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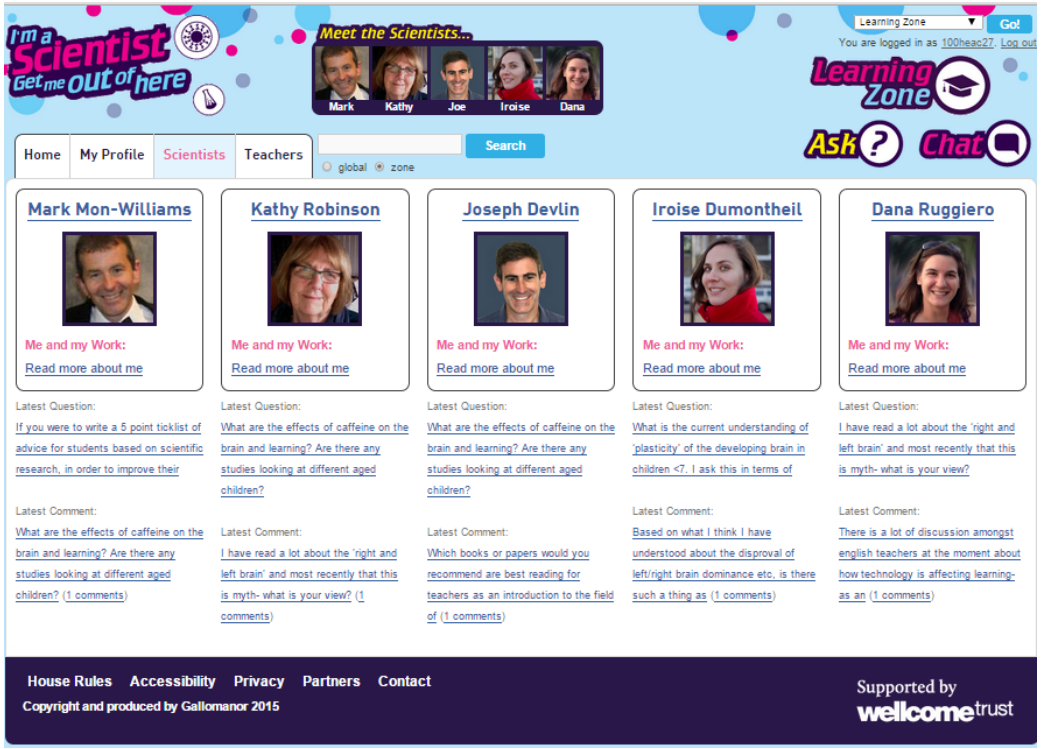
Evaluation Report

Learning Zone

April – May 2015

Funded by the Wellcome Trust



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Executive Summary

The pilot Learning Zone was successful, both teachers and scientists found it a valuable experience.

1. **We created a conversation between teachers and experts on the science of learning**. 40 scientists and almost 300 teachers registered to take part. Of these, 35 scientists and 96 teachers engaged with each other:
    - Teachers asked more than **100 questions**
    - Scientists wrote over **200 answers**
    - More than **170 comments** were submitted
    - **8 live chats** were held
2. **The Learning Zone site was visited by 7,000 users during the event**. Pages in the Zone were viewed **over 33,000 times** during the 6 weeks of the event.
3. **Scientists and teachers valued the event**. 89% of teachers and 94% of scientists would participate again, and 94% of teachers and 100% of scientists would recommend a colleague taking part in the Learning Zone.
4. **Teachers improved their knowledge about the brain and learning.** 66% of the teachers who filled in the post-event survey agreed that "their understanding about the brain and/or learning had improved" after taking part. We will follow up teacher evaluation with another survey in the next school year to analyse the practical impact of the Learning Zone in the classroom over the long term.
5. **Improving knowledge may not lead to more confidence or enable more informed decision-making.** Before taking part 73% of teachers strongly agreed that "Understanding more about the brain & learning will allow you to make more informed decisions about teaching" – yet afterwards only 36% agreed that they could take more informed decisions. 58% and 25% correspondingly for feeling more confident. Either the teachers haven't learnt more from the project or learning a bit more doesn't immediately improve confidence and decision-making. Perhaps realising the complexity of issues has the opposite effect.
6. **The Learning Zone bridged the gap between scientists research and teachers**. 77% of scientists who filled in the post-event survey agreed that they have a better understanding of teachers' needs after taking part.

This being our first *I'm a Scientist* event specifically for teachers, we think we still can improve certain aspects of it:

1. **Increase the variety of live chat the schedule**. There were 2 live chats per week: Monday 8pm and Wednesday 4pm. This schedule remained constant to create familiarity with the timings, however it meant that teachers and scientists who were available at other times were restricted from taking part in the live chats.
2. **Add themes to the Learning Zone.** Consider theming certain weeks around specific topics e.g. motivation, literacy etc., while leaving other weeks with a general "science learning" theme.

Introduction and Background

Teachers and education professionals are becoming increasingly interested in what neuroscience research is finding out about how the brain learns. The Wellcome Trust Education team is working to foster this interest.

However, it can be difficult for teachers to gain access to these findings due to pay-for-access, language, and time barriers. Similarly, neuroscientists and psychologists may not often have the opportunity to talk directly with those that their research has implications for. It was proposed that the format of *I'm a Scientist* could be used to provide an opportunity for these two groups to engage with each other.

I'm a Scientist is an award-winning science engagement event that gets scientists and school students talking online at imascientist.org.uk.

In February 2015 Gallomanor and the Wellcome Trust Education team partnered to create the *I'm a Scientist* Learning Zone. In the Learning Zone teachers could send questions to and have conversations (thought text based live-chats) with neuroscientists and psychologists involved in research on a broad range of topics around the science of learning. This zone was created as a pilot and if successful would form the basis of future zones to provide an on-going service for teachers. Each week a different group of five scientists were available to send questions to, live-chat times were decided and announced in advance by Gallomanor.

Project objectives

Objectives	**Result**
Launch the Learning Zone on April 13th during BNA2015 (Festival of Neuroscience) and run the activity for 4 weeks.	The Learning Zone as a whole was set up to run for 4 weeks between April 13th and May 8th. This was then extended for another two weeks to give more teachers the chance to take part, making the whole event 6 weeks long in total.
Recruit at least 10 neuroscientists, and up to 20 if viable.	40 scientists were recruited to take part, of which 35 answered questions or took part in live chats.
Recruit at least 50 teachers.	In total 283 teachers registered for the event, far more than the aim of 50. Of these teachers, 96 were active on the site in some way, either by submitting questions, commenting on answers from the scientists or participating in live chats.
Teachers register through a standard form.	Teachers could either log in using usernames from previous *I'm a Scientist* events, use a registration form on the Learning Zone site to gain a new username, or use their personal social media log ins from Twitter, Facebook and Google+.
Live chats will be scheduled one per day rotating through lunchtime, post-school, and evening.	There were 2 live chats session times per week: Monday 8pm and Wednesday 4pm. There were a total of 8 scheduled chats.
Specialist moderation	Annie Brookman, a PhD student at the Centre for Brain and Cognitive Development, was responsible for zone moderation.
Evaluation	This report collects web metrics, text analysis, and feedback from teachers and scientists collected through interviews and surveys. We will follow up evaluation on teachers, to measure the real impact of the Zone in the classroom.

Activity

The Learning Zone is the first *I'm a Scientist* activity to be aimed exclusively at teachers. The aim of the pilot was to find out how teachers and scientists used the site and if they found it a valuable experience. 283 teachers and 40 scientists were recruited to take part in the Zone. Of these, **96 teachers and 35 scientists engaged with each other through ASK and live-chats.**

Questions in ASK came from 78 teachers, who also left 75 comments on the answers from scientists. 36 teachers were active in live chat, contributing 242 lines.

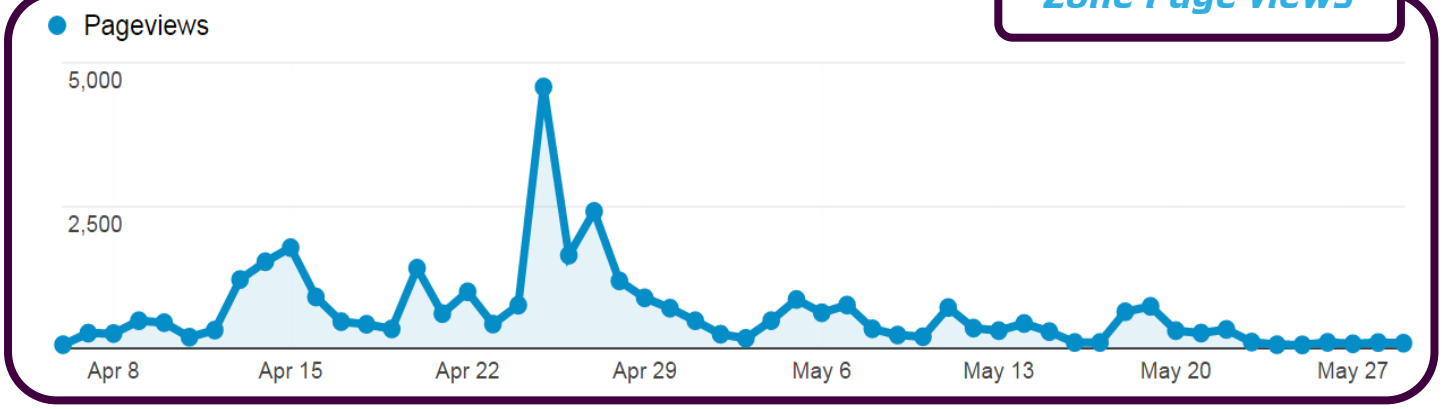
	LEARNING ZONE
Teachers	283
% of teachers active in ASK, Comment or CHAT	34%
Questions asked	107
Questions approved	101
Answers given	207
Comments	154
Lines of live chat	1049
Live chats	8
Average lines of live chat	131

PAGE VIEWS	LEARNING ZONE
Total zone views	33,885
Home page	8,871
Profile pages	4,882
ASK page	618

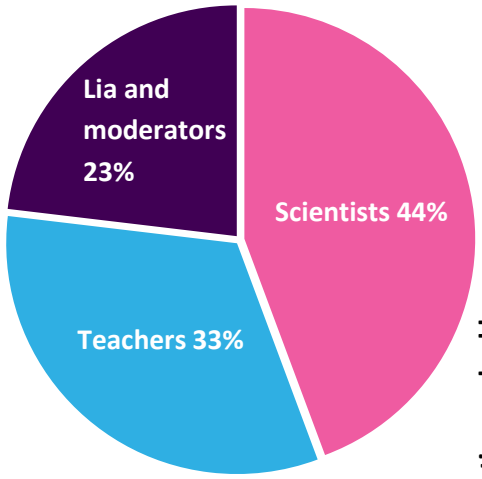
During the event, the Learning Zone pages were viewed over 33,000 times. The large peak in the chart below corresponds to when a newspaper article about the Zone was published in the Science section of the Guardian website on April 24th. Following the week after this, page views returned to a lower level.

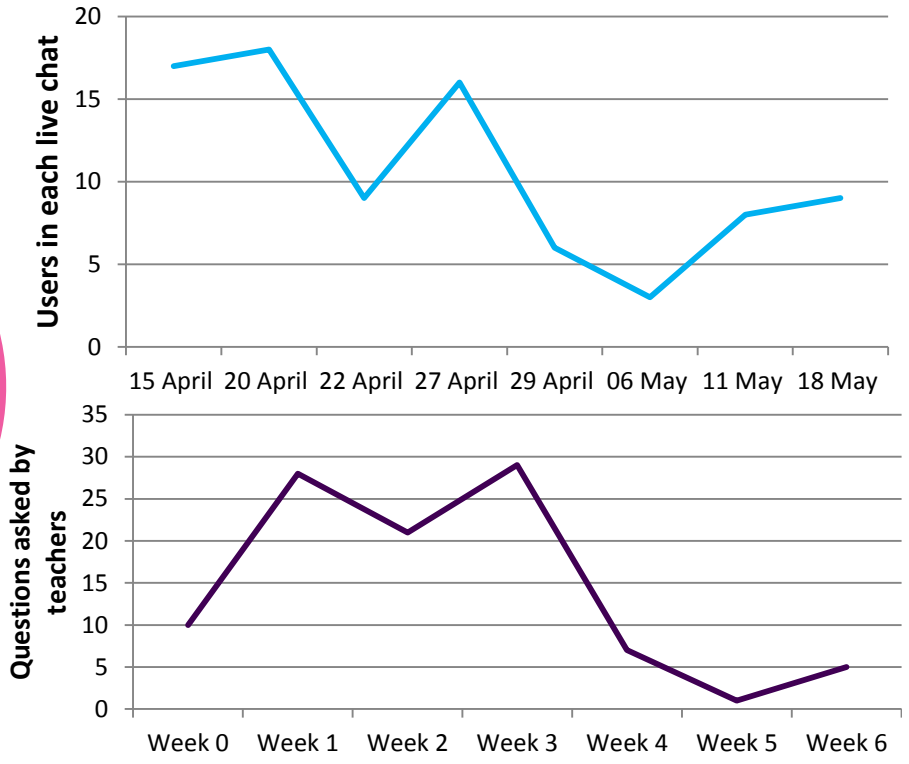
Some questions were viewed over 600 times (see page 7), which indicates that people may have been visiting the site solely to view the questions and answers, rather than actively participate.

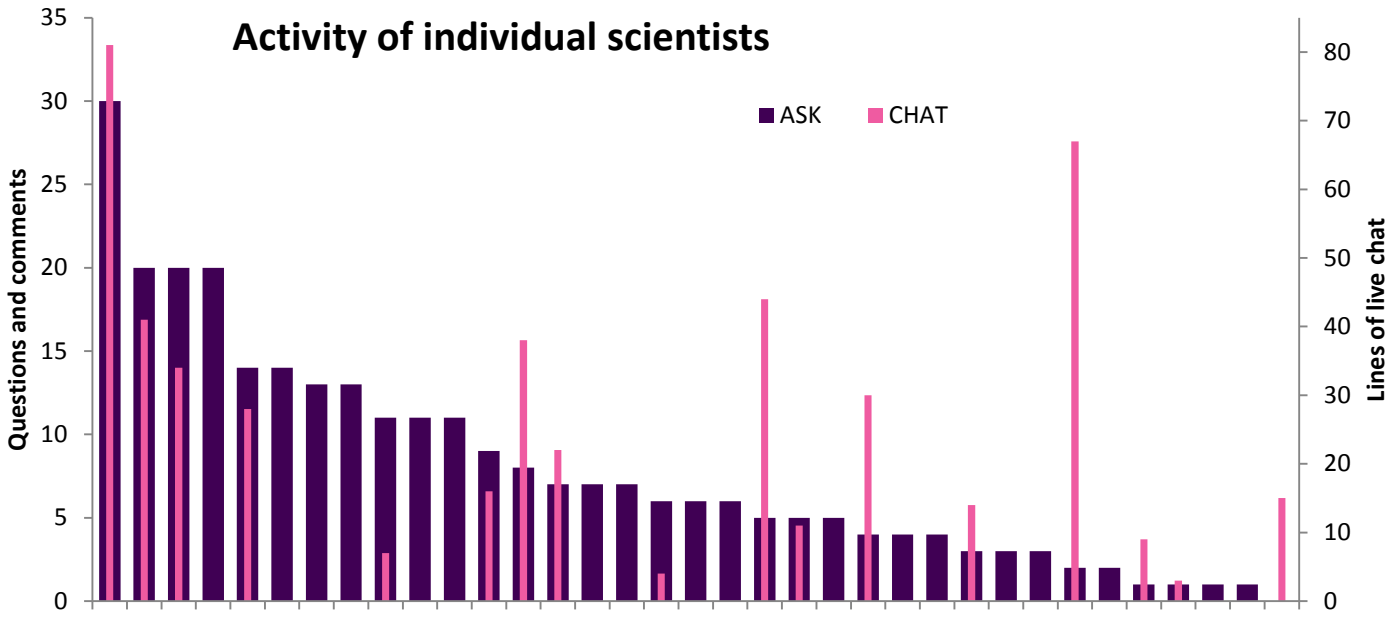
Zone Page views



Zone Activity







The live chats were better attended in the first half of the event and six out of the eight live chats were attended by teachers. Lia Commissar from the Wellcome Trust Education team attended chats to help facilitate them.

In total, 78 teachers asked **107 questions and received 207 answers** from 32 scientists. The majority of questions have multiple answers from scientists.

Comments were left on 70% of answered questions, adding up to a total of **170 comments**, which are divided almost equally between scientists and teachers (65/75). These comments could be conversations between teachers and scientists about the answers given, or contain links to further information. According

to post event survey results, each teacher read – on average — answers to more than four answers (see page 11).

Popular topics

Major themes were advice for students on **how to improve their learning and revision**, discussion of evidence, or lack thereof, for **widely held beliefs** such as Learning Styles and left brain/right brain thinking, research into how the brains of young people differed, methods for teaching specific subjects, the development of **language** and its effect on further learning, how **memory** formation and recall worked, and the practicality of **translating evidence about best practice from research into the classroom**.

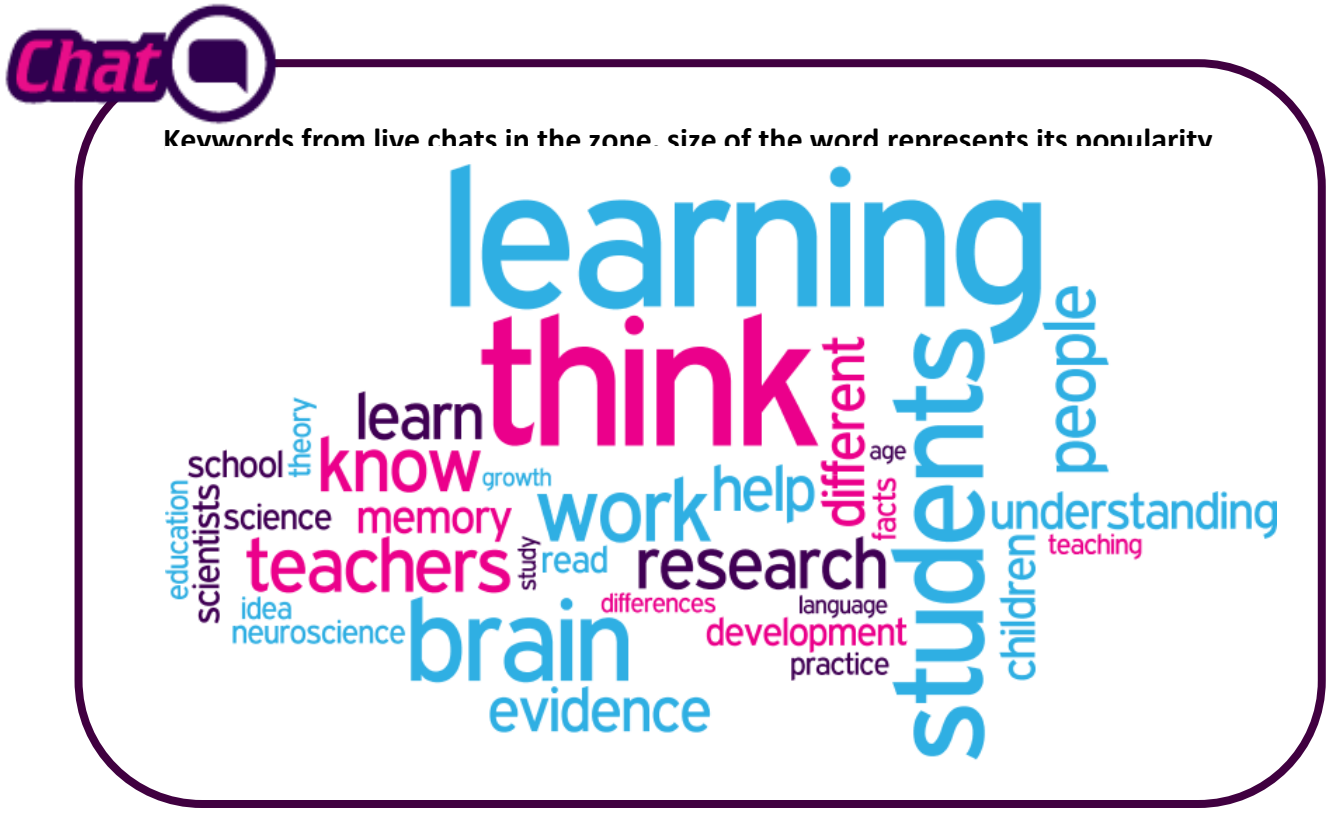
Teachers also talked with each other during the chats to compare experiences and best practice.

Live Chats

The live chats were held at 4pm on Wednesday afternoon and 8pm on Monday evenings. This schedule remained constant during the event to create familiarity with the timings, however it may have meant that teachers and scientists who were available at other times were restricted from taking part in the live chats (see more in post-event interviews and surveys from page 8).

Scientists' responses ranged from careful replies emphasising uncertainty in some areas to more definitive statements about either the strength, or the lack, of evidence. Responses could be lengthy and scientists were keen to provide links to further information and content, such as academic papers, resources, and detailed answers they had left in ASK to similar questions.

Edited transcripts from live chats were posted on the Learning Zone site in blogs to make the information and links that were mentioned accessible to those who hadn't attended.



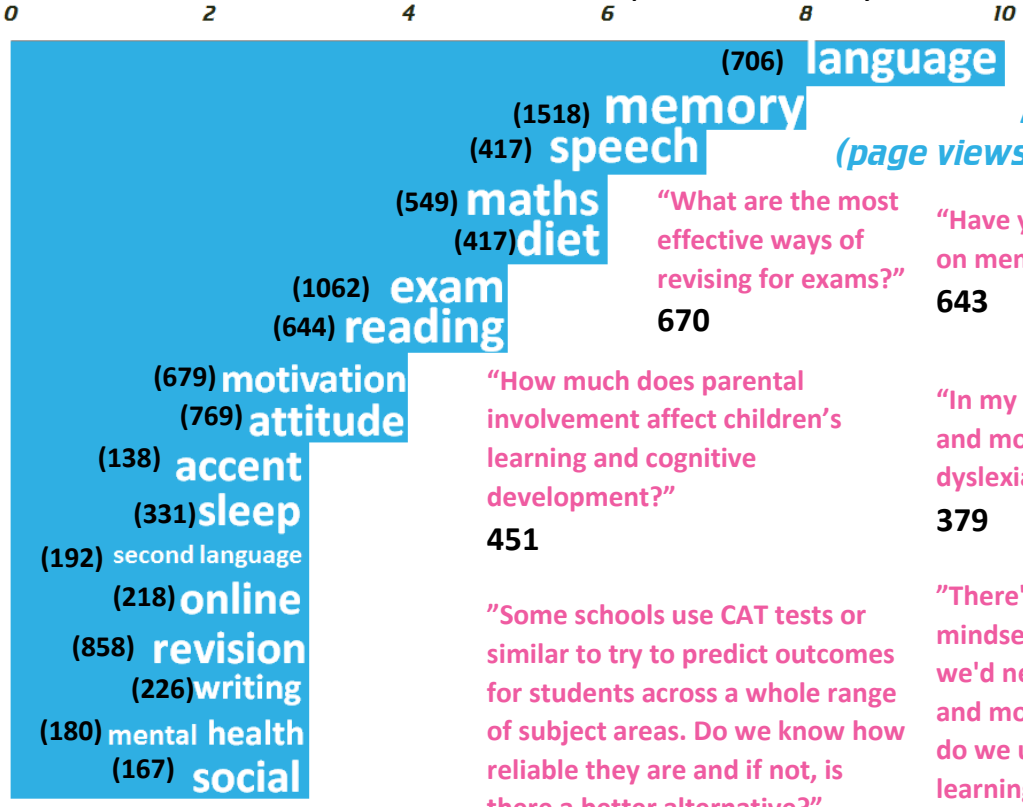
Keywords from live chats in the zone, size of the word represents its popularity

ASK Questions

Questions often included detail about the teacher's background and could relate to specific experiences they had encountered in classrooms. Teachers also asked for comment from the scientists on specific resources they were using in class or to prepare lessons.

Answers from scientists were often long, detailed, and included many links to supporting information and resources. Both teachers and scientists used the comments feature to add their views and knowledge.

Keywords from questions in ASK. The length of the bar represents the frequency of each word. In brackets is the total number of times that questions with the keyword were viewed.



Most viewed questions (page views in bold, click for links)

"What are the most effective ways of revising for exams?"
670

"Have you looked at the effect of diet on memory?"
643

"How much does parental involvement affect children's learning and cognitive development?"
451

"In my classrooms there are more and more pupils with disorders like dyslexia. Can we explain this fact?"
379

"Some schools use CAT tests or similar to try to predict outcomes for students across a whole range of subject areas. Do we know how reliable they are and if not, is there a better alternative?"
373

"There's a lot of talk about 'growth mindset' in education at the moment. we'd need more than a few posters and motivational assemblies! What do we understand about attitude to learning and 'achievement'? What evidence is there?"
371

"I am interested what neuroscience can tell us to provide robust and reliable teaching strategies that can be used one to one and within the classroom whilst teaching a very fast paced curriculum."
332

"VAK learning styles have become embedded in many teachers' planning and practice. What does the research actually tell us about them?"
245

"Mixed-ability classes - good or bad? I know I'm oversimplifying but - all else being equal - is setting good for some and not others, or bad/good for all?"
210

"Nature vs Nurture… what does the research say? Are there some areas in which teachers can have more/less impact?"
203

"It's great that so much more information is coming out with regards learning and the brain but if we can't get students to access it or believe in it, what's the point?"
178

"What are the mechanics behind how the brain learns and stores information?"
170

Examples of engagement

The excerpt from a live chat below is a discussion about the supposed stubbornness of the teenage brain. It demonstrates how teachers and scientists would engage in real conversation, both asking questions of the other. It also shows how teachers brought in their own information to be discussed. The scientists offer their perspective but also ask for the viewpoints of teachers, and talk about their own level of expertise.

> *"I showed students today this: bigthink.com/neurobonkers/assessing-the-evidence-for-the-one-thing-you-never-get-taught-in-school-how-to-learn and as I was telling them, it suddenly occurred to me that there is a paradox at play with regards students and brain research. They are interested to listen but much brain research suggests that due to the late development of the teenage brain, they can be stubborn and refuse to change their minds despite the evidence put in front of them. What do you think?"* – Mr S, teacher
>
> *"I guess I wonder whether there is evidence that teens are any more stubborn than others when faced with evidence. Anyone know?"* – Joseph Devlin, scientist
>
> *"This is quite common in adults and children as well'* – Kathrin Cohen Kadosh, scientist
>
> *"Is there no link between stubbornness and brain development then?"* – Mr S, teacher
>
> *"I think the important bit about the adolescent brain is not so much that it is inflexible or stubborn, but rather that there is a lot going on at the same time. There is a link, in as far as slower developing control areas might interfere with controlling behaviour , but this is not the only reason why people refuse to change behaviour"*– Kathrin Cohen Kadosh, scientist
>
> *"I'm not familiar with a link between brain development and stubbornness — that certainly doesn't mean much though as it's not really my area though ☺"* – Joseph Devlin, scientist
>
> *"I'm aware of things like confirmation bias and so on but I always like the quote about insanity, which is doing the same thing over and over again and expecting different results."* – Mr S, *teacher*
>
> *"Just think about how far adolescents have come already when it comes to controlling behaviour, for example in comparison with toddlers!"*– Kathrin Cohen Kadosh, scientist
>
> *"How important is it, do you think, to get the kids to believe it as opposed to teachers and policy makers? I mean, if we can use the science to change policy locally at a school or more globally within the UK, is that enough?"* – Joseph Devlin, scientist
>
> *"I think that's a good point Joe but we tried the top down approach for growth mindsets and I would argue that a bottom up approach might have worked better."* – Mr S, teacher
>
> *"Ahh that's a good one because the evidence is really clear for the value in testing."*– Joseph Devlin, scientist

Scientist interviews

We conducted 3 interviews either on the phone or through Skype with Daniel Ansari, Iroise Dumontheil and Joseph Devlin, between May 19th -28th. They were generally very positive:

> *"I'm looking forward to using it in the future with some of the teachers I work with."* – Iroise Dumontheil
>
> *"Great project. Really good idea. Clever use of the I'm a Scientist format."* – Joseph Devlin

Motivation to take part

The three scientists interviewed consider that communicating with teachers is part of their responsibilities as researchers. For Daniel and Joseph, Wellcome Trust involvement was also crucial. "*I would have been less sure without Lia and Wellcome Trust involvement",* said Daniel Ansari.

Living up to expectations

Joseph Devlin, who had taking part in one of our *I'm a Scientist* zones for school students said the Learning Zone was *''pretty much exactly what I expected, although of course some of the dynamics changed. For instance, the chats are chaotic with students, while teachers were very polite."*
Iroise Dumonthiel expected the communication to be more fluent and keep going during the whole event as she experienced it in the first chat she took part in, which was *"quite fun and full with activity."*
Daniel Ansari, on the other hand, had no expectations; he had previously not always been convinced by online communications.

Perceived benefits

The three scientists agreed that the Learning Zone helped bridging the gap between scientists and teachers. Iroise and Joseph highlighted the fact that teachers get tailored answers to specific questions, rather than searching them or trying to find the right answer. *"…teachers can later send them an email, or call us and ask about anything, maybe ask us to go to their schools… and this works both sides, also for scientists",* said Joseph Devlin.

When asked about the main benefits of the Zone for them as scientists, both Daniel and Joseph mentioned that the event helped them gain a better sense of what teachers' interests are, what they think about and what they want to know. As scientists, the event allowed them to see if their research was responsive to real world problems and the experience may even guide their future research. For Iroise, the Learning Zone represented an alternative way of making sure field research gets back to the public.

Learning

The three scientists interviewed highlighted some of the answers that other colleagues gave, finding interesting facts and papers, as well as finding interesting questions: *"I will go back and look in detail to see what could input into research"* Said Daniel Ansari.
For Daniel, taking part "*reinforced my conviction that we need to do a lot to change teacher education. (…) Some questions were incredibly broad, showing educators don't understand the level of knowledge held by researchers. (…)Teachers overestimate scientist ability."*

Suggestions to improve the event

Daniel Ansari suggested that the whole Zone be made a *"2 way interaction, so scientists can also ask questions and remove some of that knowledge hierarchy".*
Daniel also mentioned that he found the live-chats challenging because of the lack of theme, so organising chats thematically could be helpful.
Regarding live chats, Iroise said that they could be improved if "*there were different colours for each person, as I found it a bit difficult to keep track of who was talking"* and that we *"could ask people when would be the best time for chats"* to increase attendance.
Both her and Joseph suggested that "*It would be good to have some kind of filtering or opting out of answering certain questions if they have already been answered by someone else. "*

Teacher interviews

We conducted 2 phone interviews with Kim Vale (June 5th) and Tracy Tyrrell (May 21st). We tried to conduct interviews with other teachers, but we didn't get a response from them. However, we got more teacher feedback through our post-event survey.

Motivation to take part

Both teachers were driven to take part in the Learning Zone mainly by their curiosity. Tracy mentioned that it was an invitation from the Wellcome Trust that first caught her attention.

Living up to expectations

Both Tracy and Kim had taken part in *I'm a Scientist* with their students, so they knew what to expect from the Learning Zone to some extent. Their expectations were successfully met, although Kim didn't do as much as she thought she would due to problems with the live chat schedule, and Tracy felt *"Live chats were very high level and I was put off joining in again".*

Perceived benefits

For Tracy Tyrrell, the main benefit was that "y*ou get links and get to know people that we can get ideas from to improve learning and teaching. "* Kim Valle agreed with this and she was also "*particularly interested in knowing how they get their samples and whether they might be skewed."*

Learning Zone Format

When asked if the Learning Zone had been planned at the appropriate time of the school year, they both said it was a good time.

> *"I don't think there is better time of the year, it is just always busy! It was nice that you could use the activity to think of things you can do next school year, in September".* — Tracy Tyrrell

In terms of the length of the event, Tracy didn't feel like she "*had to look at it every week. It was good to see how the variety (of scientists) changed from time to time."* On the other hand, Kim only took part for three weeks, so she wasn't sure she could give feedback on the rest of the activity.

We then asked them if they would have liked to have found it useful if weeks were themed around specific topics e.g. motivation, literacy etc. Kim said that "*it would be a lot better. I think might have tried to do more*

if that have be the case". Tracy pointed out that "*it could be nice for a couple of the six weeks, but it would be good to keep having general ones as well."*

Scientific panel selection

Both Tracy and Kim were very positive about the scientific panel selection. Kim specified that *"Some were so determined that their research was working that I'm not sure they were listening. But others were very keen and seemed to be taking what we said on board."*

Suggestions to improve the event

Kim Vale made several suggestions to improve the Zone. She suggested that **teachers are asked which themes they'd like** to see in future similar events, and that teachers are given a **participation certificate** *"to prove that we do more things than just teaching"*, and maybe even be incorporated into Continuing Professional Development.

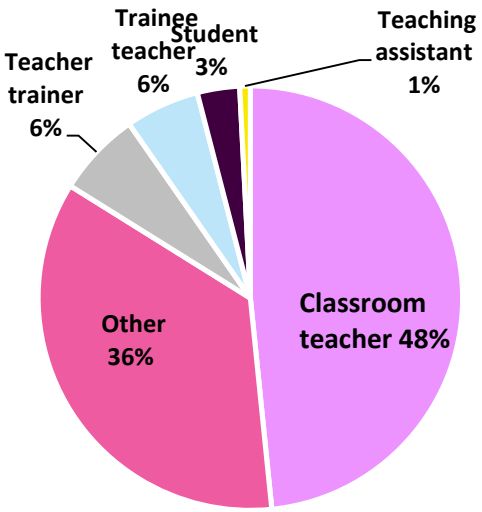
She also suggested having a **more varied live chat schedule,** and that we build a place on the site where both scientists and teachers **can share resources** and ideas that come up during the event: *"That way we would have some kind of record of the things we talked about and it would also be useful for people who haven't taken part in the event, or hear about it later on."*

Teacher registration data

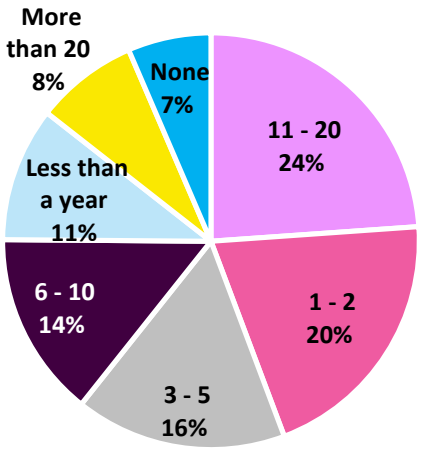
Upon registration, we asked teachers to answer a series of questions to get an idea of the types of teachers taking part, their prior knowledge, and their expectations of the activity. This is what we found out.

The teachers taking part in the Learning Zone had a variety of experiences. Some of them were new teachers with just a couple of years of teaching experience, others had been teaching for over 10 years. Almost half of the teachers taking part were classroom teachers, but there were also teacher assistants, trainees and teacher trainers. There were primary, secondary as well as pre-school and higher education teachers.

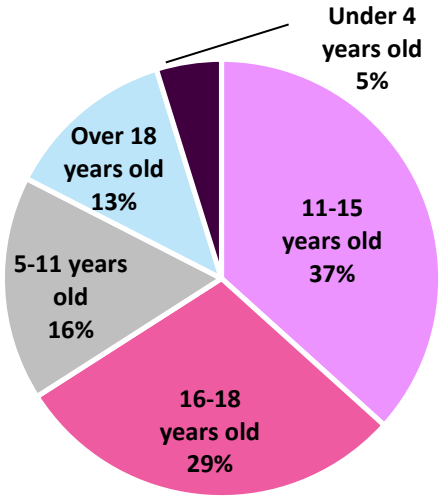
Current possition



Years of experience

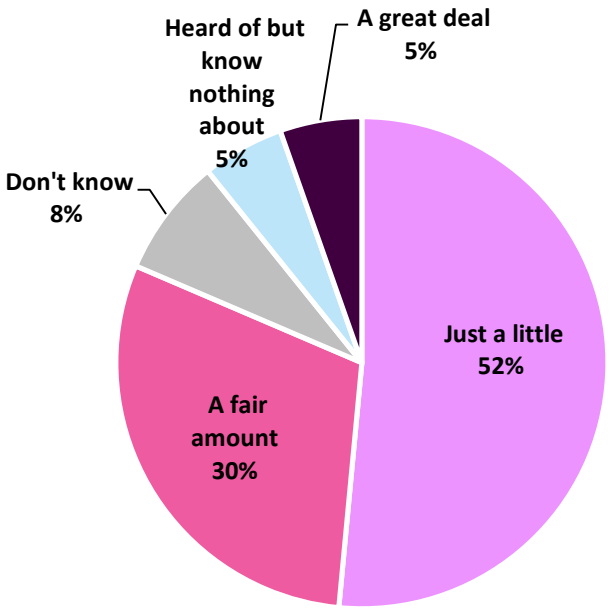


Age group you teach

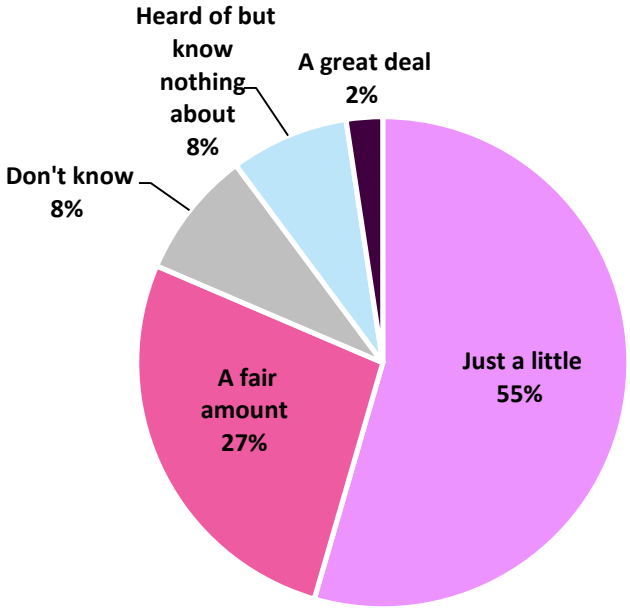


We then asked them to evaluate their own knowledge about neuroscience and psychology. Most of them (55%) thought they "just knew a little" about psychology and neuroscience, although around a third thought they knew a "fair amount".

How much, if anything, would you say that you know about psychology?

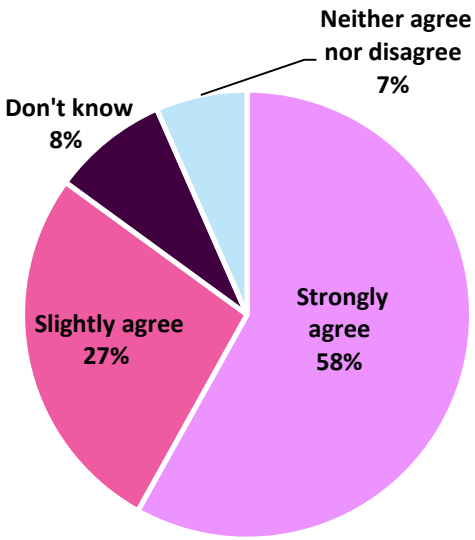


How much, if anything, would you say that you know about neuroscience?

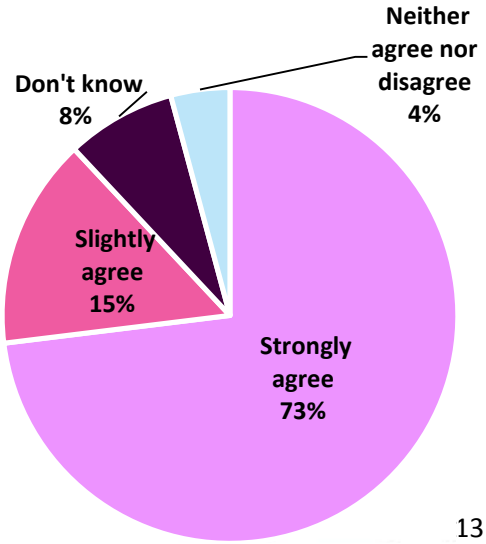


We also asked teachers how they thought that learning more about the brain and how learning will help them as teachers. Most of them agreed with this. 58% of them strongly agreed that understanding more about the brain and learning will increase their confidence as professional, and 73% strongly agreed that they could make more informed decisions about teaching.

Understanding more about the brain & learning will increase your confidence as a professional



Understanding more about the brain & learning will allow you to make more informed decisions about teaching



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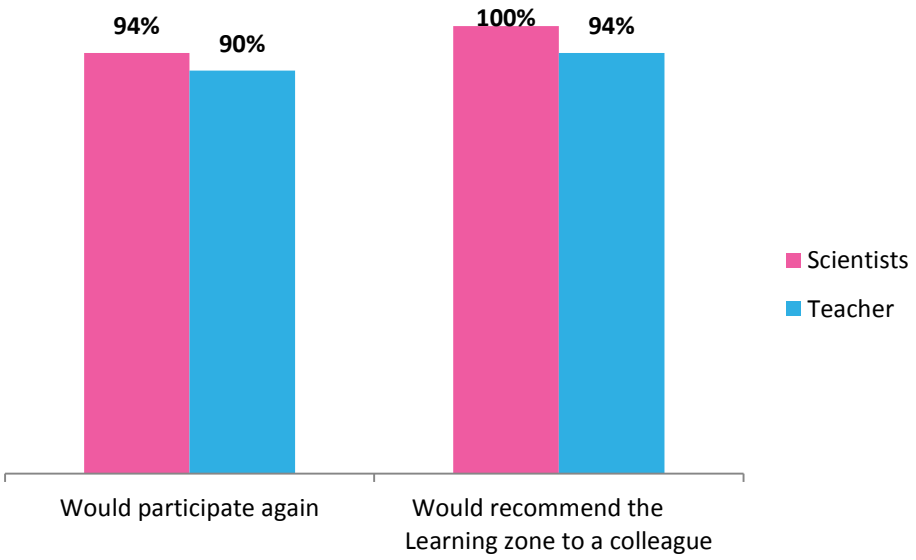
Post-event surveys

We emailed post-event surveys to all the teachers and scientists who took part. We sent them a couple of reminders and by the time of writing this report, 36 teachers (38% of the active teachers, and 13% of the total number of teachers registered), and 17 scientists (43% of the total number of recruited scientists) have filled it in.

The results of these surveys are, almost unavoidably, self-selecting as the keener scientists and teachers are more likely to respond. However, they still provide a good evaluation basis and guidance for future events. The full results from the survey are available in the appendices here: about.imascientist.org.uk/files/2015/06/Learning-Zone-post-event-survey-responses.pdf

The majority of teachers and scientists thought the Learning Zone was a valuable experience and would take part again.

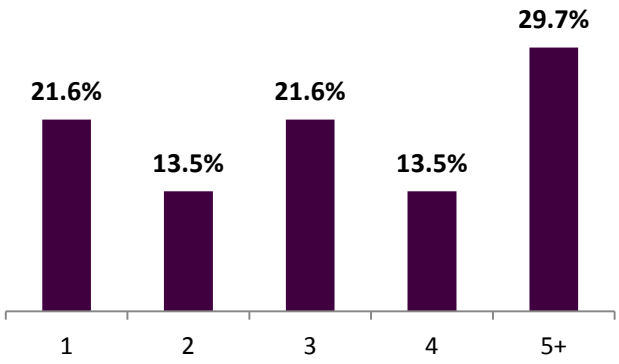


In the next pages we go into more detail into the teachers' and scientists responses to the post-event survey.

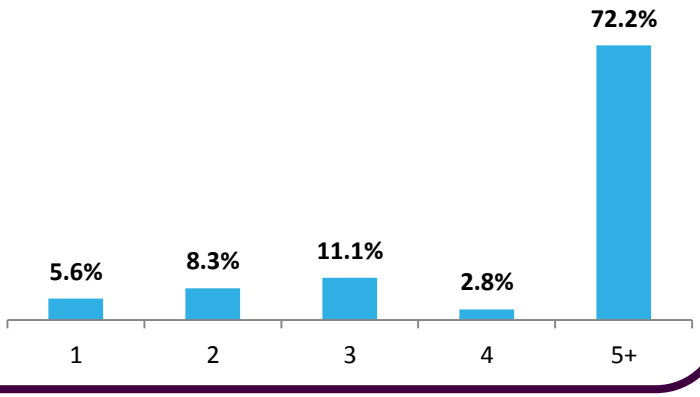
Teacher responses

The teachers who filled in the post-event survey said they had used the Learning Zone site an average of three times (Chart 1) and that they had read the answers to an average of four questions. 72% of them had read the answers to more than five questions (Chart 2). This is actually in line with our back-end data, which show that registered teachers viewed a mean of 27 pages each.

1. How many times did you visit the Learning Zone site?



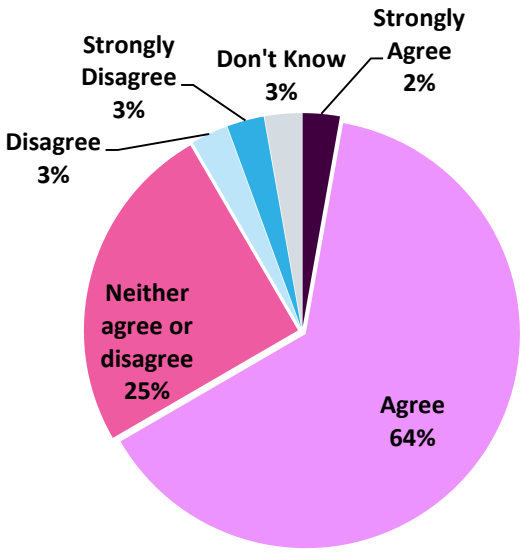
2. How many questions did you read the answer to?



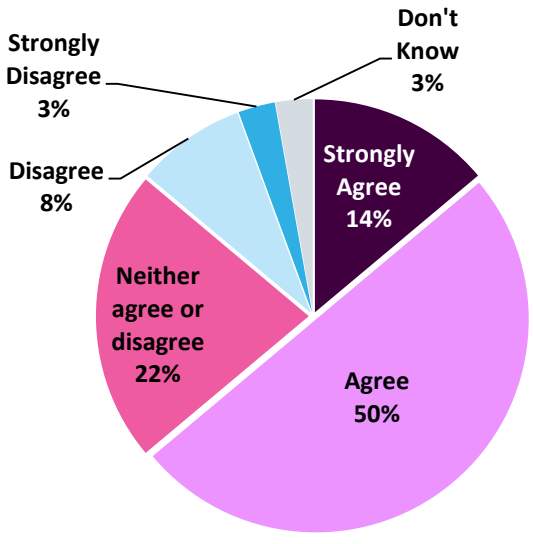
Teachers were asked to reflect on the impact of taking part in the Learning Zone. The majority (64%) of the teachers who filled in the post-event survey thought that 'their understanding about the brain and/or learning had improved' after taking part (Chart 3).

64% of the teachers who filled in the survey agreed that they 'understand more about how neuroscience and psychology can work with education to benefit students' (Chart 4)

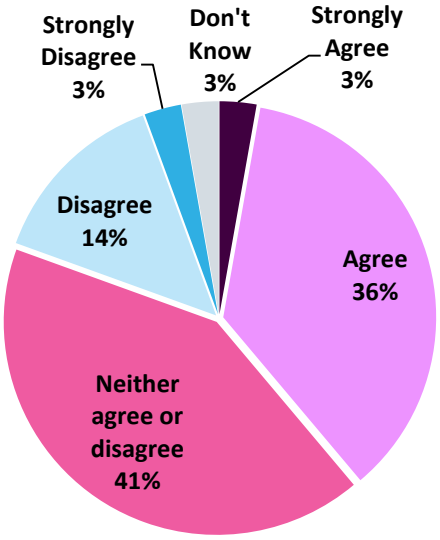
3. My understanding about the brain and/or learning has improved



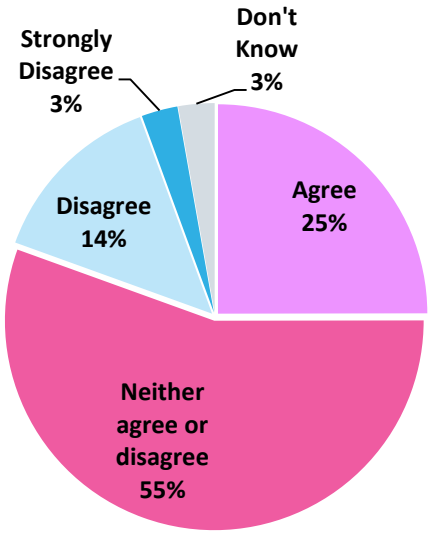
4. I understand more about how neuroscience and psychology can work with education to benefit students



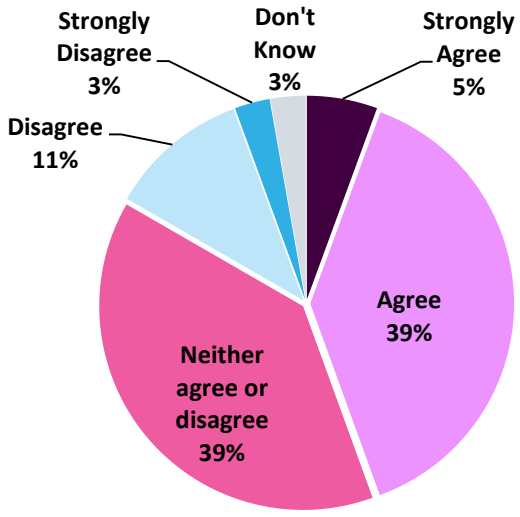
5. I can make more informed decisions about my teaching



6. I feel more confident as a professional



7. There will be a positive impact on my students



There was less certain agreement that their experience would have practical benefits. 41% neither agreed nor disagreed with the statement that they would make more informed decisions about teaching (Chart 5), and the majority (55%) neither agreed nor disagreed that they felt more confident as a teacher after taking part (Chart 6).

Similarly, although 44% felt that the Learning Zone would have a positive impact on their students, 39% could neither agree nor disagree (Chart 7).

It is quite difficult to measure the impact that the Learning Zone has had on teachers in such a short period of time. This may explain the high proportion of respondents choosing 'Neither agree or disagree'.

A follow up survey in the next school year will ask whether they have applied any of what they learnt or talked about in the Learning Zone in their lessons. As for now, we can only have a very approximate idea about practical impact.

On reflection the question format we used was not ideal. A teacher who feels that their confidence, for example is the same before and after the event should answer "disagree" or "disagree strongly" depending on how sure they are that their confidence is the same. However we expect many teachers would answer "Neither agree or disagree" as it is the middle option and would assume that disagree would be the option if they felt they had lost confidence.

The only thing we can say with confidence, is that 25% of respondents feel more confident post event. We don't know if the other 75% are less confident or much the same.

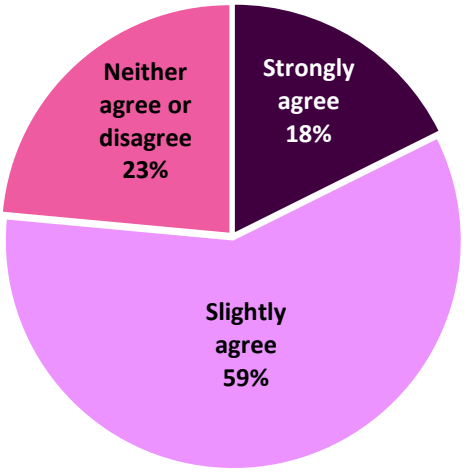
These results contrast with teachers' responses upon registration, when 85% of them agreed that learning more about the brain and learning would make them feel more confident, and 88% said it would help them make more informed decisions about their teaching. 64% of the teachers think that they have improved their understanding of the brain an learning after taking part, but this didn't seem to improve the confidence or ability to make informed decisions of most of them

Scientist responses

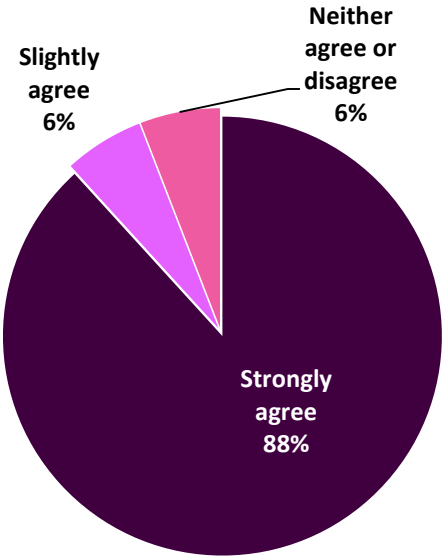
Results for impact were clearer for scientists; 77% of scientists agreed that they have a better understanding of teachers' needs after taking part in the Learning Zone (Chart 8).

The majority (94%) agreed that it is important that teachers and researchers engage on neuroscience and psychology. Most of the scientists who filled in the post-event survey (76%) said that they are more aware of what other scientists do after taking part in the Zone (Chart 10), and 59% felt re-energised about their work (Chart 11).

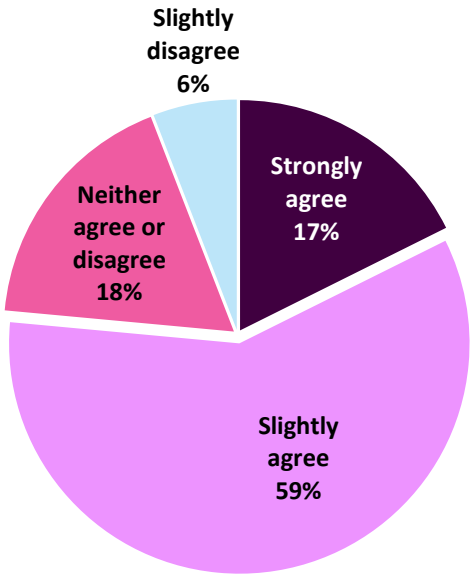
8. I have a better understanding of teacher needs



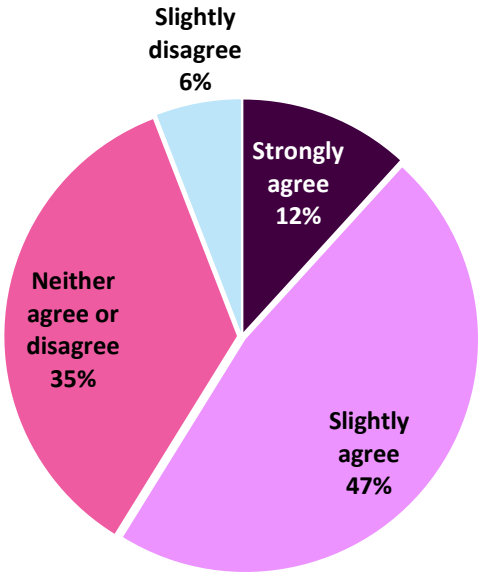
9. I think it is important for there to be engagement between teachers and researchers on this topic



10. I am more aware of what other scientists do



11. I am re-energised about my work



Survey comments

Some very positive comments were left in the survey by both parties:

> *"The simple fact of applying rigorous scientific thinking to education issues. Too much of the discussion in the teaching profession is anything but scientific."* – teacher

> *"I found the question session really valuable, it provided access to really interesting academic literature that I would not have found. This allowed me to make better informed decisions and choices in my daily teaching."* – teacher

> *"I love the live chats; I think it gives a good opportunity to really understand what teachers want/need. It's also great to get feedback on whether your idea/response has really hit the mark or been helpful."* – scientist

We asked the scientists to provide some examples of their main learning points from the event. Here are some of them:

> *"I didn't realize VAK (Visual Auditory Kinaesthetic) styles were used in teaching; there are a ton of brain-myths that seem to inspire specific practices*." – scientist

> *"I have a better understanding of the starting point of some teachers - so I know better where to pitch my ideas."* – scientist

There were also suggestions for improvements to the event. Live chat timings seemed to be an issue for both teachers and scientists, explaining why some of them had very little activity. Some scientists also pointed out that the chats were too broad: "*I found the chats difficult to engage with as the questions were too varied and it was hard to provide coherent answers with the fast flow of questions."*

Several teachers mentioned that they'd like to have a bit more of context to the activity. They suggested a content based section, some organisation of key points and findings, and email alerts about new related articles.