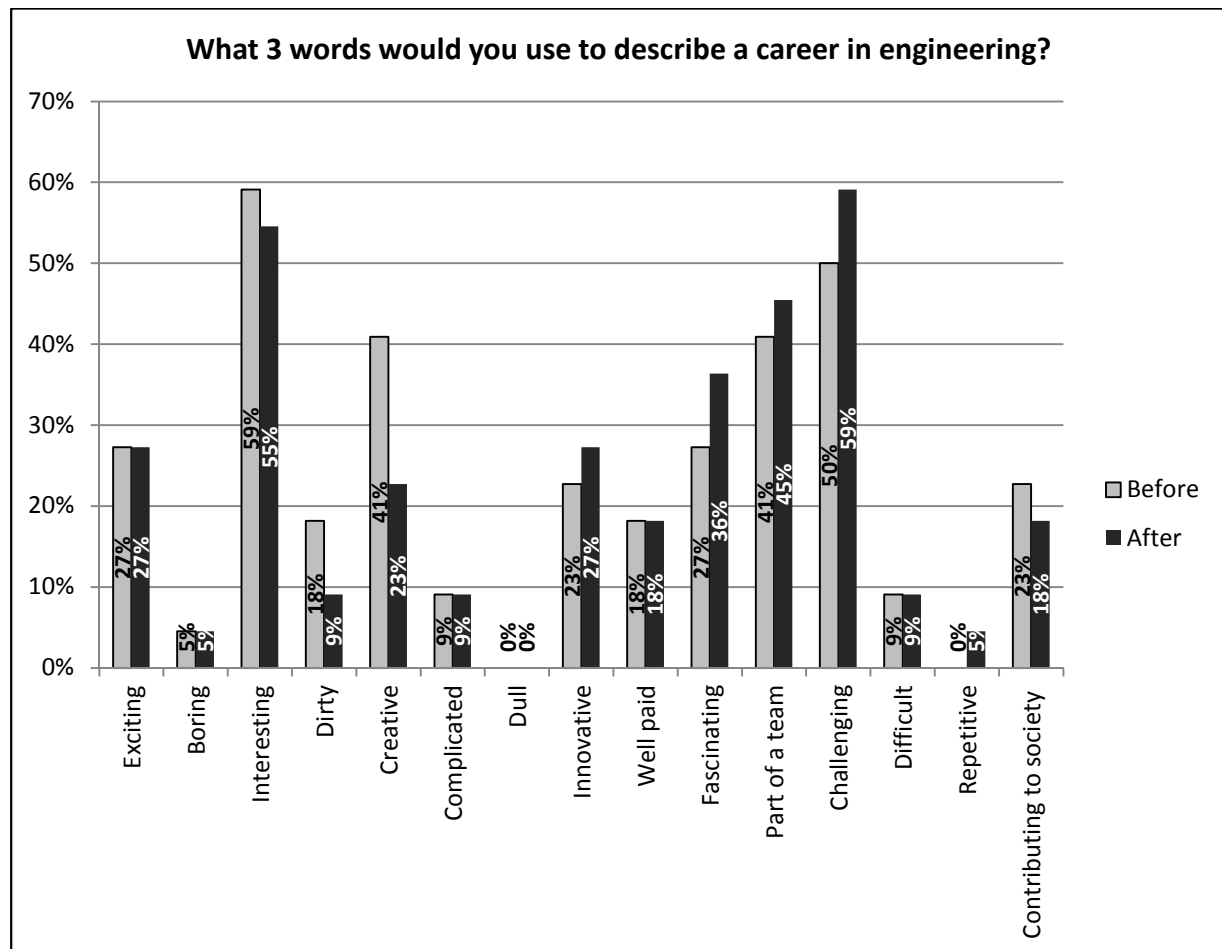
When asked which words they would use to describe engineering, the responses were mixed, with the highest answer (at 59%) being 'interesting' at the beginning of the week. By the end of the week, over half the participants (59%) said that they felt engineering was 'challenging', this could be seen a neutral response in that it does not necessarily convey a positive reaction (challenges can be difficult/rewarding/fun etc). There was also a rise from the beginning to the end of the week in the number of girls who said it was 'fascinating', 'innovative' and 'part of a team', see Figure 8 (Engineering UK, 2011).

It is encouraging to note that none of the girls used the word 'dull' to describe a career in engineering. The drop in the number of participants who said a career in engineering could be 'creative' (falling from 41% to 23%) is a little worrying. This may be a reflection of the fact that activities are undertaken in groups (which are mixed ability cohorts) and the tasks are, by definition, limited in the amount of creativity used by individuals to achieve a positive outcome for the team. The percentage of girls who thought a career in engineering would be 'dirty' was halved during the week, from 18% to 9%, which could be seen as a positive outcome.



Participant undertaking engineering task

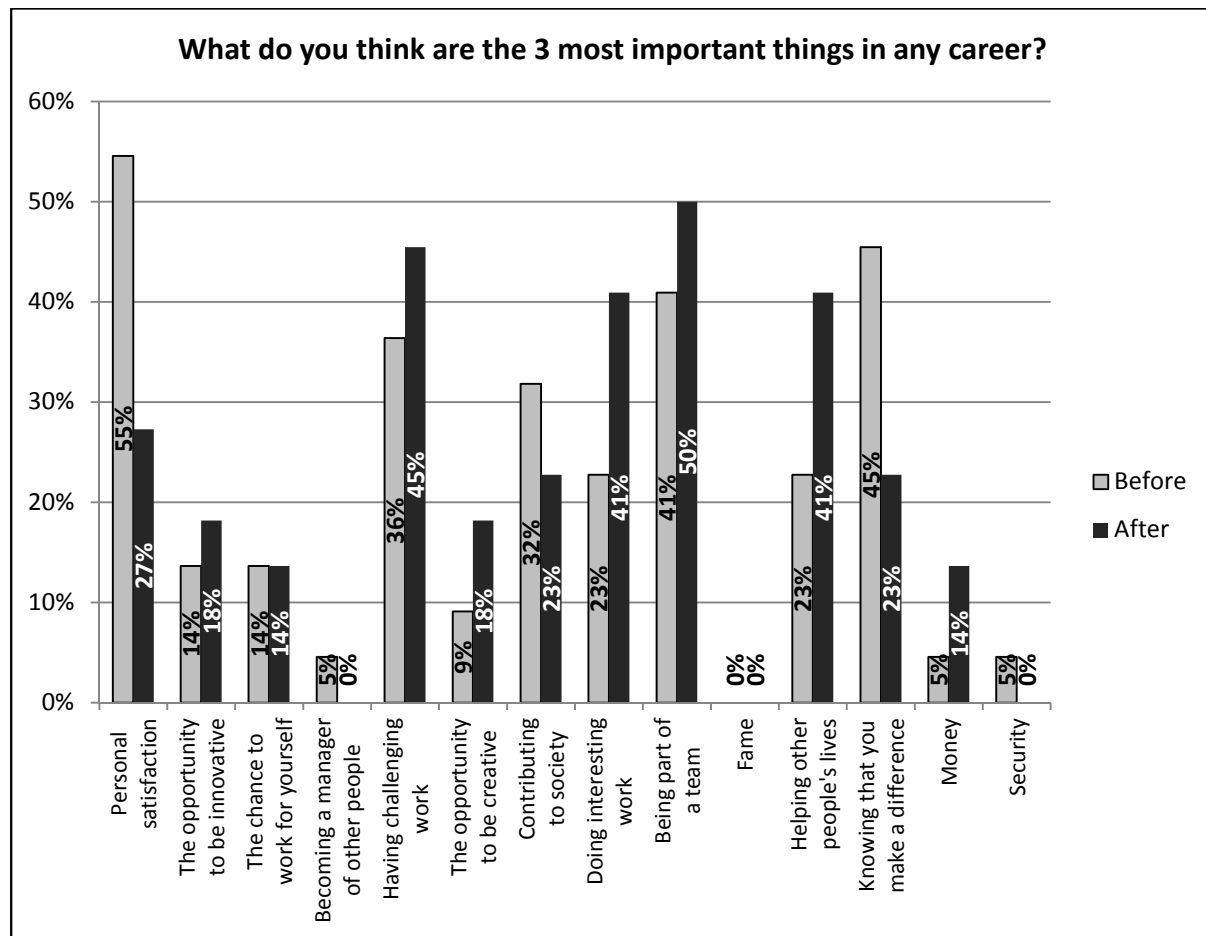
**Figure 8**



Potentially one of the most interesting questions, in terms of how it relates to wider discussions about STEM careers engagement, is "What do you think are the 3 most important things in any career?". Much has been written (eg DCSF, 2009; Turner and James 2010; Engineering UK 2013) about the various influences on young peoples career decisions and what they view as important. The issue of young people's attitudes to 'fame' and 'celebrity' is often cited as an influence on their career decisions and there is ongoing research into this phenomenon (Allen and Mendick, 2012). In answer to the RAF-WISE questionnaire in 2012, none of the girls identified 'fame' as important, whereas 'personal satisfaction', 'having challenging work' and 'being part of a team' featured highly.

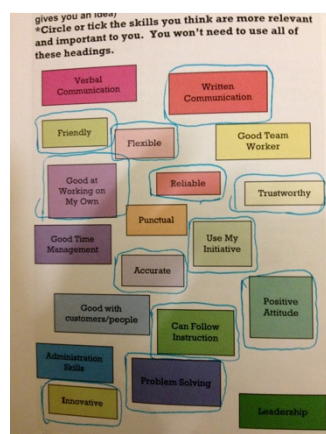
There were some shifts in thinking between the beginning and end of the week, particularly in relation to 'personal satisfaction' which dropped from 12 to 6 individuals highlighting this as important. Having said this, the terms are subjective and some overlap to some degree, for example, it could be argued that 'helping other peoples lives' and 'knowing you are making a difference' could be interpreted in very similar ways.

Figure 9



The questionnaire asked participants to indicate which careers they might be interested in when they leave school and the majority indicated that they were interested in engineering and/or the RAF (they could circle up to 3 from the list on the form). 'Science, maths and statistics' and 'Sport' also rated highly (Figure 9) This confirms that to some extent that those with existing positive attitudes to STEM are recruited to the course.

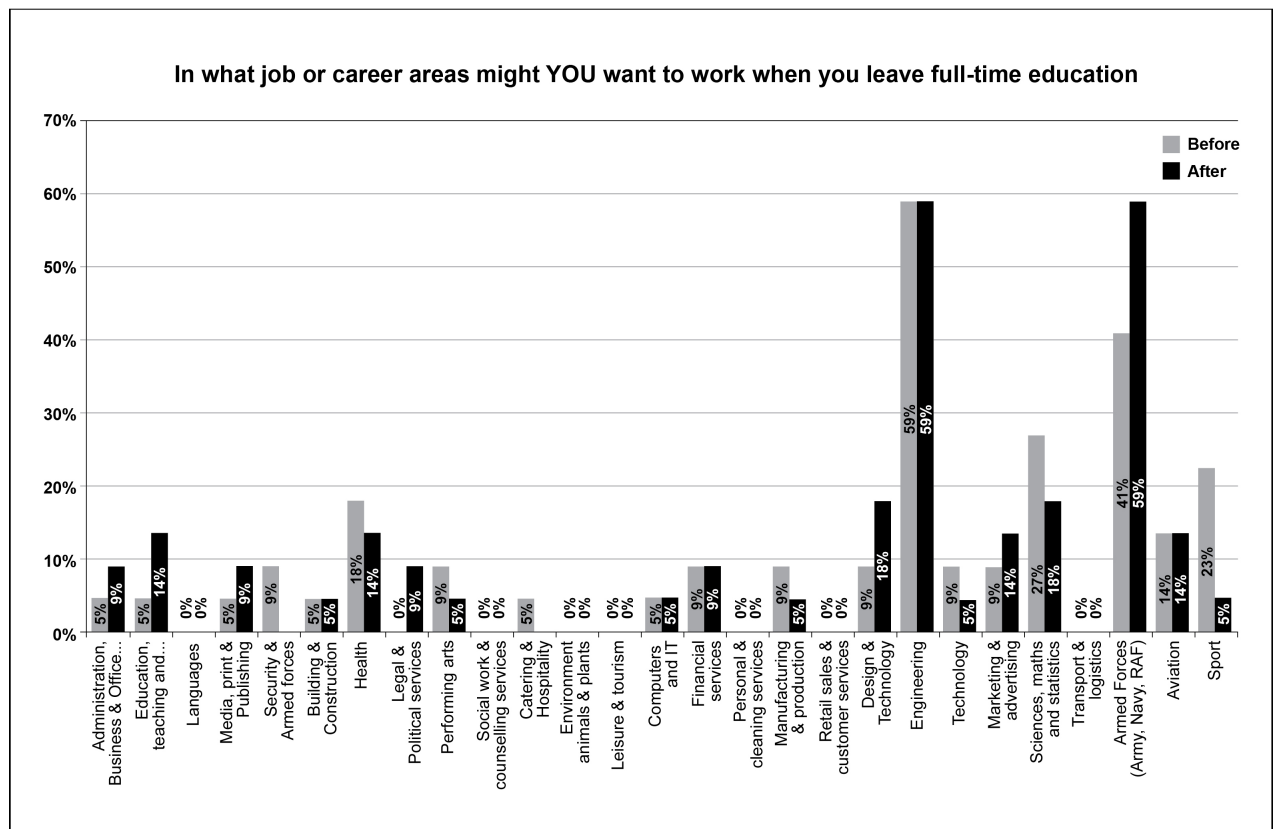
There were no responses to this question for careers in the categories of Languages, Social Work, Environment, Leisure & Tourism, Personal and Cleaning, Retail and Transport. The fact that the girls on RAF-WISE were not interested in the 5 C's which represent the occupations 75% of women work in: Clerical, Catering, Cleaning, Cashiering and Caring (Osgood, Francis and Archer 2006) is worth noting and may reflect the fact that most of the participants were already interested in STEM and more open to non-traditional careers for females.



Example where participant has identified transferrable skills acquired during work experience week

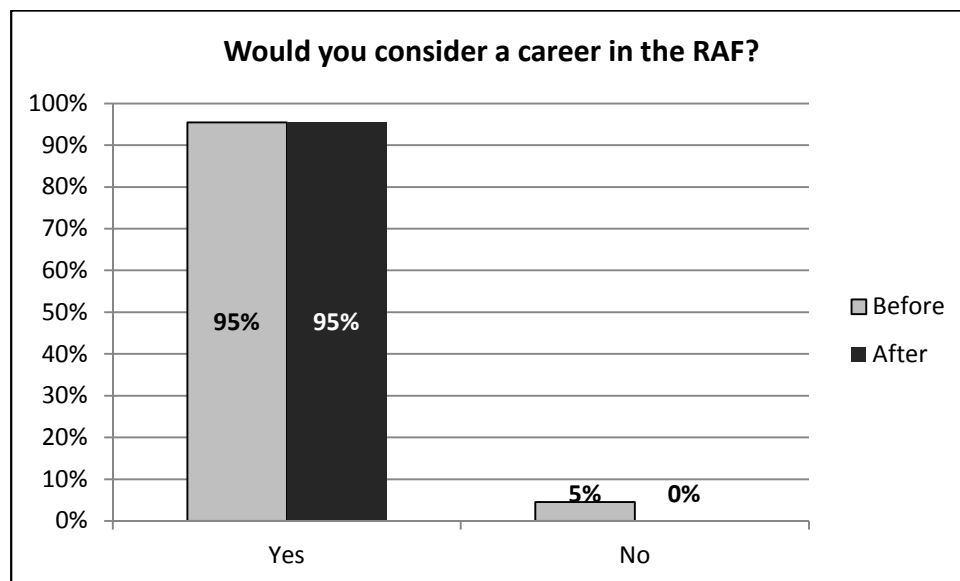


Figure 10



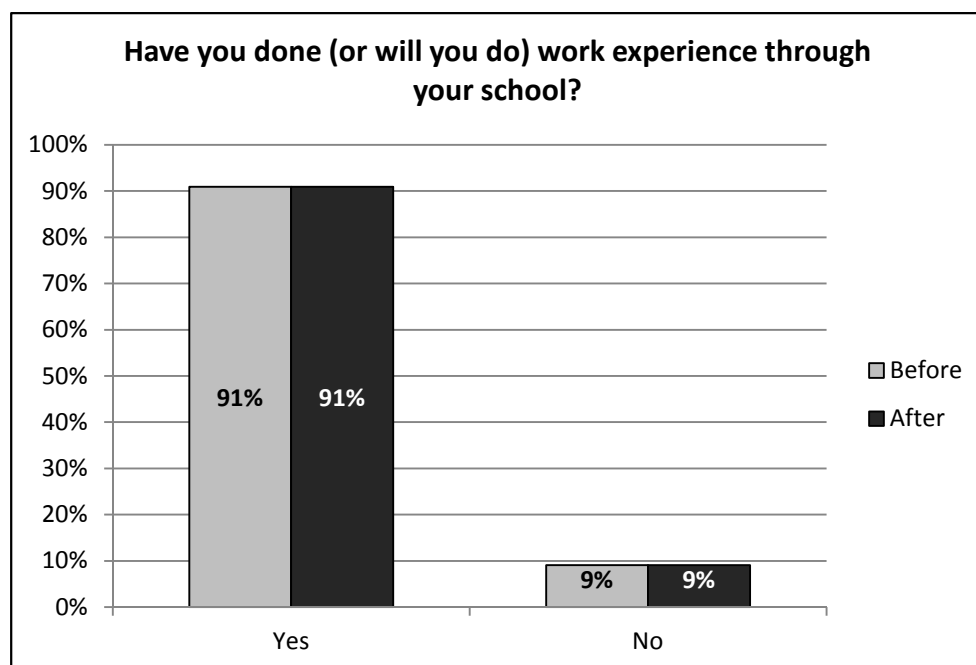
In order to gain a short term impact measurement of potential recruits, the participants were asked if they would consider a career in the RAF (Figure 11). Nearly all of the responses were positive at the beginning and at the end of the week - one participant stated 'Maybe' at the end (the options on the form were yes/no). This would indicate that the girls on the RAF-WISE work experience were already prepared to consider a career in the RAF and it is encouraging that none of them appears to have decided against this by the end of the week.

**Figure 11**



The final questions on the form related to work experience that the girls might undertake through their school. The purpose of this was to gauge whether the impact of the Wolf Review and the removal of 'work related learning' from the statutory elements of the 14-16 curriculum has had an impact on the young women who participated in RAF-WISE. As Figure 12 shows, the majority had either undertaken work experience through their school or were expecting to do so. Further analysis of the follow up question, about what their occupational choices for work experience were, could provide some useful additional information in the future.

**Figure 12**



## 7 The benefits of RAF-WISE to the participants, the RAF and the wider STEM community

### 7.1 General feedback

It is difficult to separate the benefits for the different groups since many responses indicate that there was a positive outcome for the participant (who found the experience rewarding), for the RAF (with a possible new recruit) and the STEM Community (which could also gain a new member).

It has already been highlighted in this report that there appear to be three main types of applicants:

- Those who already intend to enter STEM/RAF careers
- Those who have a tentative interest
- Those who are willing to try something new

The following response to the application form question 'What career would you like to follow' gives one example of someone already interested in the RAF and who has some ideas about the STEM roles she would consider and would fall into the first category:

*I want to join the RAF as a technician as I am very interested in aero engineering. If I cannot join the RAF I will work with one of the civilian airlines in a similar capacity so that I can work on aircraft (2011)*

It is likely that the RAF would want to encourage those who are already interested to continue with their plans and move into the organisation in a STEM role. The RAF-WISE work experience week also provides a platform to enthuse and inform those with a tentative interest so that they can move forward with some confidence. One example of this category indicated in the telephone survey that the RAF-WISE experience had helped her, encouraging her to reconsider her A Level subjects and that she is planning now to go into science and engineer. Her original application contained the following remarks:

*Recently, I have thought about being an engineer as this was the occupation of both my grandparents. I was always the unconventional girl, whilst everyone was playing with Barbie dolls I was trying to open up my broken walkie talkie and rewiring it in an effort to get it to work or exploring inside an old video player to see how it worked. As well as this I have also considered medicine but I still remain undecided to this point. (2011)*

The third group is different; the girls who are willing to try something new are often those who will consider the full range of RAF careers. In the follow up survey some participants indicated that they were considering nursing, photography or other roles within the organisation. Some also indicated that the experience was valuable in helping identify where their interests, strengths and abilities lie. One girl from the 2010 cohort who falls into this category described how the experience had "introduced me to the organisation and showed me various aspects of it and engineering" and that she "liked the experience but I would not pursue engineering as a career"

Many of those taking part in the scheme are now committed to careers in engineering, aerospace, astrophysics and other STEM specific careers. Others have chosen to pursue non-RAF and non-STEM roles such as childcare and bar work but there are clear messages about the value of the work experience week, in how it informed their career choices and built their confidence. Whatever their eventual 'destination', taking part in an RAF work experience programme appears to have had a positive effect on many of the girls' career plans. The following quotes are examples of feedback where there has been raised awareness of occupations and opportunities within the armed forces and in STEM careers.

*Changed her ideas completely - she says it made her want to join the RAF (2009)*

*Gave me an idea that it's not that difficult to do engineering...It's exciting and women can do it too (2010)*

*I chose out-door education because it is part of what the RAF do (2010)*

*Didn't know much about it before, now knows she could do an engineering job in the RAF (2011)*

The 'application forms' section of this report has already highlighted how socio-economic status and the type of school attended can affect accessibility to the RAF-WISE work experience. Whilst some girls are already engaged in fairly high level STEM (and other) enrichment activities (such as STEM Clubs, Duke of Edinburgh Award, county level sports, members of orchestras), there are a number whose experience and career ideas appear more limited and have less 'evidence' of interest in STEM careers.

The following two examples of responses to the question 'what are your hobbies' illustrate the range of experience sometimes exhibited:

*I am currently attempting to learn the guitar by myself, but have had lessons in ballet (grade 6), modern dance (grade 6) and piano (grade 7) since a very young age. I also joined the (local town name removed) CCF contingent (RAF Section)... I have flown once and glided once, which I found fun, and enjoyed being fascinated by the physics of flight. I [play] badminton twice a week with friends and swim... I also like to keep up to date with current affairs, whether it is general or political. I'm also interested in helping out in charity events, as my contingent raised money for 'Help For Heroes' (2011)*

The next quote gives an example of the other end of the spectrum:

*I enjoy looking at and fixing cars with my dad and looking at what goes into cars/ landrovers. I enjoy/am interested in rifles and air rifles and seeing how they work. (2009)*

The 2011 participant is now taking STEM A Levels and is planning to progress to a degree in engineering and the girl in the 2009 example is now applying for apprenticeship in engineering so, in terms of the benefits for these two young women, both will have gained from their experience. In the 2012 survey several of the participants indicated that the RAF WISE experience had helped them to clarify their ideas and had provided evidence of their interest in engineering/STEM in application forms for future courses and jobs.

Each year there have been one or two cases of individuals missing out on some or all of the programme due to behaviour or personal issues. The fact that participants are not allowed to smoke during the week is one reason why some girls have found it particularly difficult to complete the experience and have chosen to leave prematurely as a result. One young woman who had undertaken the programme in 2010 was still very positive about her experience, saying that she had been treated fairly and had gained some value from having attended, albeit for a shortened period of time. She went on to describe how a member of the RAF DRIT staff had supported her by sending information and liaising with the school.

When considering the destinations of the girls who have participated in the programme, it could be said that the outcomes are typical. Some of the participants have decided to move towards a career in STEM and possibly in the RAF, others have decided against these careers. The longstanding issue of losing females (and to some extent males) to alternative science and mathematical careers, such as medical and finance sectors, applies to the RAF-WISE girls as much as it does to the wider population (Mellors Bourne, Connor and Jackson, 2010). There were girls who had used the RAF-WISE experience to clarify their ideas and move on to alternative courses, the following case study provides one example of this. It also highlights how the positive experience of one participant may have impacted on a wider group of people (her peers, teachers, and others she came into contact with).



## Case study 2 - Susan

Susan's application for the 2009 programme was well-articulated and showed a degree of vocational maturity, in that she appeared to have some ideas about her interests and long term career aims. She completed the section on why she was applying for RAF-WISE thus:

*I would love the opportunity to be involved with such a project as I have always been fascinated by how things work. Science and maths have been my favourite subjects for a long time. I am particularly enthusiastic about Physics. **My trip to RAF Cosford last year inspired me to take a closer look at aeronautical engineering as a possible career whereas before this visit, I had only considered civil engineering.** I excel in science and believe this work experience will be extremely beneficial by giving me a more informed insight into aeronautical engineering. **This type of practical experience is very hard to find so when I heard about this event, I decided to seize the opportunity.***

Susan had a range of hobbies and interests, including playing for a school sports team, DIY and she had recently climbed Mount Snowdon. In answer to the question about potential careers in the future Susan indicated that she was keen on engineering and that civil or aeronautical engineering were of particular interest.

In response to the survey in 2012, Susan said that the RAF WISE experience had been a great week, informative and had created a feeling of togetherness. On her return to school she had been asked to speak to younger students about her experience. She felt that it made her realise "that women have a bigger part to play in engineering in the RAF than I first thought" and presumably this message will have been passed on to the students she spoke to. Whilst the RAF WISE programme had encouraged her to consider engineering and in Year 12 (aged 16-17) she took part in the Engineering Education Scheme, Susan has now decided to study Economics at university.

The wider impact on families, teachers and other individuals who have been made aware of the RAF's commitment to promoting STEM and the organisation's role with schools and community, is apparent at the celebration day of every work experience week. Proud parents, interested teachers and others often ask questions about future programmes at the celebration event.

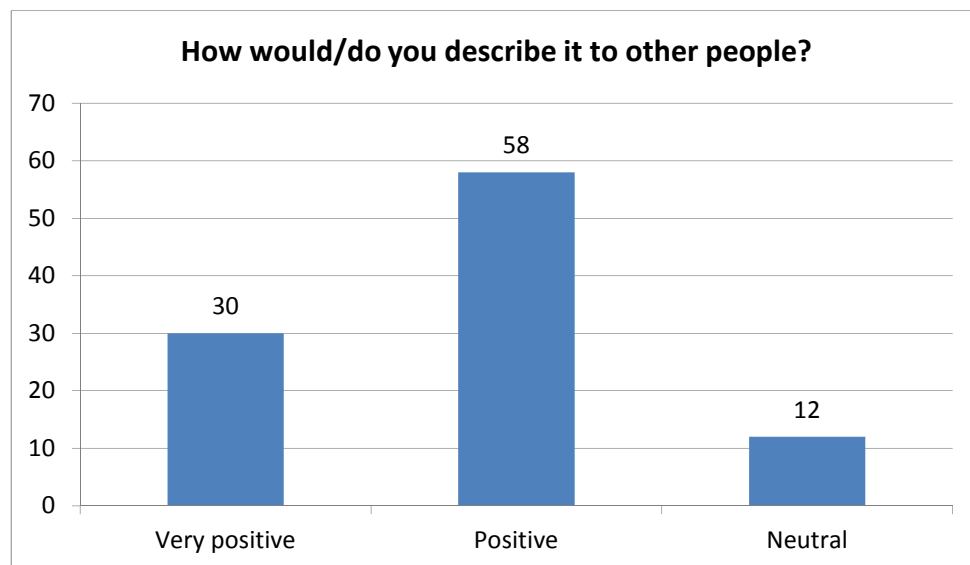
Broader messages about the RAF involvement in work experience are delivered through the RAF Recruit Marketing Team who write press releases and have recorded footage of work experience participants in the past. Some of the girls indicated that they were featured in local newspapers when they responded to the survey and local radio stations have also included the work experience programmes in their news items.

## 7.2 What the participants say about the RAF

In the 2012 survey many of the respondents used very positive terms to describe their experience. As explained in the ECER Paper (Appendix 1), the question in the survey which asked them to describe the RAF WISE experience hardly elicited any negative responses.

Figure 13 shows the number of participants who responded in a very positive, positive or neutral manner. Some girls used more than one word to describe their experience and as a result would not be appropriate to illustrate this point in percentage terms.

**Figure 13**



There were strong messages from the participants about their views on the RAF, both in terms of STEM related careers and in relation to the lifestyle and range of jobs available within the organisation. Some of survey responses gave indications of the impression girls had gained of the RAF. They had formed views from talking to individual staff and role models, from observing a range of careers at RAF Cosford and from seeing the facilities on offer and being aware of the way of life at an RAF base.

In order to elicit their views about the organisation specifically, the girls were asked (in the telephone survey) 'How did it [the work experience] affect your views on the RAF?'. There were hardly any negative comments in response to this and some examples are given below.

#### **From 2009:**

- *Now still has niggling thought in her head that she wants to join RAF in an engineering role.*
- *Definitely wants to join RAF when she finishes*
- *Made her realise that women have a bigger part to play in engineering in the RAF than she first thought.*

#### **From 2010:**

- *I didn't know women could work as engineers within RAF.*
- *I want to be a nursing officer in the RAF/Army, I want to join.*
- *It opened my eyes. When I went I thought it would be action packed but we did lots of activities. I thought it would be guys fighting and running around but it showed me jobs for women and that they can get into the flow of everything. A nurse who went to Afghanistan spoke to us and she did a nursing course in the RAF. Even if I don't go in the RAF it made me change my views about further education and nursing.*

#### **From 2011:**

- *Applying for medical course in RAF now. Made her want to apply for RAF.*
- *Engineering in RAF is a possibility now.*
- *Did consider going to an RAF 6th form college - didn't though. Made her consider engineering more than RAF based work.*
- *Made me think about going into RAF as possible career*

## 8. Next steps

The feedback obtained from past participants of RAF-WISE, as well as from the survey, the assessment of the application process and other information gathered since 2009, can be used to inform some potential next steps for the RAF and for the partners involved in the work experience programmes.

One of the variables which has not been measured (other than anecdotally) is the extent to which school involvement in the preparation and debrief of the participants affects their experience. It appears that some girls have been supported in the completion of their application forms - either on an individual basis or possibly through their careers lessons where they may have been given instruction on how to emphasise their skills, abilities, interests and career goals. It is clear from the applications that some girls have a keen interest in engineering, for example, but have not been able to articulate and demonstrate this as strongly as others. This can create a 'playing field' which is uneven from the outset and is a particular challenge for the recruiting panel in sifting the applications.

One way of mitigating against this would be to issue guidance on how to complete the application form. The guidelines could be aimed at the participants and those who are supporting them, bearing in mind that some individuals may not be in formal education, such as those being home-schooled. The most accessible point for this information would be the RAF and WISE websites but it may be worth considering alternative (and additional) places where it could be hosted - so that those who are unaware of the RAF-WISE programme might find it through a web search for work experience in general.

Further contact with teachers and others (especially parents/guardians) could provide some valuable information, in order to assess the impact when participants have returned to school and the wider messages that the RAF may have conveyed in the community.

Exchanging information with schools on what the pupils have achieved on work experience and asking for feedback from teaching staff could provide a useful dialogue about future RAF STEM interventions. More detailed information about what each pupil has achieved during the work experience week, including a copy of their certificate of attendance and skills gained, could be useful for schools and the participants in terms of their career planning. The schools may also find it useful to have sight of the workbook the pupils have completed.

Currently the RAF DRIT team works alongside RAF Cosford (as well as RAF Halton and RAF Cranwell) to create a programme which is challenging and rewarding for the young people who participate. The issue of whether the work experience programmes for under-represented groups would continue without the input from the DRIT team is uncertain. Whilst there is a high level of commitment on the part of the Station Commander and staff at the base, the impetus for ensuring that the RAF-WISE programme continues rests with the central team. A checklist of things which need to be in place to create a successful work experience programme, with particular information relating to inclusive practice or specific activities for girls/BAME/widening participation could be created. This may help to embed the programme locally and ensure consistency of approach. On a more practical and immediate level, a basic 'dos and don'ts' list for people involved in the work experience week could provide support for those who may be delivering induction/debrief and other sessions. Information could include: rights and responsibilities of participants (for example, smoking rules, being involved in evening activities), who to contact in an emergency and an overview of the final day so that the participants are aware of the need to take photos and record information for their presentation.

Another way to embed the process at each RAF base involved could be to encourage at least one person each year to be involved in the next year's planning and delivery. This would provide some continuity but would be dependent on staff being available for two years in succession.

The information in relation to RAF-WISE participants has been relatively easy to gather, with the main contact details having been gained from the initial application form. The response rate for the telephone survey was high, even for those who had completed the work experience 3 years earlier. It has been harder to obtain contact details for previous participants of the Generating Genius and RAF Halton Logistics programmes. It would be good practice to ensure that in the future all individuals who attend RAF work experience activities complete a standard application form. The current RAF-WISE application form includes questions about ethnicity and other factors which support the future tracking and monitoring of the programme. This model could be adopted by others to support future evaluation and to provide an exercise in completing application forms for school pupils.

The final case study focuses on a participant who had tentative ideas about joining the RAF.

### Case Study 3 - Angela

Angela's application form was well written, highlighting her interest in Science and Design and Technology and the fact that her family were in the medical profession. The description of her hobbies focused on extension activities linked to the subjects she enjoyed at school (science, art, english and languages). She made it clear that her career ideas were very tentative, although she was interested in the RAF and possibly scientific/construction careers:

*At this stage I am not quite sure what I want to be, but if I get a place on this residential then it will help me see whether I really want to join the RAF or do a science /construction based job. At present I think I am keen to join the RAF, partly because I love travel and exploring different countries and cultures, I am also keen to help other people and I know that is what the RAF does in a lot of its work abroad. I also know that I want to work as part of a team with people from many different backgrounds and with different skills – again the RAF would offer this opportunity. I know I might be fantasising, but I think it's better to have broad horizons and a big view of things – I know I don't want to be office based. (2010)*

When asked what she remembered most about the week, Angela was typical and indicated: "Making gliders and investigating how far they went. Sitting inside the plane. Hands-on activities" and that it had been an "eye-opening" experience, something different. Whilst she acknowledged that it had encouraged her to try some new activities and introduced her to the RAF as an organisation, Angela said that she enjoyed the experience but had decided that engineering was not for her.



Participants undertaking physical training

## 9. Conclusions

The RAF/WiSET team's relationships with partners have developed since 2009, both in the context of the work experience programmes and in respect of other RAF activities. The core team of people involved in the development of the work experience programme has changed to some extent but there has been a level of continuity and sustainability as a result of two key members of the original team's consistent involvement.

The on-going leadership of Squadron Leader Dean and the links with the WiSET Project Manager have helped to maintain a consistency of approach during a period when other personnel in the RAF and partner organisations have changed. The result has been a programme which has grown from a testing phase, been reviewed and revised and embedded within the activities at RAF Cosford, to the point that station staff expect to provide engineering tasks for a group for girls each year and to support their colleagues in ensuring that the week is a success.

The aims and objectives of the programmes are well established, the ethos behind it and the way the project has developed organically are less obvious. Simply putting female role models in place as chaperones, for example, would not necessarily result in positive outcomes. A holistic approach to the organisation of the work experience, from the application process to the delivery and review of the programme, is key to its success.

The early testing and trialling in the project development should be communicated as new work experience programmes develop. This should ensure that new personnel are aware of the importance of the inclusive approach which has been created over a number of years.

Many of the elements of the programme map against other STEM initiatives and interventions very positively. The use of the CREST Awards system offers a means of structuring an activity which provides evidence of STEM learning and understanding. The employability skills (see, for example, STEMNET Employability Skills)<sup>6</sup> embedded in the RAF-WISE programme will stand the participants in good stead for future career thinking and learning, giving them an opportunity to reflect on how they have used the skills as well as the option of considering which of those they feel they do best in.

In the broader context, outcomes from the Aspires Project at King's College, London, and other major pieces of research, confirm the relevance of the approach the RAF has taken in the work experience programmes it delivers. As explained in the 'Ten Science Facts and Fictions' leaflet, the<sup>7</sup> myths around STEM careers can be partly tackled through the curriculum. Work experience programmes, such as RAF WISE, can also make an important contribution to a broader perception of careers from (and in) STEM.

The messages that have been taken back into schools and the local community have been positive, with some girls speaking to family and peers, and others spreading the news more widely through press releases and other networks. The RAF has made good use of local press to inform communities about the work experience programmes and a continuation of this approach in the future can help to promote the activities more widely.

The work experience at RAF Cosford is undoubtedly highly valued by the participants and offers a consistently high standard of placement for girls who are interested in STEM and/or are keen to try something new. The long term positive impact is evidence of the standing of the scheme and the thorough approach taken by the team.

---

<sup>6</sup> <http://www.stemnet.org.uk/resources/other/10>

<sup>7</sup> <http://www.kcl.ac.uk/sspp/departments/education/research/aspires/10FactsandFictionsfinalversion.pdf>



There is an annual review of the programme which feeds into future development. RAF-WISE could perhaps be enhanced by ensuring that the participants are aware that many of the female role models they come into contact with are engineers. There was some evidence from the questionnaire, administered in 2012, that girls were not clear that they had met a female engineer by the end of the week.

It has become apparent over the years, that some schools have recognised the value of the RAF work experience week and appear to pre-select and support students they think will benefit from it (some of the girls' comments in the telephone survey corroborate this). There has not been any research into this but it is also evident that whilst some applications come from local schools and students are coached prior to making application; other applicants come into the process with no prior knowledge of the programme and without the support of their school. In the long term this may affect the make-up of future cohorts: if participants are drawn from schools and families where the 'rules' of making a successful application are known then this may exclude some individuals who do not have the social capital to compete with their more polished/coached peers.

The possibility of using a competence based selection process, linked to assessing forms based on evidence of skills and abilities that the applicants possess (often perceived as one of the best ways of selecting candidates), may not provide a fairer system for the RAF in this instance. The girls who can 'match' their skills and experience to the application form in an enthusiastic and articulate way may not necessarily be those who have the most potential as RAF recruits or STEM specialists in the future. Discussions with recruitment specialists within the RAF (or externally) could throw some light onto how the process could be made more equitable.

In order to maintain a picture of how the RAF-WISE and other RAF work experience programmes are developing, it would be beneficial to undertake an evaluation every two years. This can inform future development and give useful insights into how improvements might be made to achieve the highest impact.

# Recommendations

As a result of the evaluation the following recommendations are suggested for the RAF to consider in future development of the work experience programmes:

## Application and selection process

- Conduct regular reviews of the application process so that those who are more supported by schools/parents are not at an unfair advantage. It may be that the process will need to be revised to safeguard the inclusion of under-represented groups. For example, create briefings for schools and hold more information centrally about how people are selected.
- Consider how to deal with applicants in terms of preference towards those already engaged in comparison with those who are tentative or new to the RAF.
- Explore whether it would be preferable to have a different way of dealing with those who are already 'high flyers' as opposed to those aiming for technician/apprentice entry. For example, there could be some optional additional activities for those who are interested and able.
- Take care when reviewing applications from the same school or those with previous experience of the scheme, where pupils may be hand-picked and 'coached'. It may be that an alternative way of engaging these applicants may create a fairer system so that they are still eligible but the schools are aware of the RAF's desire to widen participation too.
- Ensure that all participants in RAF work experience programmes have completed an application form with contact details and information for equality and diversity monitoring. This will provide useful data to track the range of applicants and their success rates.

## Links with schools

- Continue to offer work experience in holidays to make it more accessible (not all schools offer it now and may not allow people out in term time)
- Develop a work experience pack to support teachers/influencers and applicants, hosted on the WISE and RAF Careers websites.
- Build relationships with pupils' schools to ensure better exchange of information and support learners and teachers before and after the work experience week.
- Ensure schools are aware of the workbook which participants complete so that staff are aware of the evidence the girls have already collated for their CVs.

## Within the RAF

- Develop the model more broadly with other stations and create a checklist of inclusive practice (which could outline girl only events or activities targeting under-represented groups).
- Encourage one member of the delivery team to be involved in the planning and development of the following year's work experience programme, to promote continuity
- Explore ways of reinforcing the fact that some of the role models are engineers too, engaged in rewarding, worthwhile and often exciting roles within the RAF. This could be covered by the role models themselves who could perhaps be more explicit in their explanation of their engineer status.

Aspires Project, Kings College, London. Ten science facts and fiction: the case for early education about STEM Careers (No date, accessed 4.2.13)  
<http://www.kcl.ac.uk/sspp/departments/education/research/aspires/10FactsandFictionsfinalversion.pdf>

Barnes, A., Bassot, B. and Chant, A. (2011) *An Introduction to Career Learning and Development 11-19: Perspective, Practice and Possibilities*. London: Taylor and Francis

CBI (2011) Action for Jobs, How To Get the UK Working

Dean Glyn, Collins Jill, Morton Pat and Guy Mary (2011) Ensuring the Future Work Force - A Royal Air Force Perspective presented at the Education Employer Taskforce Conference, October 2011

Department for Children Schools and Families (2009) 'Gender Equality: Nuts and Bolts Series'

Department for Education (2011) 'Encouraging Equality & Diversity: Working towards equal opportunities in STEM subjects and careers'

Department for Education (2012) 'Securing Careers Guidance: A Practical Guide for Schools'

Education Committee - Seventh Report 'Careers guidance for young people: The impact of the new duty on schools' (2013)

Engineering UK (2013) 'Engineering UK 2013: Executive Summary and Recommendations'

Equal Opportunities Commission (2005) 'Gender Equality in work experience placements for Young People'

Gottfredson, L. S. (2005). Applying Gottfredson's theory of circumscription and compromise in career guidance and counseling. In S. D. Brown & R. W. Lent (Eds.), *Career development and counseling: Putting theory and research to work*

Grant L, (2006) University of Liverpool Crest awards evaluation Impact study  
<http://www.britishecienceassociation.org/NR/rdonlyres/F0D49C9F-BFCC-48C7-BC7A-B5C33CCCF4A9/0/CRESTfinalevaluationreport.pdf> (Accessed 13.9.12)

Hamilton, Sheila (2003) Equality in education: Work experience placements. The SCRE Centre, University of Glasgow for the Equal opportunities Commission.

Harrison M, (2011) Supporting the T and the E in STEM: 2004-2010 Design and Technology Education: an International Journal <http://ojs.lboro.ac.uk/ojs/index.php/DATE/article/view/1591>

Hatcher, R and Le Gallais, T (2008) The work experience placements of secondary school students : widening horizons or reproducing social inequality? Birmingham City University, research supported by Esmée Fairburn Foundation.

Higher Education Statistics Authority (HESA) Destinations of Leavers from Higher Education (DLHE) Collection 2008/09 Methodology  
<http://www.hesa.ac.uk/content/view/1385/233/#aprilphone> accessed 7.3.13

Hughes D and Gration G (2009) Evidence and Impact: Careers and guidance-related interventions

Institute of Physics (2012) 'It's different for girls: the influence of schools'

JIVE (2005) JIVE Manifesto, Bradford

McMahon M, Watson M and Bimrose J, (2010) Stories of careers, learning and identity across the lifespan: Considering the future narrative of career theory

Mann, A (2012) It's who you meet: why employer contacts at school make a difference to the employment prospects of young adults  
<http://www.educationandemployers.org/research/taskforce-publications/its-who-you-meet/>  
(Accessed 13.9.12)

Mann, A and Oldknow, A, (2012) Education Employers' Taskforce: School-industry STEM links in the UK: A report commissioned by Futurelab

Mellors-Bourne, R and Connor, H and Jackson, C. (2010) STEM graduates in non STEM jobs (BIS Research Paper number 30).

Miller, A, Watts A.G, and Jamieson, I (1991) Rethinking Work Experience

Morris, M (2011) in Work-Related Teaching and Learning A guide for teachers and practitioners (edited by Huddleston, P and Stanley, J) 2011

Morton, P and Collins, J (2010) Widening horizons in science, technology, engineering and maths (STEM) work experience, paper presented at the Employer and Education Taskforce Research Conference, University of Warwick, October 15 2010.

Murphy, P and Whitelegg, E (2006) Girls in the Physics Classroom: A review of the Research on the Participation of Girls in Physics, Institute of Physics.

Norris, E (2011). 'Not enough capital? Exploring education and employment progression in further education' Royal Society of Arts 2011

NHS Work Experience web pages and toolkit (accessed 1.4.13)  
<http://www.nhscareers.nhs.uk/explore-by-who-you-are/teachers-and-careers-advisers/work-experience/>

Osgood, J., Francis, B. and Archer, L. Gendered identities and work placement: why don't boys care? (2006) Journal of Education Policy, 21(3), pp.305-321

Randerson N and Kumar A, EngineeringUK (2011) Student Subject decision Making 14-16

Royal Society (2008) Exploring the relationship between socioeconomic status and participation and attainment in science education, Royal Society, London

Russo, Liz (2009) RAF Work Experience Evaluation, Kairos Solutions, Ltd

NICEC [http://www.nicec.org/nicec\\_new\\_dots\\_contemporary\\_world.pdf](http://www.nicec.org/nicec_new_dots_contemporary_world.pdf) New DOTS: Career Learning for the Contemporary World (Date unknown, accessed 13.9.12)

Nicoletti C and Berthoud R (2010) The Role of Information, Advice and Guidance in Young People's Education and Employment Choices

Royal Air Force Equality and Diversity website pages:

<http://www.raf.mod.uk/community/support/equalityanddiversity.cfm> (Accessed on 4.2.13)

Super, D. E. (1990). A life-span, life-space approach to career development. In D. Brown, & L. Brooks (Eds.), *Career choice and development* (2nd ed.)

Turner, K and James, D (2010) STEM baseline research for STEM Subject Choice and Careers Project, VT Research.

Watts, A.G, (2011) Careers England Policy Commentary 15A (Revised Version): The Coalition's Emerging Policies on Career Guidance

Watts, A.G Careers England Policy Commentary 17

<http://www.careersengland.org.uk/documents/Public/Policy%20Commentary%2017.pdf> accessed on 23.11.12

WISE (2012) Women in Science, Technology, Engineering and Mathematics: from Classroom to Boardroom, UK Statistics 2012

Wolf, Alison (2011) Review of Vocational Education; The Wolf Report



# Appendix 1

## Maximising Opportunities For Career Learning Through Work Experience Placements

Jill Collins, Pat Morton, Glynis Dean  
Sheffield Hallam University, United Kingdom  
Presenting Author: Jill Collins

### Abstract

This paper explores the role of work experience placements in providing valuable career learning opportunities for 14-19 year olds. Work related learning (WRL) and specifically work experience placements have been a feature of the English education system for many years and are under constant review. The role of work experience in providing young people with some real (and relevant) experience on which to start career planning is often an integral part of the careers education programme for schools.

This paper will highlight the concept of career related learning skills and will explore how these are located within wider theories of vocational choice and guidance (Super 1990, Gottfredson 2005). The traditional DOTS model of career planning developed by Watts and Law (1977): D – Decision learning; O – Opportunity awareness; T – Transition learning; and S – Self awareness is well established. The DOTS model is often under-utilised in the design and delivery of work experience for children in secondary education (post 11), at a point in their lives where it could make a huge difference in terms of career learning and planning skills. Added to this, many schools are endeavouring to develop new ways of embedding careers education, information, advice and guidance and the option of using work experience placements to support this is often left unexplored. For the purposes of this paper, the target group will be 14-19 year olds participating in a work experience placement (which often takes place at age 14-16 for a period of 1 or 2 weeks).

The benefits of creating work experience opportunities which are planned, structured, meaningful and which encourage reflection by the individual about what it means for them, will be explored in depth through reference to successful programmes which have been developed in the past and are currently running. The role of employer organisations in providing work experience opportunities which encourage applications from a diverse range of applicants and which can help engage young people in the career planning progress will be examined.

An in depth evaluation of one successful current scheme run by the Royal Air Force (RAF) will be used as a case study. The authors have undertaken project development and an evaluation exercise on behalf of the RAF and will make reference to the results of the data.

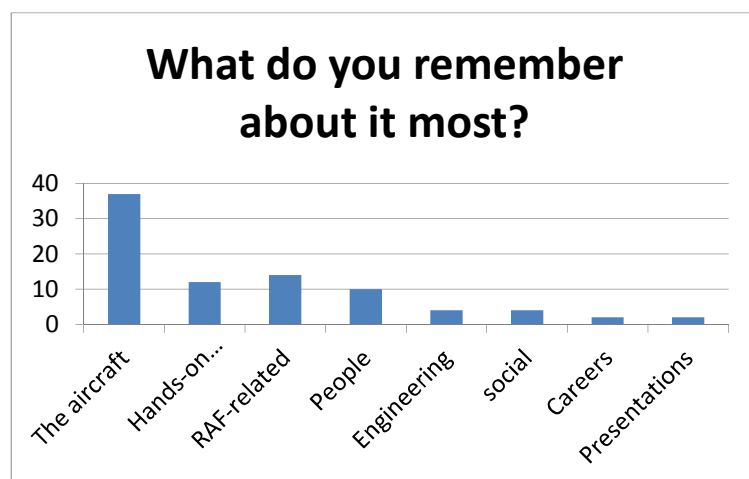
*Sections regarding the current situation in the UK in relation to Careers Education, Information, Advice and Guidance as well as a summary of Work Experience have been removed from this appendix.*

### Results so far

The initial results of the survey are promising, with some clear messages that the work experience programme in engineering has had a positive impact on career choice. Future analysis of the girls' application forms which were completed prior to the work experience may provide further evidence of the impact, highlighting when girls who were not initially interested in the RAF or engineering may have altered their opinions after the week at RAF Cosford. Some of the participants were already interested in a career in the RAF/engineering (or both) so care needs to be taken about making assumptions regarding impact until further analysis has taken place.

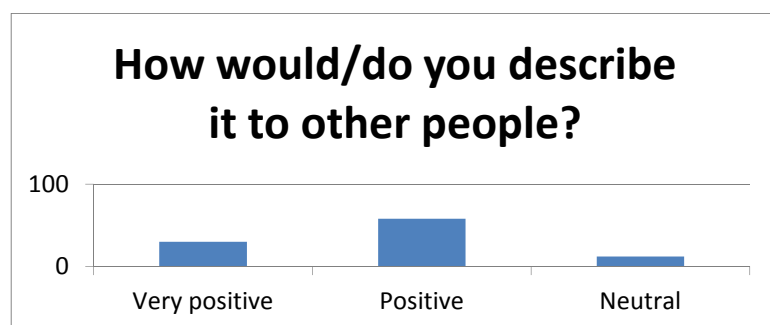
In answer to the first question about what the girls remembered most, the answers have been grouped according to whether they talked about activities related to the aircraft, eg recurring words and themes like "removing the wing of the plane" or "taking off the flaps". The hands-on activities such as sports, making rockets, or other practical activities were grouped and the quotes about the RAF (visiting the base, going in the hangar, etc) were also clustered in order to identify key themes shown in Figure 1.

**Figure 1**



The second question was designed to offer another opportunity for the interviewers to encourage the girls to reflect on what they had done by asking them to describe the week. Whilst most used the opportunity to give one word (or several word) responses, the majority were enthusiastic about the experience. Figure 2 shows overall responses in terms of very positive, positive and neutral (there were no obviously negative responses). Words and phrases like "life-changing", "a once in a lifetime", "amazing" and "fantastic" were grouped into very positive responses. Descriptions such as "fun", "good" and "insightful" have been labelled positive. Words such as "challenging", "different" and "daunting" have been clustered in the neutral band, because it is unclear whether this is intended as a positive or negative.

**Figure 2**



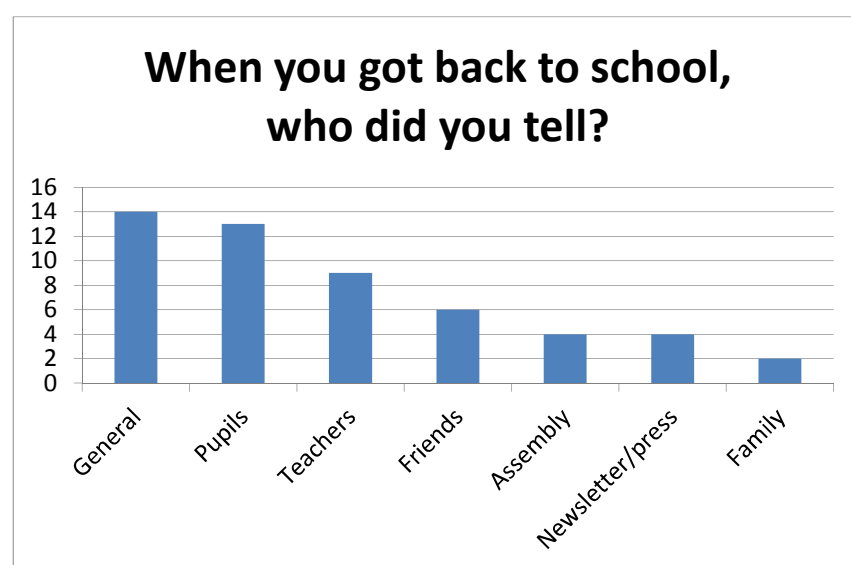
Question 3 asked the students what had happened when they returned to school and was made up of two parts: did their school know they had taken part in the RAF week (bearing in mind some of the participants had attended in school holidays), and did the school ask them to tell others (teachers, peers) about it. Many responded positively in this regard and when the school had not asked them to share their experience they sometimes took it upon themselves to tell family and friends in any case. Table 2 shows the number of participants who said that their schools knew about their experience and whether they had been asked to talk about it.

The purpose of this question was to assess whether the messages about the RAF and its offer of work experience for girls in engineering had been spread more widely. It is not uncommon for schools to ask pupils to give talks or create displays showcasing their work experience weeks and it was anticipated that this might have been an option for some of the girls. In fact, some had also had articles published in the local press and in school newsletters, more than one had been interviewed by teachers (sometimes the Head Teacher) on their return to school too. Figure 3 shows a breakdown of how the girls shared their news, 'General' relates to telling pupils and teachers for example in groups, assemblies, classroom situations.

**Table 2**

School knew about it		Were asked to talk about it	
Yes	No	Yes	No
49	3	30	19

**Figure 3**



The next two questions asked the girls what had happened after their GCSEs and what they are doing now. The responses contained varying degrees of detail, with some saying that they were "in 6<sup>th</sup> Form" or "doing GCSEs" whilst others gave fuller explanations such as the following:

*"Currently doing A levels and diploma: engineering diploma level 3, biology, English and physics for next year." (Student, 2010)*

and

*"Taking an extra year to do A levels (picking up RE) and then wants to do architecture at Uni." (Student, 2009)*

Figures 4 and 5 show the majority of responses grouped into subjects or the type of learning/work they are in now. Some responses double up in as much that the participants have moved on to do A Levels in a 6<sup>th</sup> Form or be doing an engineering apprenticeship so they may have been double counted but the overall categories give a flavour of the things they have moved on to. Further analysis is required on this section of the survey.

Figure 4

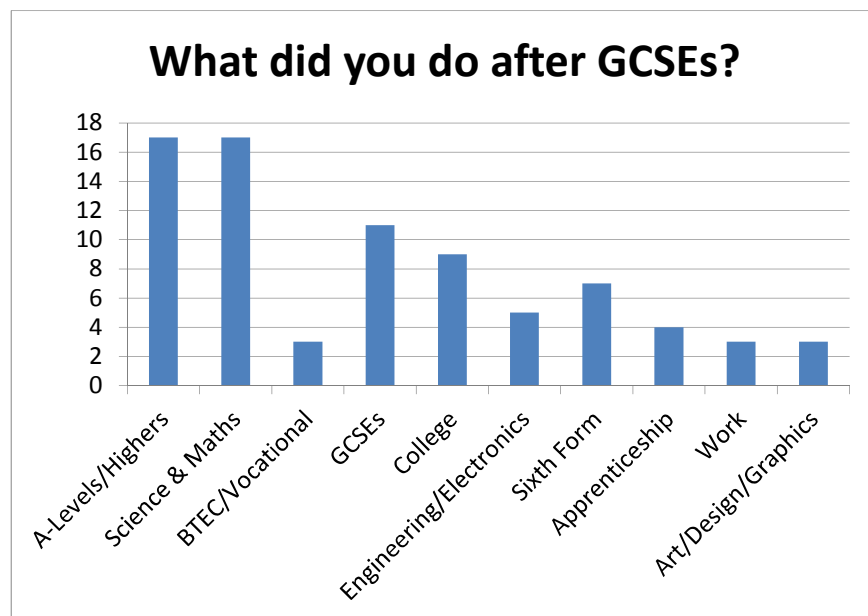
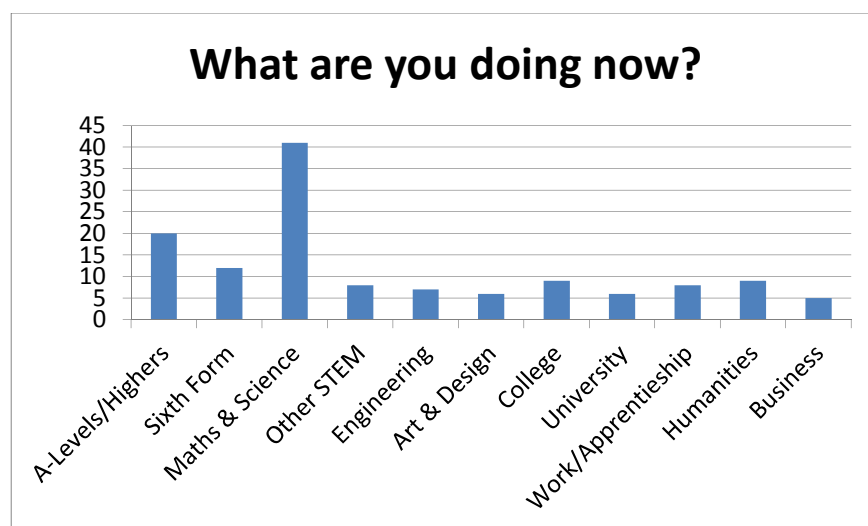


Figure 5



When asked how the RAF experience had made a difference to their choices about work/life the girls often alluded to increased levels of career confidence or self-confidence, as the following examples illustrate:

*"Made her realise what she was good at so she could make an informed choice on her career" (Student, 2009)*

and

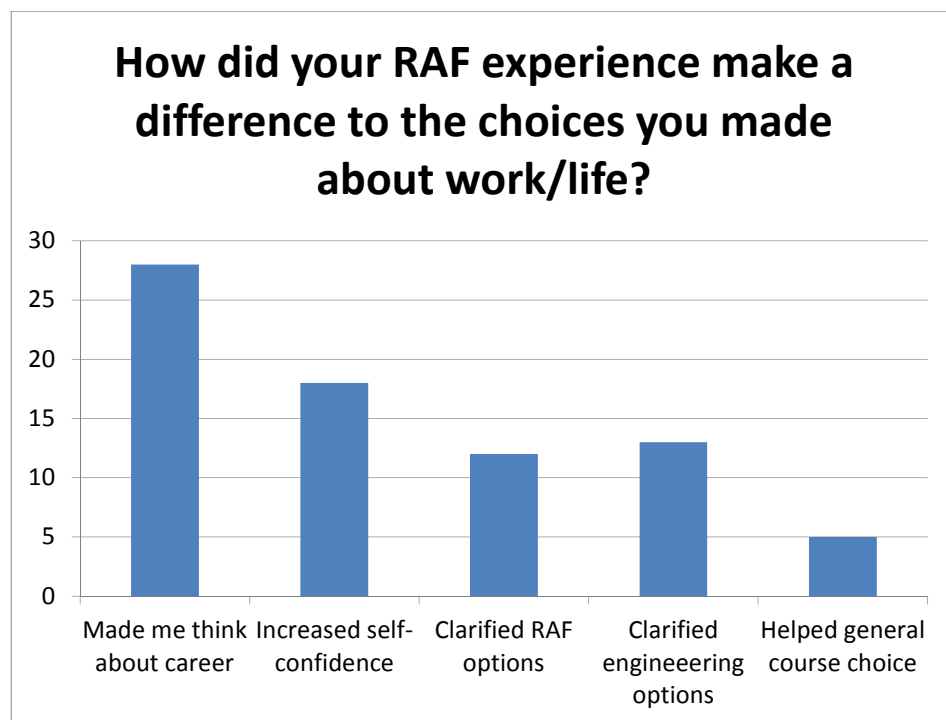
*"I decided not to be a pilot (my original career path) as I found out I couldn't due to me wearing glasses. the RAF influenced me to do engineering. Having the RAF down on my CV helped me with jobs and to get into a new 6th form college which specialised in engineering. My friend from a different year also referenced the RAF when she applied to the same college and also got in." (Student, 2010)*

and

*"To me it was just looking at the practical applications of the physics I was learning at school. I looked at the RAF and it wasn't an option, as a person I learned a lot about myself." (Student, 2010)*

The responses were fairly disparate (nearly all positive in nature) and have been clustered into different sections according to whether they referred to the impact on career choice, related to self-confidence, clarified ideas regarding RAF/Engineering careers or helped more generally in career choice. The largest groups of responses are shown in Figure 6.

**Figure 6**



Responses to the questions relating to how the RAF week had affected the participants' views on the RAF/Engineering varied and it was difficult to draw out dominant themes at this stage. However, there is scope to undertake further analysis of this at a later date. Some quotes from these sections of the survey are included below.

#### How did it affect your views of the RAF:

*"Made her realise that women have a a bigger part to play in engineering in the RAF than she first thought." (Student, 2009)*

*"I always thought that the RAF was a scary place and that it operated on commanding people, however, I discovered that the people work together as a team." (Student, 2010)*

*"Positive view. Showed RAF life. Means she now knows she could enjoy a job in RAF - it wouldn't just be a job." (Student, 2011)*

#### How did it affect your views of Engineering:

*"Possible career path for her at the time - now even more knowing female engineers get treated equally was a great thing to know." (Student, 2009)*

*"Sparked my interest in physics when I understood what it could lead to. I would definitely pursue engineering as a career." (Student, 2010)*

*"Yes - made her change her mind from doing electrical engineering to engineering." (Student, 2011)*

Respondents were asked if they had any suggestions about whether the RAF should change anything about the week and the responses are summarised on Table 3. The responses are



largely positive even when the answer is "yes" and conversely sometimes respondents have said "no" but then gone on to make a suggestion. Examples of the comments in response to this question are below Table 3.

**Table 3**

Question	Yes	No
Is there anything the RAF should do to change future courses like this?	10	42

*"Just to let people know there are these opportunities available." (Student, 2011)*

*"To include more practical activities associated with the army, such as high rope and jumping." (Student, 2010)*

*"2 weeks. Being a passenger in a ..... More visits to other airfields. Go into other departments." (Student, 2009)*

Participants were asked to comment on the workbook they had been given during the week and the responses largely fell into positive, negative or neutral categories. Table 4 gives a summary of the responses with some comments about the workbook included below (note that some respondents used more than one word to answer this so the total responses exceeds the number of participants). Some of the most encouraging responses are those which relate to the usefulness in hindsight and the opportunity for reflection. The main intentions behind the workbook were to build in an opportunity for the girls to record their thoughts and feelings, to give them some career related materials and ideas as well as some information about the RAF and engineering. There are equality and diversity themes woven through the booklet (perhaps more explicit in terms of gender in the first version) and it is hoped it will encourage participants to think about what they need to do when they return to school/home.

**Table 4**

Question	Positive	Negative	Neutral
What did you think of the workbook you had during the week	51	5	14

*"Brilliant - has kept hers. Paper was very good quality. Kept post cards and mind maps" (Student, 2009)*

*"It was OK - can't really remember it." (Student, 2009)*

*"It was really helpful, especially because we had to do presentation and it helped prepare for that. I look back on it now using things they told me to write down which have come in useful but at the time I didn't realise that. It was a packed week, it helped me to remember things now." (Student, 2010)*

*"I liked it because you got to keep it. I refer back to it permanently, I use now. After I came back I showed everyone in family. I like to look back on it so I can remember what I did. Most useful = part you wrote re each day the questions it used. The school one was a diary. RAF one had questions on what we did, more details and more." (Student, 2011)*

*"Good - showed teachers the work book when she got back, the teachers then showed other staff and pupils. Said she did it every night so it wouldn't creep up on her." (Student, 2011)*

*"Wasn't very helpful for me personally as there was too much text and as a 14 year old girl I got bored reading it." (Student, 2010)*

The last 2 sections of the survey form asked if the participants had anything to add and if they could be contacted again. There were some comments in the penultimate section, only one of which was negative and relates to some filming which took place during the week:

*"Didn't enjoy being filmed." (Student, 2009)*

Some of the positive comments included:

*"Just it was epic and would like more info so she could promote it to other people." (Student, 2009)*

*"Really good -would be great to get the message across more and to more people." (Student, 2009)*

*"It was amazing and life changing." (Student, 2010)*

*"I liked the diversity of the people and got the opportunity to make new friends." (Student, 2010)*

*"No. It was really good fun. If I could do it again tomorrow with the same girls I would." (Student, 2010)*

*"I can remember working on jets and making the little glider, they were good." (Student 2010)*

*"Really enjoyed doing silver crest award." (Student, 2011)*

*" Like PE part as she is quite sporty." (Student, 2011)*

## Conclusions

The analysis is still at an early stage, but the interviews have shown the long term impact of an enhanced work experience scheme on the participants. The feedback indicates that there is more gained than a 'hands-on' experience of engineering alone would provide.

The organic nature of the RAF's approach to work experience and the organisation's willingness to evaluate the programme so thoroughly has created a situation which is ideal for further research. Grounded theory methods would be particularly suited to this to enable further themes to develop and be explored. The majority of participants have indicated that they are willing to offer more feedback and this could prove invaluable in drawing out what happened as a result of the RAF Experience, beyond the initial impact.

There are references to career learning and self-identity at various points within the responses and it would be interesting to delve deeper, to find out if the programme design (combining activities, meeting role models, time for reflection and some career information) could be improved further.

The comments gained from this first survey have given some insights into the impact of the programme and clues about the design, content and delivery can be further enhanced to support young people's career thinking, learning and planning. This final quote from one girl in the survey is typical of some of the encouraging feedback received:

*"I wasn't going to go to college but the RAF had a presentation near the end where they said you can get to where you want to, it showed me I can have another go and you can get there in the end. I was sad to leave the 23 girls who I'd bonded with and cried when we said goodbye."*

The same student went on to say of the experience:

*"It opened my eyes. When I went I thought it would be action packed but we did lots of activities. I thought it would be guys fighting and running around but it showed me jobs for women and that they can get into the flow of everything. A nurse who went to Afghanistan spoke to us and she did a nursing course in the RAF. Even if I don't go in the RAF it made me change my views about further education and nursing." (Student, 2010)*

## Appendix 2



### RAF Work Experience Participant Questionnaire

The RAF and Sheffield Hallam University are trying to find out if young people understand what is meant by 'engineering'. This questionnaire is a part of that project and your answers will be a great help to us. Thank you for taking part. This is not a test about your knowledge.

<b>Your Name</b>			
<b>School Name</b>			
<b>Please circle your year group</b>	Y9   Y10   Y11   Y12   Y13	<b>Are you male or female?</b>	M   F

<b>1</b>	<b>Which THREE subjects do you MOST enjoy at school? (please tick 3)</b>
Physical Education (PE) <input type="checkbox"/> Maths <input type="checkbox"/> Art <input type="checkbox"/> Science <input type="checkbox"/> Religious Studies (RE) <input type="checkbox"/> Design & Technology <input type="checkbox"/> Music <input type="checkbox"/> History <input type="checkbox"/> Geography <input type="checkbox"/> Languages <input type="checkbox"/> English <input type="checkbox"/> ICT <input type="checkbox"/> Food Technology <input type="checkbox"/>	
<b>2</b>	<b>Which 3 subjects do you think are the most difficult? (please tick 3)</b>
Physical Education (PE) <input type="checkbox"/> Maths <input type="checkbox"/> Art <input type="checkbox"/> Science <input type="checkbox"/> Religious Studies (RE) <input type="checkbox"/> Design & Technology <input type="checkbox"/> Music <input type="checkbox"/> History <input type="checkbox"/> Geography <input type="checkbox"/> Languages <input type="checkbox"/> English <input type="checkbox"/> ICT <input type="checkbox"/> Food Technology <input type="checkbox"/>	
<b>3a</b>	<b>Do you know what an <i>engineer</i> does?</b> Yes <input type="checkbox"/> No <input type="checkbox"/> Not sure <input type="checkbox"/>
<b>3b</b>	<b>Do you know what the <i>RAF</i> does?</b> Yes <input type="checkbox"/> No <input type="checkbox"/> Not sure <input type="checkbox"/>
<b>4a</b>	<b>Whatever you answered for Q3a, try and explain what you think an engineer does.</b>

<b>4b</b>	<b>Whatever you answered for Q3b, try and explain what you think the RAF does.</b>
<b>5</b>	<b>Have you learnt anything about engineering, in your science lessons?</b> Yes <input type="checkbox"/> No <input type="checkbox"/> Not sure <input type="checkbox"/>
<b>6</b>	<b>In which other lessons have you learnt about engineering? Tick as many as you need.</b>
Physical Education (PE) <input type="checkbox"/> Maths <input type="checkbox"/> Art <input type="checkbox"/> ICT <input type="checkbox"/> Religious Studies (RE) <input type="checkbox"/> Design & Technology <input type="checkbox"/> Music <input type="checkbox"/> History <input type="checkbox"/> Geography <input type="checkbox"/> Languages <input type="checkbox"/> English <input type="checkbox"/> Food Technology <input type="checkbox"/> PSHE <input type="checkbox"/> Careers <input type="checkbox"/> Tutor Time <input type="checkbox"/>	
<b>7</b>	<b>Which of the following do you think are important subjects to study to become an engineer?</b>
Physical Education (PE) <input type="checkbox"/> Maths <input type="checkbox"/> Art <input type="checkbox"/> Science <input type="checkbox"/> Religious Studies (RE) <input type="checkbox"/> Design & Technology <input type="checkbox"/> Music <input type="checkbox"/> History <input type="checkbox"/> Geography <input type="checkbox"/> Languages <input type="checkbox"/> English <input type="checkbox"/> ICT <input type="checkbox"/> Food Technology <input type="checkbox"/>	
<b>8</b>	<b>Have you ever met an engineer? If yes, was that engineer male or female?</b>
Yes - The engineer was <b>Female</b> <input type="checkbox"/> Yes - the engineer was <b>Male</b> <input type="checkbox"/> No - I have not met an engineer <input type="checkbox"/>	
<b>9</b>	<b>If the answer to Question 8 is YES, describe what he or she did for a job</b>
<b>10</b>	<b>If the answer to Question 8 is YES, how did you meet him or her?</b>
Family member <input type="checkbox"/> Other adults I know <input type="checkbox"/> Through school <input type="checkbox"/> Other (please state) <input type="checkbox"/> _____	
<b>11</b>	<b>Have you ever visited somewhere and seen engineering in action?</b> Yes <input type="checkbox"/> No <input type="checkbox"/>
<b>12</b>	<b>If the answer to Question 11 is YES, where did you go and what type of engineering did you see?</b>

<b>13</b>	<b>What 3 words would you use to describe a career in engineering? <i>(please tick)</i></b>
<div style="display: flex; flex-wrap: wrap;"> <div style="width: 33%;">Exciting <input type="checkbox"/></div> <div style="width: 33%;">Boring <input type="checkbox"/></div> <div style="width: 33%;">Interesting <input type="checkbox"/></div> <div style="width: 33%;">Dirty <input type="checkbox"/></div> <div style="width: 33%;">Creative <input type="checkbox"/></div> <div style="width: 33%;">Complicated <input type="checkbox"/></div> <div style="width: 33%;">Dull <input type="checkbox"/></div> <div style="width: 33%;">Innovative <input type="checkbox"/></div> </div> <div style="display: flex; flex-wrap: wrap; margin-top: 10px;"> <div style="width: 33%;">Well paid <input type="checkbox"/></div> <div style="width: 33%;">Fascinating <input type="checkbox"/></div> <div style="width: 33%;">Part of a team <input type="checkbox"/></div> <div style="width: 33%;">Challenging <input type="checkbox"/></div> <div style="width: 33%;">Difficult <input type="checkbox"/></div> <div style="width: 33%;">Repetitive <input type="checkbox"/></div> <div style="width: 33%;">Contributing to society <input type="checkbox"/></div> </div>	
<b>14</b>	<b>What do you think are the 3 most important things in any careers? <i>(please tick 3)</i></b>
<div style="display: flex; flex-wrap: wrap;"> <div style="width: 33%;">Personal Satisfaction <input type="checkbox"/></div> <div style="width: 33%;">The opportunity to be innovative <input type="checkbox"/></div> <div style="width: 33%;">The chance to work for yourself <input type="checkbox"/></div> <div style="width: 33%;">Becoming a manager of other people <input type="checkbox"/></div> <div style="width: 33%;">Having challenging work <input type="checkbox"/></div> </div> <div style="display: flex; flex-wrap: wrap; margin-top: 10px;"> <div style="width: 33%;">The opportunity to be creative <input type="checkbox"/></div> <div style="width: 33%;">Contributing to society <input type="checkbox"/></div> <div style="width: 33%;">Doing interesting work <input type="checkbox"/></div> <div style="width: 33%;">Being part of a team <input type="checkbox"/></div> <div style="width: 33%;">Fame <input type="checkbox"/></div> <div style="width: 33%;">Helping other people's lives <input type="checkbox"/></div> </div> <div style="display: flex; flex-wrap: wrap; margin-top: 10px;"> <div style="width: 33%;">Knowing that you make a difference <input type="checkbox"/></div> <div style="width: 33%;">Money <input type="checkbox"/></div> <div style="width: 33%;">Security <input type="checkbox"/></div> </div>	
<b>15</b>	<b>In what job or career areas might YOU want to work when you leave full time education?   (Please pick a maximum of THREE)</b>
<div style="display: flex; flex-wrap: wrap;"> <div style="width: 33%;">Administration, Business &amp; Office training <input type="checkbox"/></div> <div style="width: 33%;">Education, teaching and <input type="checkbox"/></div> <div style="width: 33%;">Languages <input type="checkbox"/></div> <div style="width: 33%;">Media, print &amp; publishing <input type="checkbox"/></div> <div style="width: 33%;">Security &amp; armed forces <input type="checkbox"/></div> <div style="width: 33%;">Building &amp; Construction work <input type="checkbox"/></div> <div style="width: 33%;">Health <input type="checkbox"/></div> </div> <div style="display: flex; flex-wrap: wrap; margin-top: 10px;"> <div style="width: 33%;">Legal &amp; political services <input type="checkbox"/></div> <div style="width: 33%;">Performing arts <input type="checkbox"/></div> <div style="width: 33%;">Social work &amp; counselling services <input type="checkbox"/></div> <div style="width: 33%;">Catering &amp; Hospitality <input type="checkbox"/></div> <div style="width: 33%;">Environment, animals &amp; plants <input type="checkbox"/></div> <div style="width: 33%;">Leisure &amp; tourism <input type="checkbox"/></div> </div> <div style="display: flex; flex-wrap: wrap; margin-top: 10px;"> <div style="width: 33%;">Computers and IT <input type="checkbox"/></div> <div style="width: 33%;">Financial services <input type="checkbox"/></div> <div style="width: 33%;">Personal &amp; cleaning services <input type="checkbox"/></div> <div style="width: 33%;">Manufacturing &amp; production <input type="checkbox"/></div> <div style="width: 33%;">Retail sales &amp; customer services <input type="checkbox"/></div> <div style="width: 33%;">Design &amp; Technology <input type="checkbox"/></div> <div style="width: 33%;">Engineering <input type="checkbox"/></div> </div> <div style="display: flex; flex-wrap: wrap; margin-top: 10px;"> <div style="width: 33%;">Technology <input type="checkbox"/></div> <div style="width: 33%;">Marketing &amp; advertising <input type="checkbox"/></div> <div style="width: 33%;">Sciences, maths and statistics <input type="checkbox"/></div> <div style="width: 33%;">Transport &amp; logistics <input type="checkbox"/></div> <div style="width: 33%;">Armed Forces (Army, Navy, RAF) <input type="checkbox"/></div> <div style="width: 33%;">Aviation <input type="checkbox"/></div> <div style="width: 33%;">Sport <input type="checkbox"/></div> </div>	
<div style="border: 1px solid black; padding: 5px; height: 40px;">             Other <i>(please use this space to state the career you are interested in)</i> </div>	
<b>16</b>	<b>Would you consider a career in the RAF?</b> <span style="margin-left: 50px;">Yes <input type="checkbox"/></span> <span style="margin-left: 50px;">No <input type="checkbox"/></span>
<b>17</b>	<b>What kind of jobs do you think the RAF can offer to girls? Name THREE.</b>



18	Have you done (or will you do) work experience through your school? Yes <input type="checkbox"/> No <input type="checkbox"/>
19	If the answer is yes, what type of work will you (or did you) do?

## Appendix 3



### PROJECT RAF WISE YEAR 10 WORK EXPERIENCE 4 – 8 July 2011

#### APPLICATION FORM (TO BE SUBMITTED BY 21 APR 11)

Name:

Address:

Home telephone number:

Contact number (in case of emergency):

Parent mobile number:

Student mobile number:

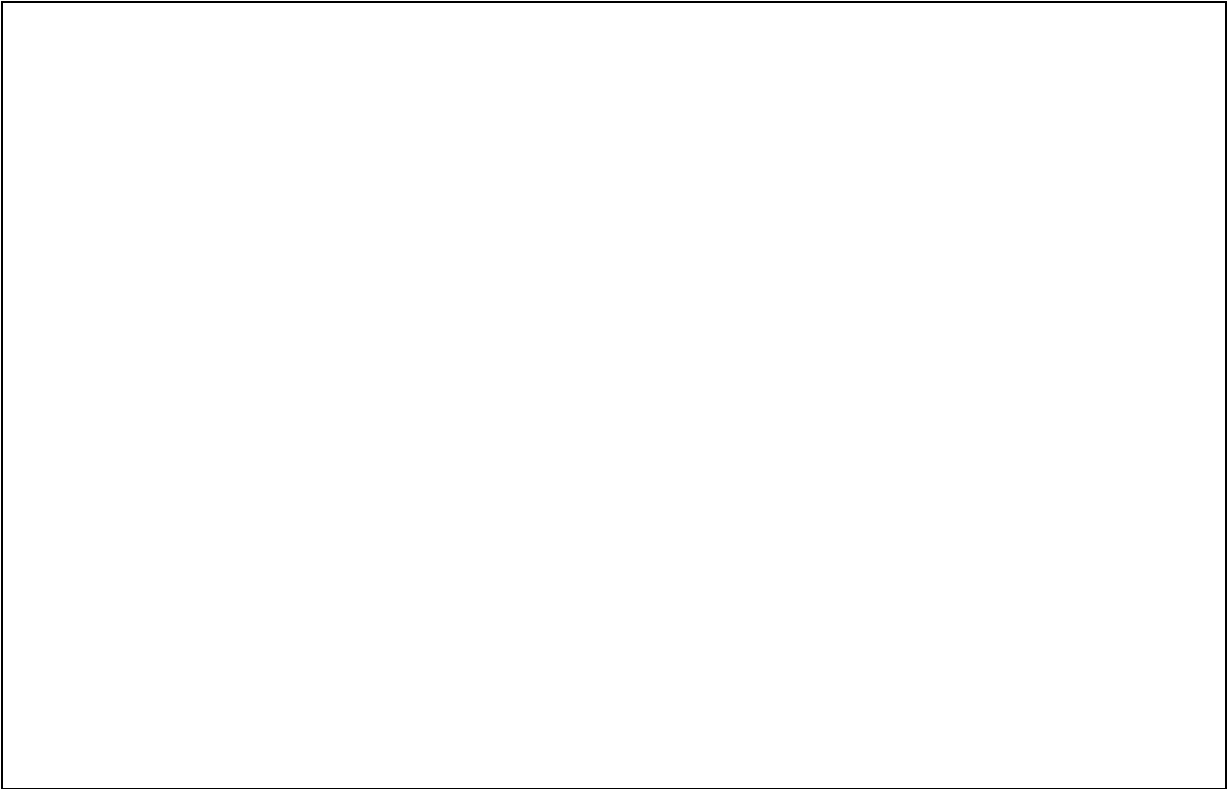
Date of birth:

Height:

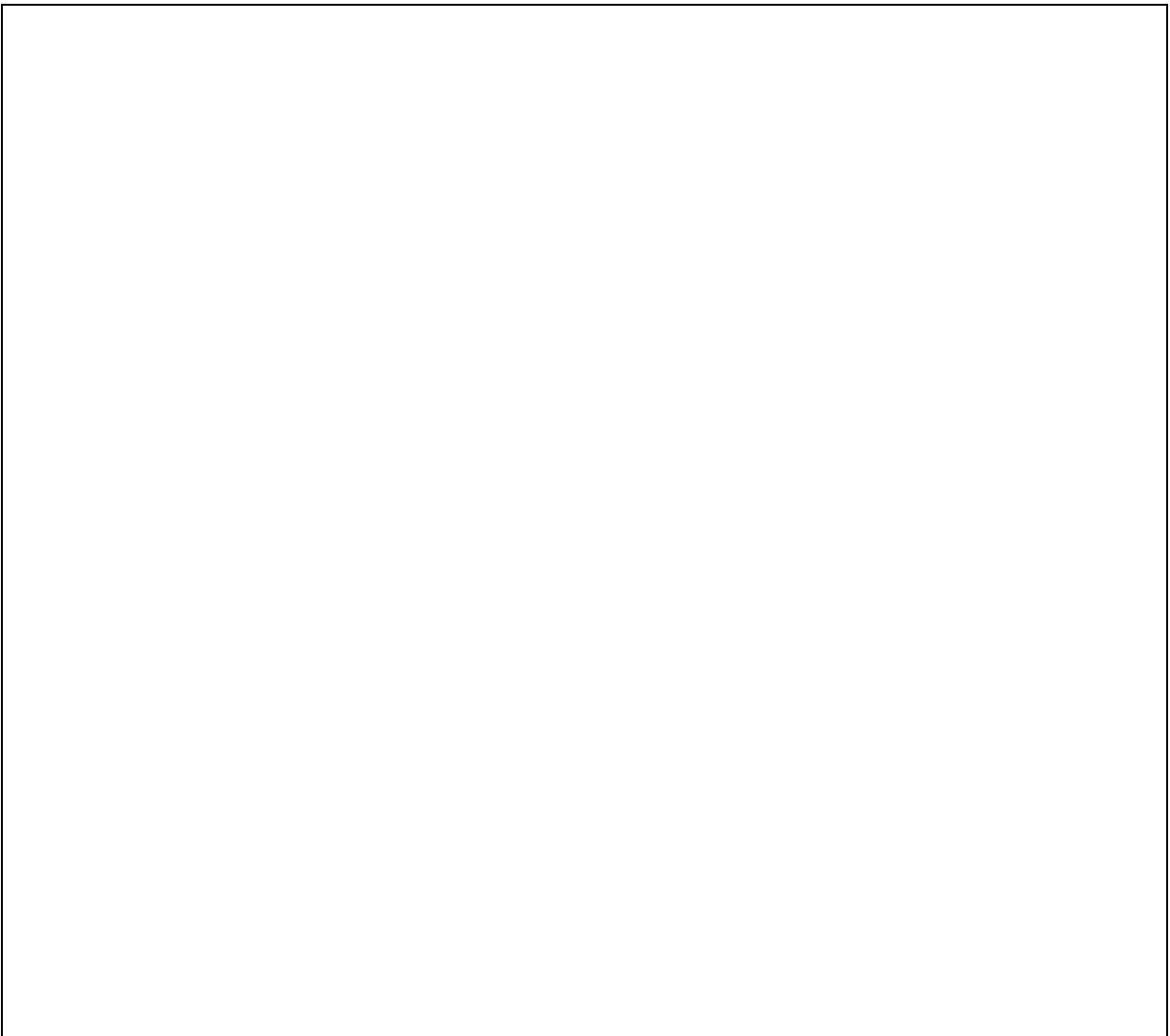
Clothes size:

Shoe size:

Please tell us why you want to go on this work experience (in approximately 150 words):  
This is the main deciding feature of this form – so use your words wisely



Please tell us a little bit about your hobbies and interests



Have you any thoughts about what career you would like to follow when you are older and why?

Do you have any learning difficulties e.g. dyslexia? Yes/No

If yes, please give details here:

Do you have any special dietary requirements? Yes/No

If yes, please give details here:

## SCHOOL DETAILS

Name of School:

School address:

Telephone number:

Name of Teacher who recommended you attend this course:

### General Information

Are any of your family or friends in the RAF? Yes/No

If yes, please state who:

### Medical Information

Doctor's name, address & telephone no:

Please give details of any illnesses or disabilities you have had during the last six months which we may need to know about (please indicate if you still have these):

--

Please provide details of any medication that you are currently taking and which you will be bringing with you:

--

To the best of your knowledge, have you been in contact with any infectious diseases in the last four weeks? If yes, please give details:

--

Please indicate if there are any medical reasons that could affect you taking part in fitness activities. Also indicate what actions you take to minimise any medical conditions that affect you when undertaking physical activities:

--



## DECLARATION

I declare that the information given above is correct to the best of my knowledge.

Student name:..... date:.....

Student signature:.....

Parent/guardian name:.....

date: .....

Parent/guardian signature:.....

**If you have any queries, please feel free to telephone Flying Officer Louise Quilter, Project Officer on 01902 377778.**

Once complete please pass this form (along with the signed **Terms and Conditions** document) to your teacher, who will send it to:

Flight Lieutenant Askew  
SO3 Co-Ord  
RAF College Cranwell  
Sleaford  
Lincs  
NG34 8GZ

# RAF WISE Work experience

## Terms and Conditions



This document summarises the information you must be familiar with before the placement commences.

Please read the terms and conditions carefully and sign where indicated, returning one copy of the form to Flight Lieutenant Askew (address on application form). Keep another copy for your records.

Details of the work placement arrangements are provided for you below.

**Duration of your placement:** 5 days, 4 – 8 July 2011.

**Base for your placement:** Your placement will be based at DCAE Cosford

**On your first day you should report to:**

Flight Lieutenant Askew or Flying Officer Quilter

at Cosford Railway station/Main car park

on Monday 4 July

between 0930-1000

You will be escorted from there.

**Late arrivals:** Please notify Flight Lieutenant Askew on 07535 710204

## RAF obligations to you:

**HEALTH SAFETY & WELFARE:** The RAF is committed to providing and maintaining a safe working environment and safe systems of work. The details of your placement are as follows but will be further explained to you on the first day of your placement.

A risk assessment for the placement programme has been undertaken, and the necessary processes have been put in place to ensure, as far as is practicable your health, safety and welfare whilst at DCAE Cosford.

**IDENTIFICATION:** You will be given a name badge to be worn at all times whilst on this work experience placement.

# What is expected from you:

## Dress

- You will need to bring flat shoes and trainers, trousers/jeans for daily routine activities at DCAE Cosford – skirts and heels are **not** suitable.
- Please bring enough clothes with you for 5 days activities and 1 smart evening wear outfit, for the final evening event.
- Please bring towels, as they will not be provided.
- Any special clothing (Personal Protective Equipment, PPE) you need will be provided by the RAF.

## Smoking and alcohol

- You will not be permitted to smoke or consume alcohol throughout the week.

## Electrical equipment

- You can bring electrical equipment, e.g. hairdryers, but are advised not to bring expensive electrical items with you e.g. laptops

## Money

- Please bring some extra cash with you to cover additional expenses during the week. Please note, there are no other costs incurred, but attendees may wish to buy magazines, sweets etc. This extra money should easily cover such sundries ( no more than £50 please)

## Mobile phones

- You are allowed to bring mobile phones with you.
- Please keep mobile phone switched off during all activities.
- You are allowed to make and receive calls during free time in the evening.
- You must ensure mobile phone chargers are unplugged and stowed away when not in use.

## Cleanliness

- WISE Work Experience attendees are guests of the RAF, so please remember to:
  - a. Make up your bed daily.
  - b. Keep your room tidy.
  - c. Hang all clothes and towels in appropriate areas.
  - d. Ensure that lights are out by 22:00 each evening.
- Personal belongings are the responsibility of the individual attendee.
- Any loss or damage to RAF equipment is to be reported to the Duty Officer.

## Respect for others

- In line with the RAF's diversity policy, you will be expected to treat people with dignity and respect.
- Bad behaviour will not be tolerated and repeated misbehaviour could lead to you being excluded from the placement.

## Emergency orders

- A Brief detailing emergency procedures will be given upon arrival at DCAE Cosford.

**Terms and conditions acceptance:** Please return a signed version of this document to Flight Lieutenant Askew, SO3 Co-Ord, RAF College Cranwell, Sleaford, Lincs NG34 8GZ.

**Student:**

I ..... accept the placement details mentioned above and the terms and conditions specified.

Student signature & date .....

**Parent / guardian**

1) During the course of this placement, students will be photographed, photographing one another and will contribute to a video diary. These will be used to further publicise the programme, internally and externally to the RAF/WISE.

I give permission for this student to be photographed/filmed, and for these photographs/films to be used for marketing and publicising the programme in the future.

Parent/guardian signature & date .....

2) I understand that there will be supervised activities, provided by qualified professionals, to strict Health & Safety standards, and I give permission for this student to participate in all activities.

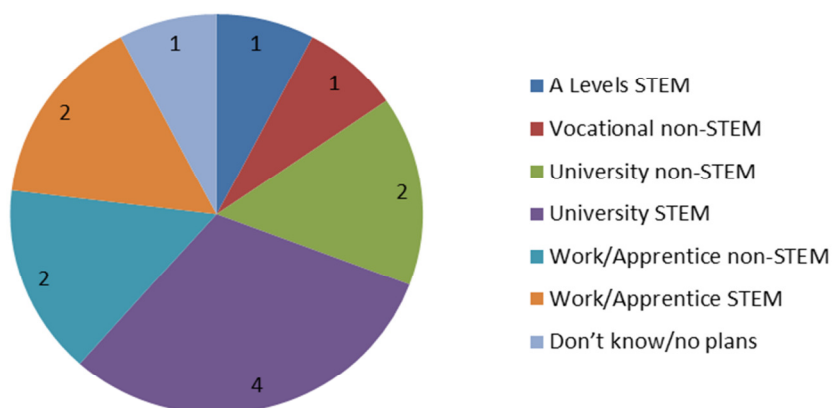
Parent/guardian signature & date.....

3) I agree to this student undertaking the above placement and confirm that the above terms have been discussed with her.

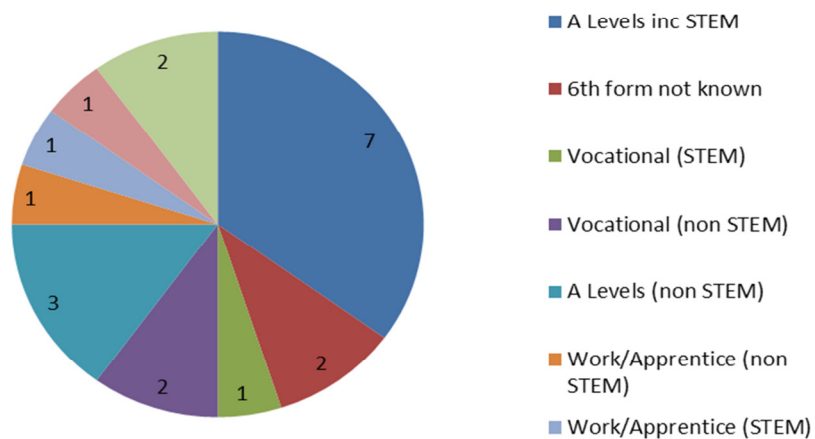
Parent/guardian signature & date .....

## Appendix 4

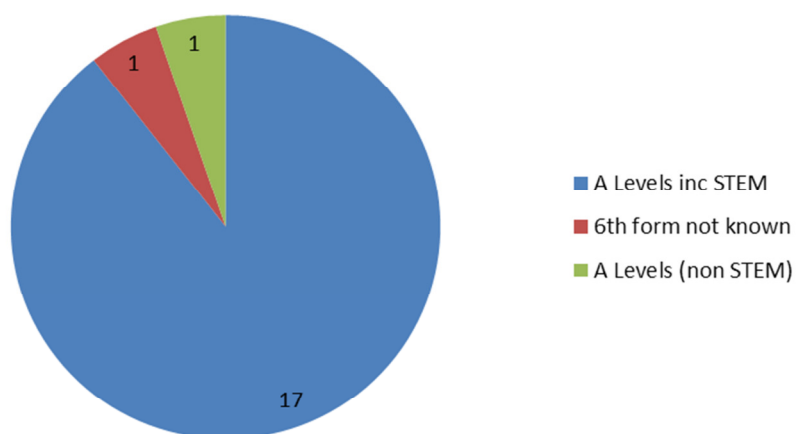
**2009 Summary - Now**



**2010 Summary - now**



**2011 Summary - Now**





*Evaluation of 'RAF WISE' work experience programmes, RAF Cosford 2009 - 2012.*

COLLINS, Jill <<http://orcid.org/0000-0002-6178-2822>>

Available from the Sheffield Hallam University Research Archive (SHURA) at:

<http://shura.shu.ac.uk/8369/>

## Copyright and re-use policy

Please visit <http://shura.shu.ac.uk/8369/> and <http://shura.shu.ac.uk/information.html> for further details about copyright and re-use permissions.