



## I'm a Scientist, Get me out of Here!

### Evaluation Interim Report

#### Student

*I just wanted to say that I am looking forward to next year's I'm a Scientist Get Me Out of Here and I can't wait to chat to even more scientists. I would just like to say congratulations to Stephen, the winner of the Imaging Zone. I would also like to say commiserations to Meeks, another scientist from the Imaging Zone, because she was a very nice scientist and I hope she will take part next year if possible. Thank you for actually creating this site modnic(s) and I hope I will speak to more scientists soon!!!!!!!!!!!! :)*

Kate Pontin

October 2010

## SUMMARY OF FINDINGS

This report summarises the findings of the first year of formal evaluation of *I'm a Scientist, Get me out of Here!* and thus acts as an interim report. *I'm a Scientist* creates opportunities for scientists to answer questions from students via the internet, opening dialogue, while developing skills and understanding of the science process. It also gives students an idea of what it is like to be a scientist and the types of careers available.

Evaluation data was collected from scientists, teachers and pupils via surveys, and interviews. Observations of a number of sessions in school were also undertaken.

### **Data suggested that the IAS programme is very successful, providing a unique approach to the communication of science to students. It shows that:**

- Students gained a lot from the experience. Their feedback shows they thoroughly enjoyed the event, especially the live chat sessions. They developed key skills including focused questioning and gained confidence in scientific discussion. They found it interesting to discover more about what it is like to be a scientist and were surprised that scientists were not as stereotypical as they originally thought.
- Teachers found that IAS supported their need to develop different approaches in the classroom and also to encourage pupils to think about science and who it is actually undertaken by. They found the resources very useful, in particular the debate kit and were also pleased with the support they received from the team during the running of the event.
- Scientists also gained or developed skills in communicating with the public, explaining their work (often complex science) clearly to pupils aged 13 onwards. This in some also helped inspire and revive their enthusiasm for their own studies.

Minor improvements suggested are:

- Helping teachers to prepare pupils especially in their development of clearly focused questions
- Promote and signpost other debate lesson packs like the IVF debate, and to help conclude the event, with perhaps an assessment element.
- Further initial guidance for scientists giving guidance on the time it might take, but also for those less familiar with students of this age some general information on KS3/4 and the diverse knowledge base. Evaluation will in 2011 focus on finding out more about how to attract scientists and about the impact their involvement has on their organisations. Longitudinal studies will look at the impact of students in the longer term (for example in take up of science or exam results). It is also hoped to develop baseline and plenary activities to find out more about change in knowledge and attitude to science.

*I'm a Scientist* enabled students using an innovative approach to inspire and enthuse. It worked with pupils from high achieving classes but also those across the ability range and from a wide range of backgrounds including groups from BME families.

### Key figures for 2010

• Two events – March and June	• 7,459 questions asked
• 125 scientists were involved, in 25 zones	• 94,909 visits to the site
• 6397 students took part	• 648,563 page views

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## 1. Introduction and background

*I'm a Scientist* is an award-winning event, funded by the Wellcome Trust that as the website states:

*Get(s) your students talking to real scientists online!*

It's in the form of an X Factor style competition between scientists, where school students are the judges. It's designed to help teachers deliver the *How Science Works* curriculum and bring real science to life for students and is supported by carefully developed classroom resources. It helps:

- develops discussion and critical thinking skills
- covers key concepts in *How Science Works*
- gets students engaged with science
- provides lesson plans, information sheets, and resources for different ages and ability levels, between years 9 – 13 (see [www.imascientist.org.uk](http://www.imascientist.org.uk))

One student wrote for her school newsletter:

*I'm a scientist is a website aimed at all teenagers – interested in science or not (but believe me, **by the time you finish the project, science will have taken over your brain and made you love it for the rest of your life**). Each pupil is given a login, leading to their individual area which can be personalised with pictures of famous scientists, exploding chemicals and swine flu particles. The login works for a specific zone. In each zone, there are five scientists. The aim of the game is simple – you ask questions (on practically anything – from "do aliens exist?" to "have you ever exploded any of your experiments?") and the scientists reply. Then, at the end of the week, you vote for the one you think has answered your questions the best.*

*So whilst I'm a scientist is fun, challenging and educational, it is a door into the future of science, which, with any luck, we will all be able to walk through one day.*

The first, pilot, *I'm a Scientist* event was run in 2008, funded by a People Award from the Wellcome Trust and proved to be very successful. The project was then awarded a Society Award in 2009 to run the event at a much bigger scale. Previous evaluation reports are available on the website [www.imascientist.org.uk](http://www.imascientist.org.uk).

## 2. Evaluation

This evaluation report is the interim report of a two year evaluation project of *I'm a Scientist*, which started in May 2010. This report reports on the *I'm a Scientist* event in June 2010 and thus does not consider any discussion of longitudinal impact; although evaluation for this has been set up it has yet to conclude. The final report will be due in October 2011.

The project's overall aim (Wellcome Trust bid) states that it will promote *more two-way dialogue between scientist and the public*.

The objectives are:

- To run the event (website, competition and supporting materials) as in the pilot (with changes in response to pilot evaluation) over the years 2010-11
- To run at least 50 "zones", each zone being one self-contained competition of five scientists talking to 20 classes of students. 50 zones equates to 250 scientists, 1000 classes and 20,000 students
- To evaluate the project at the beginning, middle and the end, to see if the desired outcomes have been achieved
- To secure further funding from other sources to allow IAS to continue

**2.1 Evaluation Objectives** were thus developed using the above aim and objectives but also the project desire outcomes which are:

### 2.1.1. Summative Evaluation Objectives:

- The extent met remit to form public engagement
- Was it *Value for money*?
- What worked well and not so well?
- The learning for sector for public engagement with science
- The value to scientists and their organisations

### *Evaluation Objectives for scientists:*

- The extent of change – new skills, confidence, changing views on public engagement, young people, science etc
- How successful was the recruitment of scientists and are there barriers to recruitment?
- The identification of most appropriate ways to attract scientists
- Were scientists' expectations met?
- Was there a different impact depending on type of scientist etc
- Are they more likely to do public engagement activities again?
- What help do they need for 2011?

*Evaluation Objectives for teachers:*

- The extent pupils have changed – attitudes, empowered, more discussion in class, etc
- Is *I'm a Scientist* (IAS) valued by teachers?
- Whether teachers have changed their practice?
- Were they supported enough?
- Is the content in a useful format?
- Are the debate kits useful?
- Are their expectations met?

*Evaluation Objectives for students:*

- Have their attitudes to science changed?
- Do they feel more empowered to make decisions relating to science?
- Are they more confident in asking questions and contributing to discussions?
- What is the biggest impact of IAS?
- Were they inspired by scientists?
- Did some types of classes, etc benefit more?

**2.1.2. Longitudinal Evaluation Objectives:**

- Did students gain any long-term impacts of IAS eg attitudes to science, confidence, taking science further in studies etc?
- The extent to which scientists had been changed through participating in IAS, e.g. new skills, confidence, attitude to engagement or young people, etc
- The different amount of change within scientists
- What are the new skills developed by teachers?
- Were teachers inspired to use new approaches in the classroom teaching?

## 3. Methodology

### 3.1. Approach taken for summative evaluation:

- Survey for scientists, teachers and pupils
- Improve personal profile as an evaluation approach with students (not done in 2010)
- Improve science words pupil activity to get a before and after picture (not done in 2010)
- Case studies
  - The Matthew Arnold Secondary School (Spelthorne, Surrey) Year 10 – a preparation lesson and a chat room lesson
  - West Thames College (Isleworth, Middlesex) – Year 12 – a preparation lesson, a chat room lesson and a plenary session
  - John Hampden Grammar, High Wycombe, Bucks – Boys Grammar Year 10 – A chat room lesson
  - The Warwick School, Redhill Surrey – Year 10 – 2 classes having a chat room lesson
  - Sacred Heart School, Hammersmith – Year 10 – double lesson – use of website with questions via email
- Observe sessions in school. It was hoped to have gone further in geographical terms but logistically this was not possible. However the schools visited do offer a sample that covers range of ability, mixed and single sex school, cultural background and class.
- Use personal meaning mapping with students (basic form using mind mapping as an approach to gathering data using one key question or phrase to solicit answer from pupils – see appendix one for approach used here)
- Interview teachers in schools
- Interview teachers by phone
- Interview / focus group with scientists

### 3.2. Approach taken for longitudinal approach

The approach taken for longitudinal objectives was:

- Develop links with schools who have used IAS several times and possibly visit 2 schools in June 2010 that have undertaken IAS before to get feedback from teachers
- Interview scientists and stakeholders
- Sort out idea for longer impact on students – possible consultation with school who is willing to check record for uptake of science exam courses

## 4. Quantitative Results

### 4.1. Survey

The general survey, used for all I'm a Scientist events since the pilot (for teachers, scientists and students) was run by Gallomanor using a spreadsheet system. The summary of data is available from Gallomanor. **Further use will be made of the data for longitudinal studies in the final report.**

### 4.2. Statistical data from web use

Factor	Count
Number of teachers involved	137 (with some working with a number of classes)
Number of classes	362 classes registered to take part 146 schools registered but 37 did not turn up and some registered more classes than actually participated
Number of students	6397 students
No of live chats	230 live chats varying from 4 in the Magnesium zone to 24 in the Cancer zone
No of responses from scientists	In June 19,659 answers to 6,580 questions, some scientists who survived early vote offs giving approximately 400 answers
Differentiation of numbers of questions per zone?	Varies: Sodium for example 148 questions Cancer – 789

## 5. Case Studies

### 5.1. Matthew Arnold Secondary School, Ashford

**Profile:** Mixed State Secondary

Year 10 Top set taking 3 science GCSE modular course with some students planning to continue at A level

Zone: Imaging

**Session One at Matthew Arnold:** Preparation for online chat

- *Included Consequences* activity – drawing scientist
- Worked as groups researching one of the Scientist, sharing their findings at the end
- Most common observed behaviours:
  - Looked interested and motivated
  - Focused and confident
  - Interacting on task
  - Some chatting with others – some on task – others off task – got bored of looking at profiles

**Session Two at Matthew Arnold:** Chat session with stimulus from the teacher:

- *"Who is worth your vote"*
- *"Think of questions – remember we thought about some last week"*

**Feedback from students**

- *– annoying to see to different pages (all mixed up)*
- *Pleased to get response to question*
- *Learning from scientist is fun*
- *Frustrating waiting for an answer*
- *Stimulated thinking*
- *Enjoyable*
- *I enjoyed it but I don't think I learnt anything though*

**Learning (using Generic Learning Outcomes as defined by [www.InspiringLearningforAll.gov.uk](http://www.InspiringLearningforAll.gov.uk))**

<b>Learning factor</b>	<b>Evidence</b>
Enjoyment and inspiration	Observation showed enjoyment, excited students full of energy
Skills development	Questioning skills used – developing ideas on what to ask
Knowledge	Science – broad concepts
Attitude change	To scientists – pleased to talk to them, find out about what they do, what their favourite jokes are etc. Really built personal relationship with those on the chat zone and those who were good at responding got the vote!
Future intentions	To look on site again Vote again Asking for another chat session

## 5.2. Case Study 2: West Thames College

**Profile:** All members of the Applied Science Course (EdExel A2 biology - lower VI). All are from BME groups. 15 students

Zone: Evolution

**First Session at West Thames College:** Preparation

Aims:

- To get to know the scientists and realise they are normal
- Brainstorm questions
- Decide what it is you want to know
- Start to think about which scientist you like best

The teacher used material from the website to introduce topic with a short power point.

The session was a preparation lesson for the live chat in their next class and looked at what they might want to find out. They spent time working in small groups, brainstorming appropriate questions.

Questions included:

- Does Science have a soul?
- How do we know how old the earth is?
- How old are you?
- Do you have time to go out?

The teacher tried to make sure they focused on who they were asking the questions to and why.

Their feedback commented on the fact that they were disappointed to find no BME scientists in their zone.

**Second Session at West Thames College:** Live Chat (Two scientists available on-line)

Early on students said "*I'm nervous*", and "*I don't know what to ask*," and so they were a little slow to get going. A focused silence descends, quite unusual the teacher states, as they use their questions from last week. They are sometimes frustrated by the slowness in response but do understand the reasons. The teacher helps them understand some of the terms used by scientists etc. She is impressed with their questions.

Observed activity: focused, confident once got going, interacting on task, expressing information when get answers, asking questions, pleased with success

**Third Session at West Thames College: Plenary**

The teacher used a number of questions to ask about what they thought of it and what they had learnt:

*Teacher Question: **What made you vote for your scientist?***

Responses from pupils

- *She was popular with more friends – not boring*
- *She is smiling in her profile picture*
- *She answered the questions properly*
- *I liked Maria – she answered silly questions happily*
- *I didn't want Kerry to win*

*Teacher Question: **What did you think originally it would be like (IAS)***

Responses from Pupils

- *Boring – show us scientist in lab coats doing their work!*

*Teacher Question: **Was it worthwhile***

Responses from Pupils

- *Yes*
- *Told me to ask noble questions*
- *Got the right answers*
- *Got explanations*
- *I had more questions*
- *They told me terms I didn't understand – so I had more questions*
- *A bit advance – some of it*
- *I liked asking questions*
- *They answered my questions*
- *I learnt how to deal with some science situations*
- *We talked about brain size, intelligence and men and women*

## Learning

Learning factor	Evidence
Enjoyment and inspiration	<p>Enjoyed, excited,</p> <ul style="list-style-type: none"> <li>• <i>I thought it would be boring – but it was good</i></li> <li>• <i>Can we do this again</i></li> <li>• <i>It isn't boring – a nice thing</i></li> </ul>
Skills development	<p>Questioning – developing a more focused approach to suit aims</p> <p>Focusing enquiring minds</p>
Knowledge	<p>About science – eg earth history, fossils etc but also about how science and religion fit together.</p> <p>Also learnt about the scientists themselves</p> <ul style="list-style-type: none"> <li>• <i>Evolution</i></li> <li>• <i>New ideas about animals</i></li> <li>• <i>Relationship between humans and animals</i></li> <li>• <i>Haematology (teacher asks what is that! – corrected Palaeontology – really old fossils they say when asked what this is)</i></li> <li>• <i>300 billion year old embryos</i></li> </ul>
Attitude change	<p>Gave them a better idea on what scientists are really like</p> <p><i>Has I'm a Scientist changed your ideas?</i></p> <ul style="list-style-type: none"> <li>• <i>They are clever</i></li> <li>• <i>Not that boring</i></li> <li>• <i>Can now be interesting</i></li> <li>• <i>Their social lives – they doing have any</i></li> <li>• <i>Some are boring</i></li> <li>• <i>Some like hanging around</i></li> <li>• <i>She supported Arsenal</i></li> </ul>
Future intentions	<p>Would like to do again in March</p> <p>Some are keen to carry on with science and will be filling in UCAS forms in the Autumn.</p> <p>What they want to do in the future – do you want to do</p>

	<p>science they were asked:</p> <ul style="list-style-type: none"><li>• <i>Biology is a girls science – I like physics</i></li><li>• <i>Physiotherapy</i></li><li>• <i>A famous scientist</i></li><li>• <i>Astronomy</i></li><li>• <i>No a teacher</i></li><li>• <i>No</i></li><li>• <i>Yes</i></li><li>• <i>I don't want to be a scientist – they are old and bald! I want to be a teacher</i></li></ul>
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### 5.3. Case Study 3: Sacred Heart, Hammersmith, Catholic Aided State School

**Profile:** Year 10 Girls – 3 (modular) science GCSEs and have just done some exams so a good breather before moving on. Some are really keen to study science already and are booked into summer schools.

Zone: Drugs Development

**Session at Sacred Heart:** Using web (IAS) to study profiles etc on the drug site – and thinking of questions to submit on the website.

*Observations* showed key behaviours: happy and interested, involved, and motivated, confident, on task, asking questions, discussion, and science focused work. There was some off task discussion amongst the girls particularly when they realised they could get into the chat room despite not having booked a session. They were excited by the interaction this provided compared with asking questions via the website.

#### **Feedback from pupils on improvements**

- *A discussion space to talk to other students about the topics would be good*
- *A double lesson is a bit long for one zone – you can only vote in one zone.*
- *Different types of resources*
- *More on how they became scientists*
- *Discussion space – for scientists to debate*
- *Warnings before being blocked*
- *Moderator in a different colour*
- *Small print*
- *Lost thread of question and answer on the mixed up texts*
- *The chat is much better than just asking questions*
- *Other types of scientists – eg doctors, vets etc – what else can you do with a science degree*
- *Ask questions in other zones too*

#### **Learning**

<b>Learning Factor</b>	<b>Evidence</b>
Enjoyment and inspiration	Enjoyed, excited A buzz of excitement when found they could go on chat – although for a time the questions ceased to be so scientific. Focused for a long time Frustration when question not answered quickly! <i>Horrid jokes made it more fun</i> <i>Chat is fun – didn't know why I was blocked</i>

	<p><i>Scientist are quite normal – quite fun</i></p> <p><i>Lots of different categories and topics</i></p> <p><i>I thought it was good – a really good idea</i></p>
Skills development	<p>Questioning – closed and open questions</p> <p>Thinking about questions</p> <p>Really interacted with the scientists</p> <ul style="list-style-type: none"> <li>• <i>Made me think</i></li> <li>• <i>Sometimes difficult to think what I want to know</i></li> </ul>
Knowledge	<p>Had some really good questions for the panel:</p> <p><i>learning some useful facts</i></p> <p><i>I like to know more about how they get there – to being a scientist</i></p> <p><i>Different types of research</i></p> <p><i>Different scientific approaches for different topics</i></p> <p><i>Interesting to find out about their work - linking science to real life</i></p>
Attitude change	<p>To science and to scientists – greater interest</p>
Future intentions	<p>To look on site again – at home</p> <p>Vote again</p> <p><i>It made me more likely to be a scientist</i></p> <p><i>I would go on again to look up more – once we start our drugs project</i></p> <p><i>Will vote for Duncan as he has a good idea of what to do with the money if he wins</i></p>

#### 5.4. Case Study 4: Warwick School, Redhill, Surrey

**Profile:** Mixed Secondary State School. Mixed ability group, with most doing triple science but with a few doing OCR Redeveloped Science GCSE Science. Other class (observed briefly) is nearly all OCR programme next year.

Zone: Beryllium

**Session at Warwick School:** Live chat session (2<sup>nd</sup>) – they have already done some preparation using the resources. The Newly Qualified Teacher has been working with one group and has worked really hard at it. She got an *outstanding* for her session on IVF from her Assessor. It has been embedded in their OCR studies on Health and Safety.

#### Feedback from pupils on improvements

- *There are no girls in the zone (received cards for another zone with women in so they could access this one too)*
- *Two sessions is enough*
- *Challenge for the scientist would be good – timed questions perhaps too*
- *Its frustrating waiting for an answer. There are too many people in the chat room*
- *Improve design – rearrange a box for each scientist*

#### Feedback from technician who organised sessions

*I asked the teachers who were largely responsible for delivering the programme for their thoughts on your questions with the following results which I hope will help. For myself, I think another time that we could get more out of it by being a little better prepared - now we know how it works it would be easier to deliver + it would be nice to involve more staff and more classes but it was at a busy time of year. I think it is a valuable programme for students to join in because it helps them understand the range of scientific careers and interests out there. Our year 9s would already have made their choices about which science course to follow next year though. It may be good to aim it at slightly younger students – year 7s and 8s – to inspire them to learn more about science but then scientists would have to aim their responses accordingly. I could also see it working well with able sixth form groups.*

#### Learning

Learning	Evidence
Enjoyment and inspiration	<p>Enjoyed, excited</p> <p><i>Yes I'm enjoying it – just waiting for an answer</i></p> <p><i>We're voting for Ian – he blew up his house!</i></p> <p><i>I like it when you get an answer</i></p> <p><i>Ian is the best</i></p>

	<p><i>Really good</i></p> <p><i>Talk to scientists – is good – interesting to find out what they do – and how it is funded – you don't normally get a chance to do this</i></p> <p><i>Not learning anything really! Good though</i></p> <p><i>Better than our other lessons normally are!</i></p>
Skills development	Questioning
knowledge	<p>Science</p> <p><i>We have learnt loads about science and things – lots of answers</i></p> <p><i>When they answer the question you learn things – that's why I'm voting for Derek</i></p> <p><i>You find out what scientists do all the different things – I'm doing triple science</i></p> <p><i>Some idea of what you can do – I'm doing triple too</i></p> <p><i>Find out what they would do with the money</i></p> <p><i>Not learning anything really! Good though</i></p>
Attitude change	<p>To science</p> <p>To scientists</p> <p><i>I thought all scientist were in the lab mixing chemicals</i></p> <p><i>Interesting to see they (scientist) are all different</i></p>
Future intentions	<p>To look on site again</p> <p>Vote again</p> <p>Asking for another chat session</p> <p><i>It's good – I've just run out of questions I like Science – probably biology best – I might do it later</i></p>

## 5.5. Case Study 5: John Hampden Grammar, High Wycombe, Bucks

**Profile:** Boys Grammar, Year 10

Zone: Brain

### **Session at John Hampden Grammar: Live chat**

The boys were slow to settle – all are doing 3 sciences expect a few language specialists. They are noisy and have short attention span they have been on the live chat before so this is the second session. Preparation work included research on the brain (their chat zone). There doesn't seem to be any evidence of question preparation – they may well have used all prepared questions in first chat. Also had a preparation lesson with research into the brain and sorting of criteria. A small group did the IVF debate and really enjoyed it.

Only one scientist on the chat and so a long queue of questions and frustration waiting for answers. Otherwise they enjoyed themselves.

### **Lesson Plenary**

At the end of the lesson they finished off by referring back to the criteria before voting. They were then asked in groups to say what they had learnt – there was a lot of feedback about the brain and then what had surprised them.

### **Feedback from pupils on learning**

- Liked Joanne
- The weight of a brain
- Left handedness
- Living with only half a brain
- Folds and grooves –
- Science is fun
- Babies brain grows
- Left handed people are not always smart
- Human brain compared to animal brains

They were surprised by:

- Forget dreams as the brain is relaxed when asleep
- Brain is a filing system like a computer
- Nut sized brain in a pigeon
- You can live with only half a brain
- Computer chip can be implanted in the brain
- Link fluid intelligence and frontal lobe

### **Feedback from teacher interview after class**

- Keen to do more of this sort of thing – fits well now – between exams and next module

- I didn't realise that you could ask anything – about scientists etc – we have focused on a study of the brain – not sure what we are supposed to do
- Interactive quizzes not available this year
- More guidance on thinking about scientist - in the information – found the activity description confusing
- More resources on how to think about the theme –and plan lessons around them
- Too many pupils at KS3 as classes bigger
- Perhaps with G&T next time

**Learning**

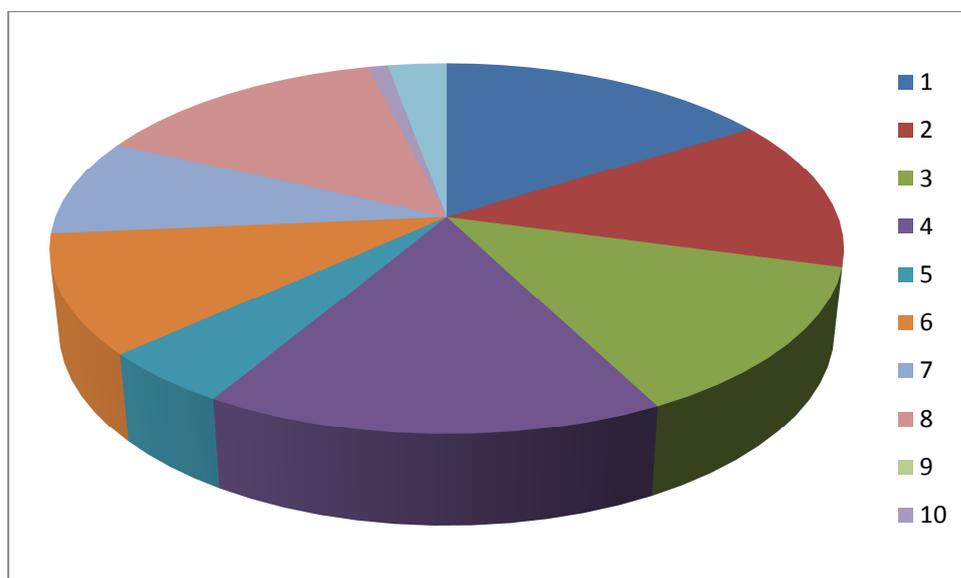
Learning	Evidence
Enjoyment and inspiration	<p>Enjoyed, excited</p> <p><i>It is all right – better than looking through a text book</i></p> <p><i>Yes I like it – ICT is my favourite subject so I enjoy this</i></p> <p><i>She replied to my questions about seeing</i></p> <p><i>Pretty good</i></p> <p><i>It is good</i></p> <p><i>Sort of – frustration of not getting an answer yet</i></p> <p><i>Definitely enjoyed</i></p> <p><i>Enjoyed voting =- didn't know you could vote</i></p>
Skills development	Questioning
knowledge	<ul style="list-style-type: none"> <li>• Left handed people are not always smart</li> <li>• Human brain compared to animal brains</li> <li>• The weight of a brain</li> <li>• Left handedness</li> <li>• Living with only half a brain</li> <li>• Folds and grooves –</li> <li>• Forget dreams as the brain is relaxed when asleep</li> <li>• Brain is a filing system like a computer</li> <li>• Nut sized brain in a pigeon</li> </ul>

	<ul style="list-style-type: none"> <li>• You can live with only half a brain</li> <li>• Computer chip can be implanted in the brain</li> <li>• Link fluid intelligence ad frontal lobe</li> <li>• <i>More in-depth answers on the forum as would like to know more and can't find any more on the web</i></li> <li>• <i>I'm interested in consciousness and I want to know more</i></li> <li>• <i>It is good to talk to scientist and their own opinions on things – better than just looking at a text book</i></li> <li>• <i>Good to ask questions to a scientist and get simple answer – books can be long and confusing</i></li> </ul>
<p>Attitude change</p>	<p>To science</p> <p>To scientists</p> <p><i>You see scientists in a good way</i></p> <p><i>Good to be able to ask any question you want about science</i></p> <p><i>It is good to talk to scientist and their own opinions on things – better than just looking at a text book</i></p> <p><i>Good to ask questions to a scientist and get simple answer – books can be long and confusing</i></p>
<p>Future intentions</p>	<p>To look on site again</p> <p>Vote again</p> <p>Asking for another chat session</p> <p><i>Joanne has asked if she can come down</i></p>

### 5.6. Summary of Observations from case studies

18 formalised observations were undertaken (using form to collect data – see appendix 1) at each case study. These were undertaken in all observed sessions at the beginning, middle and end. It is clear in the summary chart below that on task, interested and focused activity was high.

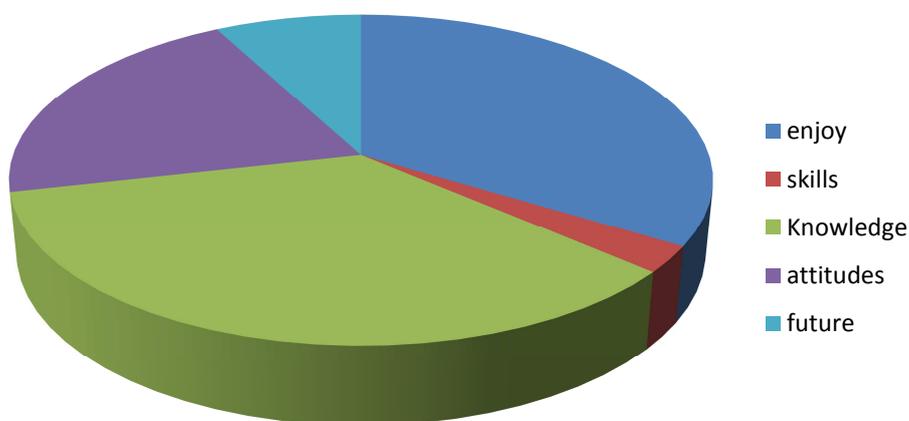
Key Behaviour	Frequency
<b>1 Interested</b>	<b>17</b>
<b>2 Involved/focused/motivated</b>	<b>14</b>
<b>3 Confident in activity</b>	<b>14</b>
<b>4 Interacting on task</b>	<b>17</b>
5 Interacting off task	5
6 Asks questions	11
7 Express information (Show)	9
<b>8 Discusses</b>	<b>15</b>
9 Problem solving	0
<b>10 Teamwork</b>	<b>1</b>
11 Pleased with success	3



### 5.7. Summary of pupil feedback from Personal Meaning Mapping

A Personal Meaning Mapping exercise was undertaken with small groups of pupils (approx 4-6 students in each group) from each case study where they were asked to respond to the question "what have you got out of IAS". Two plenary session feedbacks are also included within this analysis.

Learning	Detail	Frequency of responses Related to factor
Enjoyment and inspiration	Enjoyment, fun	26
Skills development	Rarely mentioned by students themselves but their questioning skills were definitely improved by IAS as seen in observations	2
Knowledge	The two plenary sessions placed greater emphasis on knowledge than the personal meaning mapping and so there is a count of 12 from them  Largely scientific knowledge but also knowledge about scientists and what they do, who they are.	27
Attitude change	Comments largely change in attitude to scientists  Feedback from a plenary session add 4 to this field with discussion of what they now think of scientists	16
Future intentions	Wanting to do chat again, looking at it in future when doing relevant topic or thinking about doing science etc	6



## 6. Feedback from teachers

Interviews were also held (in person, via email or phone) with all teachers involved in the case studies. All those teachers using IAS in June 2010 but who had previously been involved were also emailed for more longitudinal information. This is provided in appendix 2.

It is clear that the teachers found *I'm a Scientist* an exciting approach for teaching. They realised their aims and found that pupils were engaged and found out more about the real world of being a scientist. Comments raised a small number of minor issues. It was felt that the live chat page could be organised more effectively and those sessions with more scientists available worked better. Further longitudinal evaluation will be undertaken next year

A full summary of feedback from the case study teachers and surveys is given below.

<p><b>Q1 What do you feel the students got out of doing <i>I'm a Scientist</i>?</b></p>	<p>My students enjoyed finding out about 'real-life' scientists and the type of jobs out there. Yr 7 particularly loved the live chats and they were engaged and excited by the whole thing. Yr 9 really got into the debate and mainly loved the 1st chat and having the power to vote. (novelty wore off for some after one chat) Their ability to formulate interesting and appropriate questions improved over the sessions.</p> <p><b>It puts their studies into context. For those set on a career in science, it shows the variety of things they could get involved in. For those who won't carry on with science, it makes scientists seem real and does something to counteract the rather negative stereotypes they see in so much TV fiction.</b></p> <p>Their interest grew and they began discussing the event outside of lessons and even on facebook! They saw the job of a scientist as a lifestyle choice, I think, something you are rather than something you do so hopefully they know that scientists are just normal(ish) people!</p> <p>All students engaged to some extent, all asked questions ...</p> <p>Some students engaged more than others, though they were all interested in the researchers – the questions about using animals for research provoked a lot of discussion</p>
<p><b>Q2 Did the package fulfil your</b></p>	<p>Yep!</p>

<p><b>aims?</b></p>	<p><b>Yes - and it was fun for the students</b></p> <p>I wanted something to inspire them whilst filling a little time, this was perfect. It was enjoyable, didn't seem like work and was at a perfect time of year.</p> <p>Exceeded expectations especially the live chat which worked very well</p> <p>I wanted something to engage the pupils following exams that made them think about science in a different way. They were very engaged once they got going although to start some of the more able were a little sceptical.</p> <p>The pupils did not respond as well as I had hoped, though that was in part due to lessons being given over to other things... they did enjoy the chatting though some still didn't seem to understand what the roles of the scientist were.</p>
<p><b>Q3 Were there any issues?</b></p>	<p>All boy group. First chat no scientists came. Both these issues were resolved quickly (new access codes for girl group and chats rearranged successfully and with apologies!)</p> <p>Students suggested redesigning the chat format, perhaps with a dialogue box for each scientist to make it easier to follow.</p> <p>It's a shame there isn't a prize for the most involved student from each school, some of mine were incredibly keen and it would be nice for their efforts to be recognised by <i>I'm a Scientist</i> rather than solely by the class teacher.</p> <p><b>It would be nice to let students pick the zone that most interests them - but the whole class has to enrol to the same zone.</b></p> <p>No. All the questions I had were answered quickly and I felt well supported by the team and the resources they sent out.</p>
<p><b>Q4 Did you get anything out of doing the sessions – e.g. with regard your own teaching approach or professional practice?</b></p>	<p>Identified the need for a focus on science careers, since the students had a surprisingly limited idea of jobs available and indeed any current famous scientists!</p> <p><b>The chat sessions showed how much students could collaborate on at once - I definitely need to give them more opportunities to work collaborate in future.</b></p> <p>New ideas and approaches.</p>

## 7. Feedback from Scientists

Feedback from a small sample of scientists was gained through a telephone/email interview. It was attempted to run a focus group in London for London based scientists but positive responses to the invitation were not enough to make it possible.

As can be seen in the full summary below most feedback from scientists provided very positive feedback and would be very happy to do it again. Most already undertake a number of public communication activities, but a few found this a new learning experience and have now committed to further activity. They found IAS an opportunity to develop communication skills especially those required to talk to non-specialists. The major issue scientists found was dealing with the huge quantity of questions which ranged across all science topics and on being a scientist. **Finding ways of reducing the quantity of questions for scientists is important for future events and providing full initial briefs.**

Further evaluation will be undertaken with scientists next year, including finding out more about how they found out about the event.

Question	Responses
<p><b>Q1 How did you fine the experience of being part of <i>I'm a Scientist</i>? Did it meet your expectations?</b></p>	<p><i>I'm a Scientist</i> was such a surprise. I had no idea how many intelligent questions I was going to get asked and seriously was glad to have the internet for reference a lot of the time.</p> <p>I enjoyed most of it.</p> <p>Mostly yes, though the interaction between scientists, and between scientists and teachers, was too limited for my taste.</p> <p>I really enjoyed it! When I found out that I had won I was so happy! I was really grateful that the students had voted for me as I had worked really hard to answer all my questions as clearly and as accurately as possible. It did meet my expectations, the questions I was asked were very sophisticated and really got me thinking.</p> <p>I thoroughly enjoyed the experience. I thought some of the questions were very intelligent and insightful and I wouldn't have ever thought to ask them myself! I really enjoyed chatting with the students. The whole experience exceeded my expectations- it was good fun answering some of those questions.</p> <p>The experience was good, answering the questions was challenging but enjoyable, I got the impression the students were engaging with the science and this was my hope.</p> <p>It was busier and more time consuming then I predicted. The questions were more varied and personal (ie. religion) than expected. Overall it was an interesting experience.</p> <p>Interesting, but i was really in the wrong zone.</p>

	<p>I enjoyed it, although I didn't have time to participate in all the chat sessions. Got the opportunity to interact with kids all over the UK, and answered a variety of questions about all sorts of subjects.</p> <p>The experience was enjoyable, I did expect more questions relevant to the fields of science but was still a good way to communicate with the public</p> <p>Didn't meet my expectations – I didn't get as much out of it as I originally thought.</p>
<p><b>Q2 Were there any issues?</b></p>	<p>My main issue was that a lot of the questions were not brain related and when the answers from others came up we had obviously all used the same Wikipedia descriptions of things. I think it would be better to allow students to choose only one scientist to ask a question, that way it would reduce the number of questions we all got and make it quicker for us to answer them. I had loads of questions and it took a lot of time to go through them, especially the non-neuroscience ones as I really had to look up those answers. As questions are moderated before they are put onto the site maybe they could be redirected to a different zone more relevant to the questions.</p> <p>Also, in the chat rooms, the questions came so fast it was hard to keep up. I know it would be harder to moderate but maybe one scientist could be in a chat with a section of the class for a specific length of time then swap. I know the chats definitely had an influence on the voting so splitting them into groups may mess that up. I think the chats are great as you can see how much the kids enjoyed them from the enthusiasm in the questions but it was hard to monitor and answer all the questions coming through.</p> <p>Yes. Some of a technical nature (e.g. the lack of site search or tagging functionality) but also room for improvement in other aspects</p> <p>No - although the online chats were pretty intense!</p> <p>The only issue I had was with the sheer volume of questions- there were too many to answer well at times and many weren't at all related to evolution but I still enjoyed attempting them.</p> <p>No</p> <p>I don't think the kids learnt as much as they could have in a face-face session as chats were very unstructured - perhaps a poor use of valuable curriculum time</p> <p>You are doing a good job for the hard sciences but it would be good to include social scientists too.</p> <p>Not really - logged on for a couple of chat sessions and the schools didn't turn up</p> <p>The sheer volume of questions</p>

	<p>I was disappointed with the level of questions that came in at first. These did get better as the students settled down. They were however more random than I thought they would be – and a dialogue between students and scientist did not really develop. There were too many questions – and some inane. I don't think scientists got a lot of briefing – I did look on the site but couldn't find very much – the standard of student seemed lower than I expected. I was glad when I was voted off!</p> <p>It would be good to be able to keep track of the conversation better on the web page – it was difficult to track them – conversation worked across each other. Perhaps one scientist at a time would be helpful.</p>
<p><b>Q3 What made you decide to participate</b></p>	<p>I think I got an email from Physics Soc or somewhere telling us about it so I just sent an email. I did a lot of school talks when I was in the UK on being a scientist and using animals in research and was always amazed how little students knew about real science and the stereotypes they had of scientists. Nowadays, there are so many cool jobs in science I never really heard about when I was young and I think we need to try and change that to encourage the best students into science careers.</p> <p><b>That it was interactive, online and in public.</b></p> <p>I decided to enter the competition because I was looking for a way to improve my science communication skills and also attempt something completely different. Before the competition, I had no idea whether I was particularly good (or bad) at communicating science to young adults and I thought it would be a good way to find out!</p> <p>I wanted to participate in <i>I'm a Scientist</i> to get more outreach experience and I feel as though this was a great opportunity to do that.</p> <p>I am interested in developing educational interactions between university science and schools, both to improve the uptake of science as a career option by students but also to improve engagement of my research with society in general.</p> <p><b>I enjoy interacting with school children and think outreach is very important.</b></p> <p>I was curious as to what questions teenagers would ask about happiness and development (original zone I was to be in)</p> <p>Opportunity to interact with so many kids in a short space of time, fulfilled requirement of my Fellowship to undertake public engagement work</p> <p>Interesting way of easily getting people interested in science</p>

<p><b>Q4 Has it helped you develop any new skills?</b></p>	<p>I think it is always good to practice talking about science to non-specialists. The best talks I ever see, even at conferences, are those pitched at a non-specialist level. You can still get the key points across without burying people with the small details. The kids actually think of things I don't and it made me look at the science I do in a new perspective.</p> <p>Not really, but it was certainly a good training of existing ones</p> <p>Yes, I think I progressed by answering the questions quite formally to answering them in a more communicative way</p> <p>I think the event helped me to better understand what younger learners want to know about scientists and the nature of science in general. I would love the opportunity to participate more in events like this. It also helped me to engage with pupils in a more personal way.</p> <p>Not really, although it was a challenge to express scientific concepts and facts in lay terms.</p> <p>I think I have gained more from previous face - to - face outreach programs but learned how to guide conversations</p> <p>No</p> <p>I can type a lot faster than I used to!</p> <p>Yes how to explain difficult ideas in a simple non technical language</p> <p>No</p>
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<p><b>Q5 Has I'm a Scientist encouraged you to undertake further activity to communicate science to the public?</b></p>	<p>Yes, I think it is the only way we can keep the best people in science.</p> <p>Actually, it has taken time away from that, but there was room for blending both.</p> <p>Yes! I'm taking part the Glasgow Science Centre - Meet the Experts event.</p> <p>I'm going to be giving a school talk as a result of IAS and I plan to use the £500 to design a small publication to communicate the research my lab group and I do in Bristol. On the back of IAS I would certainly consider doing more outreach too.</p> <p>Yes.</p> <p>I don't think it has changed my attitude (neither encouraged/discouraged) to participating in outreach activities</p> <p>Unusually I've always considered this important and have done extra mural classes, talks to gen public, and professor orgs + broadcasts, blogs, videos.</p> <p>Not really, I already undertake quite a bit of public engagement work</p> <p>Yes I would like to continue to help the public understand science so they can make more informed decisions on what they read and see on the news</p> <p>No</p>
<p><b>Q6 Would you do it again? Would you recommend colleagues participated?</b></p>	<p>Yeah, it was fun.</p> <p>Yes &amp; yes.</p> <p>Yes to both questions.</p> <p>I would happily take part in IAS again and I have already recommended it to colleagues</p> <p>Yes and Yes</p> <p>No it took it too much of my time and I don't think the students got as much out of it as they would a school visit or personal contact.</p> <p>Yes but I'd be more careful about zone. Yes</p> <p>I probably wouldn't do it again myself, but have recommended taking part to my post doctorate and PhD students</p> <p>I would participate again and I would encourage others to take part</p> <p>I wouldn't do it again</p>

## 8. Discussion

Initially it will be useful to consider the results in terms of the evaluation objectives as described in the introduction.

### 8.1. General Evaluation Objectives

**These were largely met with IAS providing the opportunity for a large number of pupils to engage with scientists and research. This resulted in value for money and increased understanding within the public about science. Scientists developed communications skills and sometime rekindled enthusiasm.**

Objective	
Extent met remit to form public engagement	See discussion below 5.5
Value for money	See discussion below 5.5
What worked well and not so well	<p><b><i>I'm a Scientist largely worked very well. However, the issues</i></b> that arose from feedback included the following key aspects:</p> <ul style="list-style-type: none"> <li>• Improved briefing for scientists so they know what to expect from pupils as some, especially those who had not worked with this age group previously, found their expectations did not match reality</li> <li>• Better format on the chat so conversation thread can be followed</li> <li>• Opportunity for scientists to pass on general questions if they wish</li> <li>• Follow up activity for pupils to assess their learning</li> </ul>
Learning for sector for public engagement with science	See discussion below 5.5
Value to scientists and their organisations	Younger and less experienced communicators gained in their ability to communicate science with the lay person and in particular young people. In thinking about how to explain what they do and more widely about science topics some also found that it inspired them about their own research. It also made many think

	<p>about things they hadn't considered before. Most really enjoyed the experience and would be willing to do it again despite the commitment in time required.</p> <p>Organisations will clearly benefit from more inspired and enthused scientists and the impact on students will hopefully create not only a more informed group of young people but also offer inspiration to continue their interest in science. This element will be explored further next year.</p>
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### 8.2. Evaluation Objectives: Scientists

- 66% of those responding to the survey said that they had changed the language they used or the way they were communicating during the event
- Scientists heard of the programme from a wide range of sources
- There is currently a good range of scientists applying. Widening this further would provide a wider range of role models, as would actively encouraging BME scientists to join in.
- 88% of scientists responding to the survey said they would recommend it to a colleague and
- 78% would be happy to participate again
- Scientist expectations were largely met. Statistically 90.6% of scientist said these were met. In fact many suggested that these had been exceeded

<b>Evaluation Objective</b>	<b>Evidence summary</b>
<p><b>The extent of change – new skills, confidence changing views on public engagement, young people science etc</b></p>	<p><b>66% of those responding to the survey said that they were aware they had changed the language they used or the way they were communicating during the event. [bear in mind, some may also have changed their use of language without being aware of it! - ed]</b></p> <p>The survey provided a full range of responses from scientists on what they felt they had gained.</p>

	<p><b>Scientists felt that they had:</b></p> <ul style="list-style-type: none"><li>• <b>Developed ability to explain their research and science to non-scientists</b></li><li>• <b>Found out about science outside their field</b></li><li>• <b>Found out about young people and what they think about science</b></li><li>• <b>Reminded them why they did science – rekindling their enthusiasm!</b></li><li>• <b>Made them think about things differently, or consider a new angle</b></li></ul> <p><b>Scientists commented:</b></p> <p><i>I think it is always good to practice talking about science to non-specialists. The kids actually think of things I don't and it made me look at the science I do in a new perspective.</i></p> <p><i>(I)t was certainly a good training of existing ones</i></p> <p><i>Yes, I think I progressed by answering the questions quite formally to answering them in a more communicative way</i></p> <p><i>I think the event helped me to better understand what younger learners want to know about scientists and the nature of science in general. I would love the opportunity to participate more in events like this. It also helped me to engage with pupils in a more personal way.</i></p> <p><i>I also learnt how to express answers to commonly asked questions in a more succinct way, such as 'why do you like science'. In forming those answers I also reminded myself why I liked science, and what I think about my job. My day to day self moans a lot about my job, but in IAS I seemed to have large reserves of positivity about doing a PhD!</i></p> <p><i>Not really, although it was a challenge to</i></p>
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	<p><i>express scientific concepts and facts in lay terms.</i></p> <p><i>I think I have gained more from previous face - to - face outreach programs but learned how to guide conversations (here)</i></p> <p><i>I can type a lot faster than I used to!</i></p> <p><i>Yes how to explain difficult ideas in a simple non technical language</i></p> <p><i>A better understanding of how important ethical issues are to the students - they really have thought a lot more about such things than I have - consequently i have now thought about them and now know my own ethical opinions!! It shows that scientists need to communicate the ethical implications of their work better</i></p>
<p><b>How successful the recruitment of scientist was and barriers to recruitment?</b></p>	<p><b>Scientists heard of the programme from a wide range of sources</b> including:</p> <ul style="list-style-type: none"> <li>• Twitter</li> <li>• Via Wellcome Trust</li> <li>• Colleagues</li> <li>• Education literature</li> <li>• From their institutions or learned societies</li> </ul> <p>The numbers of scientists wishing to be involved was more than could be taken on and thus recruitment is not an issue. <b>There is currently a good range of scientists applying. Widening this further would provide a wider range of role models, as would encouraging BME scientists to join in.</b> One scientist who did not get invited to join in would have liked to have known a little more about how scientists are chosen.</p> <p>Barriers to joining in largely focused on time</p> <p><b>88% of scientists responding to the survey said they would recommend it to a colleague and</b></p> <p><b>78% would be happy to participate again.</b></p>

<p><b>Identification of most appropriate ways to attract</b></p>	<p><b>39% email from someone in the University or Research Institute they work at</b></p> <p><b>13% word of mouth</b></p> <p><b>10% Twitter</b></p> <p>Word of mouth as always one of the most successful and thus the positive feedback that scientists would recommend to others is good. Interviews highlighted other ways including:</p> <ul style="list-style-type: none"> <li>• Twitter via Sophia</li> <li>• Wellcome trust</li> <li>• Other scientists</li> <li>• Part of previous session/pilot project</li> </ul>
<p><b>Scientists expectations met</b></p>	<p><b>Scientist expectations were largely met. Statistically 90.6% of scientist said these were met. In fact many suggested that these had been exceeded</b></p> <p><i>I'm a Scientist was such a surprise. I had no idea how many intelligent questions I was going to get asked</i></p> <p><i>I really enjoyed it! When I found out that I had won I was so happy!. It did meet my expectations, the questions I was asked were very sophisticated and really got me thinking.</i></p> <p><i>I thoroughly enjoyed the experience. I thought some of the questions were very intelligent and insightful and I wouldn't have ever thought to ask them myself! I really enjoyed chatting with the students. The whole experience exceeded my expectations- it was good fun answering some of those questions.</i></p> <p>Some did also comment that they were surprised by the number of questions and this had impacted upon their time management.</p> <p>Those few who were dissatisfied had expected a different level and focus on science discussion and thus had not really understood the knowledge base or ability range of the pupils involved</p>

<p><b>Different impact depending on type of scientist etc</b></p>	<p>This is difficult to quantify from the data collected so far. <b>Impact clearly depended largely on the scientists expectations of the students rather than their specific background. Those more willing or able to answer the full range of questions appeared to have had better experiences.</b> Most scientists really enjoyed the interaction with the students (and found it inspirational) and this depended on their own personality, expectations and previous experience of public communication of their work.</p> <p>The need to manage the number of questions though is clearly an issue.</p>
<p><b>More likely to do public activity again?</b></p>	<p><b>78% would like to this activity again, but many also said they would continue to do public activity anyway.</b> Further evidence is needed to discover whether it helps change those less experienced in public engagement.</p>
<p><b>What help needed for 2011</b></p>	<ul style="list-style-type: none"> <li>• More background information for scientists so they know more about the age, diverse abilities of KS3 and \$ pupils</li> <li>• Strategies on what to do with general questions if they do not wish to answer</li> <li>• The amount of time it takes to be reduced</li> <li>• The quality of experience – with quotes from previously involved scientists – to be publicised</li> </ul>

### 7.3 Evaluation Objectives: Teachers

- **90% said their expectations were met**
- **89% of teachers thought in their responses to the survey that their pupils had a more positive view of science.**
- **92% of teachers who responded to the survey would participate again**
- **95% would recommend it to a colleague**
- **89% of teachers felt that IAS had promoted a more positive view of science, 76% said that their pupils had a more nuanced view of science and 69% of teachers felt their pupils had more ability to debate. 53% of teachers felt that pupils now had more confidence in their opinions.**
- **63% of those replying to the survey felt they had gained as a teacher in various ways (see table for details).**
- **54% of teachers responding to the survey found the briefing notes quite useful or very useful**
- **Issues raised were:**
  - Chat session with no or only one scientist
  - More ideas for plenary work
  - Ability to use more than one zone for chat sessions so that pupils can choose different zones from each other depending on their interests.
  - IT!
  - Arrangement of web page when on chat to make more user friendly

Objective	Success
<p><b>The extent that pupils have changed – attitudes, empowered, more discussion in class etc</b></p>	<p><b>89% of teachers thought in their responses to the survey that their pupils had a more positive view of science.</b></p> <p>They felt that pupils had:</p> <ul style="list-style-type: none"> <li>• Engaged in science and had an increased interest</li> <li>• Thinking about scientists – losing their stereotypes</li> <li>• Widened their knowledge of science</li> <li>• Learnt about careers</li> <li>• Talk to real expert scientists</li> <li>• Inspired about science</li> <li>• Challenged them</li> <li>• Opportunity to work in a different way and at own pace</li> </ul>

	<p>Comments in interviews were:</p> <p><i>My students enjoyed finding out about 'real-life' scientists and the type of jobs out there. Yr 7 particularly loved the live chats and they were engaged and excited by the whole thing. Yr 9 really got into the debate and mainly loved the 1st chat and having the power to vote. Their ability to formulate interesting and appropriate questions improved over the sessions.</i></p> <p><b><i>It puts their studies into context. For those set on a career in science, it shows the variety of things they could get involved in. For those who won't carry on with science, it makes scientists seem real and does something to counteract the rather negative stereotypes they see in so much TV fiction.</i></b></p> <p><i>Their interest grew and they began discussing the event outside of lessons and even on facebook! They saw the job of a scientist as a lifestyle choice, I think, something you are rather than something you do so hopefully they know that scientists are just normal(ish) people!</i></p>
<p><b>Is I'm a Scientist valued by teachers?</b></p>	<p><b>Survey results show that:</b></p> <p><b>92% of teachers who responded to the survey would participate again</b></p> <p><b>95% would recommend it to a colleague</b></p> <p><b>90% of teachers said it met their expectations or they were not sure what to expect</b></p> <p><b>89% of teachers felt that IAS had promoted a more positive view of science, 76% said that their pupils had a more nuanced view of science and 69% of teachers felt their pupils had more ability to debate. 53% of teachers felt that pupils now had more confidence in their opinions.</b></p> <p>Interviews also illustrate the high level of value held by teachers:</p>

	<p><i>It puts their studies into context. For those set on a career in science, it shows the variety of things they could get involved in. For those who won't carry on with science, it makes scientists seem real and does something to counteract the rather negative stereotypes they see in so much TV fiction.</i></p> <p><i>I wanted something to inspire them whilst filling a little time, this was perfect. It was enjoyable, didn't seem like work and was at a perfect time of year.</i></p>
<p><b>Have teachers changed their practice?</b></p>	<p><b>63% of those replying to the survey felt they had gained as a teacher in the following ways:</b></p> <ul style="list-style-type: none"> <li>• Widened knowledge especially about current research</li> <li>• Gained enthusiasm again – seeing students so excited</li> <li>• Structured debating skills</li> <li>• Good feeling of working as part of a group</li> <li>• Seeing weaker students show interest in science for the first time</li> <li>• A real life experience</li> <li>• A range of different/new activities and approaches</li> </ul> <p>Those interviewed also stated:</p> <ul style="list-style-type: none"> <li>• <i>Identified the need for a focus on science careers, since the students had a surprisingly limited idea of jobs available and indeed any current famous scientists!</i></li> <li>• <b><i>The chat sessions showed how much students could collaborate on at once - I definitely need to give them more opportunities to work collaboratively in future.</i></b></li> <li>• <i>New ideas and approaches.</i></li> </ul>
<p><b>Were they supported enough?</b></p>	<p><b>Free text in the survey suggested that teachers were satisfied with the support but no specific question was asked in the survey. Many commented on the quick and efficient response from staff when</b></p>

	<p><b>there was an issue</b></p> <p>Generally teachers in interviews responded that staff had responded quickly to any requests for help.</p> <p>Resources provided before the event were appreciated and used by most teachers. The IVF session was particularly successful.</p> <p>Advice on setting up live chats was also appreciated and solved some of the IT problems</p> <p><i>All the questions I had were answered quickly and I felt well supported by the team and the resources they sent out.</i></p> <p><b>Issues raised were:</b></p> <ul style="list-style-type: none"> <li>• Chat session with no or only one scientist</li> <li>• More ideas for plenary work</li> <li>• Ability to use more than one zone</li> <li>• Issues of timings of chat sessions</li> <li>• IT!</li> <li>• Arrangement of web page when on chat to make more user friendly</li> </ul>
<p><b>Content in a useful format</b></p>	<p>No information gathered from survey</p> <p>Interviews confirmed that pack good and easily adaptable to individual classes. Being able to use material as power point was also useful. Some teachers when interviewed would have liked more support on line for post chat activity or plenary ideas to summarise and check what students had learnt. Generally though feedback was positive.</p>
<p><b>Debate kits usefulness?</b></p>	<p><b>54% of teachers responding to the survey found the briefing notes quite useful or very useful</b></p> <p>Teachers enthused about some aspects:</p> <p><i>The NQT (at Warwick School) has been</i></p>

	<p><i>working with one group and has worked really hard at it. She got an outstanding for her session on IVF from her assessor</i></p> <p>Those not responding positively here are likely to have used the website and chat zones directly, using their own approaches.</p> <p>The only parts of the resources that were less well thought of in the survey findings were the information sheets and project analysis (lesson 6)</p>
<p><b>Expectations met?</b></p>	<p><b>90% said their expectations were met</b></p> <p><i>Yep!</i></p> <p><b><i>Yes - and it was fun for the students</i></b></p> <p><i>I wanted something to inspire them whilst filling a little time, this was perfect. It was enjoyable, didn't seem like work and was at a perfect time of year.</i></p>

### 8.3. Evaluation Objectives: Students

Generally data from survey and interviews shows a change (in the short term) in interest in science.

- **91% feel they know more about what scientists do and 77% know more about how science works.**
- **63% now more (or much more) confident in asking questions about science**
- **63% of those students responding to the survey said they were now more confident in asking questions**
- **93% of students responding to the survey said they were quite interested or very interested in IAS**
- **85% said they had learnt about science**
- **91% said they have a better or much better understanding of what scientists do**
- **77% now have more idea on how science works**
- **60% used IAS at home, having been introduced to it at school**
- **81% would recommend it to a friend**

Objective	
<p><b>Attitudes to science changed?</b></p>	<p>Generally data from survey and interviews shows a change (in the short term) in interest in science. A specific attitude question was not asked in the survey because pupils find this a difficult aspect to reflect upon.</p> <p><b>However:</b></p> <p><b>91% feel they know more about what scientists do and 77% know more about how science works.</b></p> <p>Comments from interviews suggest:</p> <p><i>I didn't think the scientists would be so interesting to be quite honest! They all had a lot of knowledge to share and I enjoyed their conversation immensely</i></p> <p><i>I found it very surprising because I used to have very stereotypical views on scientists and how they are very boring and are like freaky nerds. But now I have found out that they are not boring and they are very passionate about what they do. They enjoy themselves and have fun as scientists, which makes me even more fonder of doing something which is science related towards the future.</i></p> <p><i>The normal-ness of the scientist was quite</i></p>

	<p><i>interesting. They are just normal people with incredibly interesting jobs.</i></p> <p><i>Yea, I always thought scientists were people who always were stuck up and thought they knew everything, but they are also very nice caring and funny people. I have learned that they are humans too, instead of robots ha ha!</i></p> <p><i>There was one thing that surprised me, it was how young you could be (like Tom) and yet know so much. It was way beyond my predictions according to age. Whenever I thought of scientists, I always thought of old mad scientist and in the lab, i mostly felt like it too!!!, but now, all that has changed because i understand much more!!!</i></p> <p>Plenary teacher question: <i>Has I'm a Scientist changed your ideas?</i></p> <p>Responses:</p> <ul style="list-style-type: none"> <li>• <i>They are clever</i></li> <li>• <i>Not that boring</i></li> <li>• <i>Can now be interesting</i></li> <li>• <i>Their social lives – they doing have any</i></li> <li>• <i>Some are boring</i></li> <li>• <i>Some like hanging around</i></li> <li>• <i>She supported Arsenal</i></li> </ul> <p>Longer term impact will be evaluated next year</p>
<p><b>Empowerment to make decisions relating to science</b></p>	<p><b>63% now more (or much more) confident in asking questions about science</b></p> <p>Comments from free text in survey:</p> <p><i>I feel part of something and that my opinion mattered</i></p> <p><i>Learning in a new way, and talking to REAL scientists</i></p> <p>Teachers reported that students had developed greater skills in asking appropriate questions and that as time went on in chat sessions their confidence grew in their interactions with the scientists. This translated into them being more able and confident to vote for the most deserving scientist. Some classes developed their own list of</p>

	<p>key factors (see case study 5) whilst other students made their decisions based on their own ideas. These varied but usually depended on one or more of the following:</p> <ul style="list-style-type: none"> <li>• Personality of scientist and development of a “relationship”</li> <li>• Their response to questions asked however odd they were</li> <li>• Appropriate answers that students understood</li> </ul>
<p><b>More confident to ask questions and contribute to discussions</b></p>	<p><b>63% of those students responding to the survey said they were now more confident in asking questions</b></p> <p><b>Comments in free text:</b></p> <p><i>I loved asking real scientists about their research and the way they went about things - it made me feel more comfortable about talking to them with confidence!</i></p> <p><i>It gave me more confidence and understanding about exactly what different scientists do.</i></p> <p>Observations show they gained confidence as the event proceeded. Having planned questions before hand helped develop the chat session more effectively. Some initial guidance from teachers helped develop a focus.</p>
<p><b>Biggest impact of I'm a Scientist</b></p>	<p><b>93% of students responding to the survey said they were quite interested or very interested in IAS</b></p> <p><b>56% of respondents used <i>I'm a Scientist</i> at home and at school (4% only used it at home)</b></p> <p><b>85% said they had learnt about science</b></p> <p><b>91% said they have a better or much better understanding of what scientists do</b></p> <p><b>77% now have more idea on How Science Works</b></p> <p>Feedback also suggested:</p> <p><i>The live chats were good. It made me understand more about the scientists and why they are doing I</i></p>

	<p><i>Am a Scientist.</i></p> <p><i>I thought all scientist were in the lab mixing chemicals</i></p> <p><i>Interesting to see they (scientist) are all different</i></p>
<p><b>Inspired by scientists etc</b></p>	<p><b>81% would recommend it to a friend</b></p> <p>Comments from students:</p> <p><i>It made me more likely to be a scientist</i></p> <p><i>I would go on again to look up more – once we start our drugs project</i></p> <p><i>I thought all scientist were in the lab mixing chemicals</i></p> <p><i>Interesting to see they (scientist) are all different</i></p> <p><i>Talk to scientists – is good – interesting to find out what they do – and how it is funded – you don't normally get a chance to do this</i></p> <p><i>So whilst I'm a scientist is fun, challenging and educational, it is a door into the future of science, which, with any luck, we will all be able to walk through one day.</i></p>
<p><b>Some types of classes etc benefited more</b></p>	<p>Teachers comments suggest that those who were more shy were sometimes less confident in interacting with IAS, but some of these developed as the programme continued. It might also be suggested from observations that those who are in more able science classes and thus have it on their list of options for the future also gain more from the experience of finding out what it is like to be a scientist. However, less able pupils found that scientists were like other people and thus this may impact on their attitude toward science a subject that many find hard. Further data is needed on this.</p> <p>In surveys teachers also mention that classes who'd done prep (e.g. the intro lessons) engaged much better than students who were just presented with the website. This was mentioned by teachers in the pilot too. For example, one teacher had some students absent for the intro lessons because of a school trip – she felt those pupils noticeably engaged less constructively in chats, etc, compared to the students who had done the introductory lessons.</p>

	<p>Comments from some students were that scientists were as follows:</p> <ul style="list-style-type: none"><li>• <i>They are clever</i></li><li>• <i>Not that boring</i></li><li>• <i>Can now be interesting</i></li><li>• <i>Their social lives – they doing have any</i></li><li>• <i>Some are boring</i></li><li>• <i>Some like hanging around</i></li><li>• <i>She supported Arsenal</i></li></ul>
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## 7.5 Overall Discussion

“Value for Money” can be defined by the success of the key project aims and objectives and thus will be discussed following a review of these. The overall project, as defined in the funding bid to the Wellcome Trust state that the *aim* is to promote more two-way dialogue between scientist and the public. This broken down into the following objectives:

<p>To run the event (website, competition and supporting materials) as in the pilot (with changes in response to pilot evaluation) over the years 2010-11</p>	<p><b>2010 leg of this successfully completed</b></p>
<p><b>Over the two year period:</b> To run at least 50 “zones”, each zone being one self-contained competition of five scientists talking to 20 classes of students. 50 zones equates to <b>250 scientists</b>, 1000 classes and <b>20,000 students</b></p>	<p><b>Number of scientists in March and June 2010: 125</b></p> <p><b>Number of students: 5,951</b></p> <p><b>Numbers of students have fallen short, largely due to less take-up than expected in June. However, the number of students is significant, with plans for future sessions to involve more.</b></p> <p><b>Scientists responded to an overwhelming number of questions (up 400 each) and thus made considerable commitment to the programme. Some zones were more “active” than others and thus work will be undertaken to increase activity across the board. However the extensive number of questions and responses recorded shows a high level of engagement.</b></p>
<p>To evaluate the project at the beginning, middle and the end, to see if the desire outcomes have been achieved</p>	<p><b>This is being undertaken and this report provides interim feedback, including discussion of the quality of the experience. Initial results suggest that the original approach is inspiring and informative. Skills in questioning and discussing science were often developed. Longer term impact will be considered over the coming year</b></p> <p><b>Evaluation in 2011</b> In next year’s evaluation the focus will change to make sure that all key objectives are met and</p>

	<p>thus data will be collected to:</p> <ul style="list-style-type: none"> <li>• Find out more about how to attract scientists</li> <li>• Develop longitudinal studies partially by returning to schools already visited to:             <ul style="list-style-type: none"> <li>○ talk to teachers about their change in practice</li> <li>○ Talk to or find out from pupils who participated in 2010 about the longer term impact</li> <li>○ Develop approach to find out if it impacts on take up of science by looking at year 7-9 groups</li> </ul> </li> <li>• Develop baseline and plenary activity to find out more about change in knowledge and attitude to science</li> <li>• Add questions on recruitment of scientists, content format and monitor different responses from different types of pupils</li> </ul>
<p>To secure further funding from other sources to allow IAS to continue</p>	<p>This has not yet been completed</p>

## **Impact on public understanding of science**

In providing more two-way communication between scientists and students, I'm a Scientist has contributed to the public understanding of science agenda within the schools community. As the programme continues a large number of young people will have been introduced to key ideas about science including:

- how science is done
- what scientists are like
- what opportunities there are for careers in science
- extended knowledge about current research
- extended knowledge about current topics and issues
- extended skills in developing appropriate questions, debating
- greater confidence to contribute to scientific discussion

Schools and teachers will also be exposed to new approaches to teaching science and to the wide range of science research currently being undertaken. Scientists have also felt that their skills in communicating with non-specialists have been improved and for some it has rekindled their enthusiasm.

Using the web has provided a very effective way of establishing links between professional scientists and young people and has so far involved thousands of students. 146 schools have also been involved, with some having already been involved several times. The programme's ability to engage pupils across ability, gender and race help to promote cutting edge scientific research within the next generation.

Thus, returning to the idea of "Value for Money" it is clear that although numbers have not quite yet reached those desired, sufficient numbers are not only being involved in the *I'm a Scientist* events, but are being engaged and inspired by this new approach. Qualitative data has started to show a picture of the overall learning that pupils, but also teachers and schools have gained. Thus success can be defined in terms of numbers involved but also in quality of experience. Further studies next year will extend the evaluation to consider longer term impact.

Through triangulation (ie data from different sources giving similar results) it is clear that pupils:

- were inspired and enjoyed the experience
- were interested and engaged with the activities
- developed skills especially questioning and discussion
- developed greater understanding of current science research and of the process of research
- changed their ideas about who scientists were and what they do

Teachers felt that IAS

- challenged their students
- worked in a different way from usual
- inspired students (and themselves)

- widened knowledge

### **Recommendations**

- Continue to encourage more schools and scientists to be involved
- Iron out various logistical issues:
  - preparing scientists more effectively with better briefing
  - controlling number and type of questions
  - make visual display of chat easier to follow
- More follow up resources to help teachers assess outcomes, how to become a scientist etc

## APPENDIX 1

### Initial Plans and Tools

#### Observation Checklist : possible factors



CHILD \_\_\_\_\_

ACTIVITY \_\_\_\_\_

Time					
Looks interested					
Involved/focused/motivated					
Confident in activity					
Interacting on task					
Interacting off task					
Asks questions					
Express information (Show)					
Discusses					
Problem solving					
Teamwork					
Pleased with success					

**Teacher Questions: Initial thoughts:**

- Did it meet your expectations?
- What worked particularly well?
- Were there any issues?
- What impact do you feel it has had on students? Eg skills, knowledge confidence etc
- Would you do it again?
- Has it had any impact on your own approaches in the classroom?

*Longitudinal*

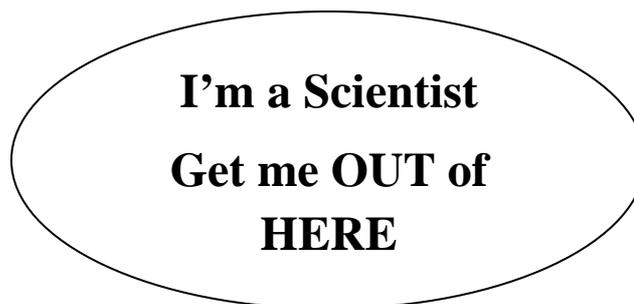
Having taken part a number of times:

- Have you changed the way you have used IAS as part of your curriculum?
- Have you changed the way you prepare for it and then follow it up?
- What impact has it had on pupils? DO you see any longer term impact – eg in approach to science or the popularity of taking it as an exam subject?
- Have other teachers taken an interest in IAS – do you have any idea on why they have not used it?

**Personal Meaning Mapping: Initial thoughts**

Key phrase:

*I'm a Scientist – Why I am staying (or something of the sort)*



Prompts for discussion:

- Remember to think about what you enjoyed about the sessions, what you have found out about science and how you have developed. How do you now feel about science?

*I'm a Scientist, Get me out of Here! Evaluation Interim Report*

- Now that you have finished that – discuss what you have written with your neighbour. Write down any extra thoughts. What particular thought do you want to tell everyone else?

## **I'm a Scientist: Evaluation Plan**

Initial Meeting and planning to develop appropriate objectives and approach, agreeing methodologies, sampling etc **(1 day)**

Development of tools in conjunction with staff:

- Checking data from survey responses
- Develop tools for longitudinal studies, summative etc **(1 day)**
- Feedback, meetings **(1 day)**

### **2010**

Data collection for:

#### **Longitudinal**

Objectives are:

- Extent to which scientists had been changed through participating in IAS new skills, confidence etc
- Different amount of change within scientists
- New skills developed by teachers
- Inspiring teachers to use the new approach in the classroom teaching
- Students felt any long-term impacts of IAS eg attitudes to science, confidence, taking science further in studies etc,

#### Approach

- Visit 2 schools in June 2010 that have undertaken IAS before to get feedback from teachers
- Interview scientists and stakeholders – not urgent
- Sort out idea for longer impact on students – possible consultation with school who is willing to check record for uptake of science exam courses
- **Total 1 days in 2010**

**Summative** data collection with scientist teachers and students

Objectives:

Scientists

- extent of change – new skills, confidence changing views on public engagement, young people science etc
- how successful the recruitment of scientist was and barriers to recruitment
- identification of most appropriate ways to attract
- scientists expectations met
- different impact depending on type of scientist etc
- more likely to do public activity again?
- What help needed for 2011

### Teachers

- Extent pupils have changed – attitudes, empowered, more discussion in class etc
- IAS valued by teachers
- Whether teachers have changed their practice
- Were they supported enough
- Content in a useful format
- Debate kits usefulness?
- Expectations met?

### Students

- Attitudes to science changed?
- Empowerment to make decisions relating to science
- More confident to ask questions and contribute to discussions
- Biggest impact of IAS
- Inspired by scientist etc
- Some types of classes etc benefited more

### General

- Extent met remit to form public engagement
- Value for money
- What worked well and not so well
- Learning for sector for public engagement with science
- Value to scientists and their organisations

### Approach

- Continue with survey
- Improve personal profile as an evaluation approach with students
- Improve science words pupil activity to get a before and after picture
- Observe sessions in schools
- Use personal meaning mapping with students
- Interview teachers in schools
- Interview teachers by phone
- Interview or focus group with scientists

- **Time allocation – 4 days in schools, interviews 2 days**

**Analysis – 3 days**

**Interim Report – Sept – 1 day**

**Communication Days -1**

**Total days for 2010 15**

**2011**

Refine tools and any formative evaluation for 2011 (**1 day**) in context of objectives:

- inform decision-making
- inform content development
- capture motivations for participants
- create buy in

Meeting **1 day**

Data collections longitudinal for 2011 – **2 days**

Data collection – summative for 2011 including final stakeholder interviews – **3 days**

Data analysis – **3 days**

**Report** and corrections for final version – **3 days**

**Presentation etc 1 day**

Total for 2011- 14 days

Total 29 days

## APPENDIX 2

### Feedback from teachers about longer term impact

<p>Have you changed the way you have used I'm a Scientist this time round? And if so, how?</p>	<p><b>We had to due to having problems with the live chat being banned by our filter system. All questions had to be sent the other way.</b></p> <p>Yes - initially I had quite a few run up lessons to introduce the topic and the event was a finale to the topic. I found this was useful in stimulating interest in the topic but not essential. Older students already had their own areas of interest and were as interested in the scientists as people as much as the science.</p> <p>Rather than using the activity in class time, I organised the activity for a group of Y7 gifted and talented. I would normally have done this over a few sessions in the weeks building up to the event but we had half term, then exam week prior to the start so this was not an option. Prior to the week of voting, I organised a lunchtime session to introduce the activity and give out the logon cards, the following week I had one room of computers where students could go to logon if they weren't able to in the library or computer rooms.</p> <p>The only change that I made to using this the second time round was that we spent less time in actual preparation. the girls knew how to use the site and also what types of questions they wanted to ask.</p>
<p>Q2 Have you changed the way you prepare for it and then follow it up? And if so, how?</p>	<p><b>No</b></p> <p>See above - the most recent event was used to segue between GCSE exams and the start of a new topic. It was quite successful at stimulating interest in the topic.</p> <p>Slightly as above.</p> <p>I did print out the scientists' profiles and we divided into 5 groups and spent a lot of time discussing their jobs which was really useful. We also wrote out some of the things we wanted to ask so this was different. The follow up has been a bit hectic but hopefully this week we will reflect on the whole experience this year.</p>
<p>Q3 Have other teachers taken an interest in using I'm a Scientist? Is there anyway we can encourage</p>	<p><b>Not sure. I keep trying with different teachers at different times. My team seems to be slow on the up take.</b></p> <p>There are only limited numbers of places for each</p>

<p>them to try it next time?</p>	<p>school (when new to the programme) - so I didn't advertise it too widely.</p> <p>The gifted and talented co-ordinator and I coordinate our sessions for any students.</p> <p>Two of my colleagues are interested and once we know our classes for next year we can target those which would benefit</p>
<p>Q4 Have you noticed any greater interest in science in the group you first worked with I'm A Scientist?</p>	<p><b>No difference</b></p> <p>The students now see scientists more as real people as - less distant and - more approachable - and part of a community they might want to join in the future. I've attached how one student summarised the experience for the school newsletter.</p> <p>I have had feedback from other Science teachers and the students had discussed some of the research topics with them so some have definitely shown a keen interest. As I run it more as a 'club' than lesson it is more difficult for me to identify when and how frequently students logon and also what they are asking. I definitely feel this project is extremely worthwhile. Students have really enjoyed learning about different areas of real research and enjoyed the opportunity to communicate with the scientists in this way. If I had had more time I would have tried to book a live chat session.</p> <p>The group are more interested in some aspects especially looking at how science works and the range of jobs. They are also more likely to come into class and bring up things they have heard in the news relating to science in the workplace.</p> <p>All in all a great experience and one we would like to repeat next year.</p>