1. Executive Summary

This report evaluates the HLF-funded ‘Science of WW1’ public outreach project, which successfully delivered 2 public engagement events at the Potteries Museum and Art Gallery in Stoke-on-Trent, in the Midlands on 25th April 2015 and the 1st April 2017 respectively, an area of significant interest which has not been previously well explored. The report will detail the project aims, what actually happened and provide information on event visitor evaluation as required by the HLF funding body. The two progress reports show images from both of those events with some included here.

Project team and their respective institutions included staff and volunteer undergraduate students from Keele and Staffordshire Universities, Stoke-on-Trent council (including their specialist archaeologists), the local branch of the Western Front Association, historical/military historians and re-enactors.

2. What we wanted to happen

The project team wished to undertake novel public engagement events linking scientific understanding and techniques to the heritage of WW1. This would allow the project team, as a well-established and experienced public outreach team working in the Potteries area, to develop our public engagement with science events into new territory that was of immense significance and interest to the public generally, involve the respective University undergraduate student event volunteers, and younger people who may not have had the experience of personal links with those who were directly affected by events of 100 years ago. It also offered us a novel context for our mission of engaging, through direct interaction, the public, and in particular young people, in the meaning of science and the impact and significance of scientific developments on their lives. This mission was driven by an accepted need to enhance the profile of science amongst the public, enthuse young people to embrace careers in science and, more generally, to raise the level of understanding of science within the population.

HLF-agreed project aims were to:

a. deliver two one-day public engagement events held at the Potteries Museum & Art Gallery, Hanley, Stoke-on-Trent. These included various ‘base’ activities such as ‘ask the expert’ panel, archaeology/metal detecting exercises, and other science-based activities;
b. develop a WW1 exhibition at the Potteries Museum & Art Gallery displaying stories of local people;
c. produce information boards of the outdoor trench;
d. develop a website and twitter feed to raise event awareness/share information;
e. use 3D camera technology to capture trenches and available online;
f. construct indoor trench dugout at the Potteries Museum;
g. install period exhibits in said trenches.

The project team hoped that the provided events would deliver unique outcomes for local visitors of past heritage, for the children and adult visitors and indeed for the project participants, including the volunteer undergraduate students who will all engage with the historical and scientific content of the project. The Potteries Museum would benefit from the addition of the semi-permanent WW1 exhibition and from an increased understanding and appreciation by the visitors of its place in the local community. More specifically, the visitors would enhance their understanding of
historical, military and social aspects of WW1 and some specific ways in which science impacted on war-time activities and events and how this led to many scientific and technological benefits we take for granted today. They would also appreciate how modern science is revealing new detail about the physical heritage of WW1 and take away a positive view of the impact of science on our understanding of the past. Younger people would acquire hands-on experience in working with scientific techniques to investigate physical heritage and to learn more about the world. They would have their interest in science more generally, enhanced by contact with the young science undergraduates who will be staffing these activities.

3. What actually happened

a) Project management

The project management team generally stuck to the agreed project plan given in Section 3a of the project proposal. One team administrator left Keele at the start of the project, which then left the rest to cover, which was managed. The timetable was also kept to schedule, with the two one-day events successfully undertaken on the 25th April 2015 and the 1st April 2017 (see interim reports for event images). The specific HLF-agreed deliverables listed were delivered successfully, except for the project twitter feed; this was unfortunate although project team members used their own twitter feeds to disseminate the project.

b) Difference made by your project

25th April 2015 event (see interim project report for images): visitor numbers:

‘Base’ Activities for visitors – these included:

• Making molecules of various Poison gases used in The Great War;
• ‘Ancient’ and modern investigators of bullets from The Great War;
• Microscopy of trench ‘insects’;
• Metal detecting for ‘hidden’ Great War artifacts, including take-home items of pre-1918 pennies;
• Demonstrations (with audience volunteers) of first aid in the Trenches, here showing head wounds;
• Archaeological excavations of ‘Great War artefacts’;
• Take-home make-your-own periscopes;
• Above-ground mining tunnel (with sound) for younger visitors to experience what it was like;
• Explosives demonstration;
• ‘Ask the Expert’ Panel, including Andy Robertshaw (ex-Time Team) to look at artefacts brought by the public.

Two public lectures, ‘Bangs and Flashes’ repeated public lecture by Dr Richard Darton (Keele) on how explosives played an important role in the Great War and ‘The Spanish Flu’ repeated public lecture by Dr. Pauline Gowland (Staffordshire University) on the deadly pandemic that broke out in January 1918 were given throughout the day.

Graphical summaries of evaluation questionnaires filled in by willing visitors (n=80) are now provided:
Event 1: postcode location summaries of visitors willing to provide them, there was also 1 visitor from London and one from Norfolk not shown on the graphical summary below.

Combined Moodle diagram of individual willing visitor feedback comments
Event 1: Individual feedback comments from willing visitors completing evaluation questionnaires:

"I enjoyed the historical context of it and how it furthered my knowledge of the war"

"Everything was very organised thanks to everyone"

"The children loved using the metal detector and the helpers were really helpful and informative"

"I liked the child tunnel. I did not like the long talk about wounds"

"Everything very interesting and displayed very good"

"Liking everything"

"5 year old liked the tunnel. 13 year old enjoyed the science chemistry experiments."

"Building molecular models & making periscopes (x2)"

"Loved the metal detecting!"

"Metal detecting and trench were fab!"

"I thought everything was great and the volunteers were very engaging and friendly"

"Enjoyed all areas I visited. Most enjoyable"

"Interesting talking to students"

"Just wanted to say the kids had a ball on sat they really enjoyed the soldier re-enactment (even if they did think the bucket of wee was real ). I wasn’t keen on having to crawl through the tunnel with a hangover but hey ho. Hadn’t got a clue what your hubby looks like so couldn’t say hi. But tell him a huge thank you from my tribe xx"

"Liked it all"

"Need more events similar to this!"

"A good, informative and varied event that was very child focused (needs more publicity next time)"

"Run very professionally - learnt a lot re: WW1"

"I really enjoyed the microscopes and getting to build my own periscope"

"Everything was fund and interactive"

"Maybe something more hands-on for very small ones - perhaps someone greeting you when you arrive to explain what is available"

"The enthusiasm and community spirit of such exhibits"

"The kids enjoyed building the different atoms and the trench, very good experience!"

"Many active, full participation events"

"Excellent activities, friendly environment which enabled children to participate"

"Really enjoyed the talk and demonstration on explosives outside, very interesting and informative"
"I love to see the museum being utilised as it is an important community facility, it would be so sad if we lost this privilege through money"

"Liked interactive and skeletons (archaeology)"

"All wonderful"

"Liked range of resources"

"Really enjoyable, thank you!"

"Now I have been here I know a lot more science. It was brilliant!"

"Hope there will be more events soon"

"Keep up the good work"

"Will come back to next WW1 event"

"now I truly understand how hard it must have been in the trenches, cold, muddy, infested"

"loved bullets and bit!"

"Tunnel was amazing"

"A fantastic event thank you"

"It was awesome, loved the tunnel"

"Loved the tunnel"

"Great Day"

"Forensics is cool"

"We had an amazing time here"

"I really liked the trench"

"What a great day out"

"Lots of great events"

"Great fun for all the family"

"Fantastic, amazing, educational, enjoyable, more please!"

"Great event, learnt loads"

"Fantastic event, great fun and educational"

"I loved all of the cool science that I learnt today"

"Cool science stuff"

"Go Staffs and Keele"

"Do a science"

"Loved metal detecting"
a) Photographs of 25th April 2015 event at Stoke Potteries & Art Museum, Hanley, Stoke-on-Trent

Making molecules of various Poison gases used in The Great War (student volunteers in white suits)

‘Ancient’ and modern investigators of bullets from The Great War
Metal detecting for ‘hidden’ Great War artifacts, including take-home items of pre-1918 pennies
Demonstrations (with audience volunteers) of first aid in the Trenches, here showing head wounds
Younger visitors being shown how to archaeologically excavate ‘Great War artifacts’
Above-ground mining tunnel (with sound) for younger visitors to experience what it was like

Explosives demonstration
b) Record of activities undertaken at the 25th April 2015 event

1) ‘Bangs and Flashes’ repeated public lecture by Dr. Richard Darton (Keele University) on how explosives played an important role in the Great War.

Richard looked at their use in grenades, torpedoes and ammunition through to excavation and mining for vital resources. Although the chemistry of military explosives has changed somewhat since WW1 the underlying principles are very much the same. Richard took an interactive look at the fundamental science behind the explosives of World War 1; including their development, chemistry, uses and disasters.

2) ‘The Spanish Flu’ repeated public lecture by Dr. Pauline Gowland (Staffordshire University) on the deadly pandemic that broke out in January 1918.

This flu was an unusually deadly influenza pandemic, the first of the two pandemics involving H1N1 influenza virus. It infected 500 million people across the world, including remote Pacific islands and the Arctic, and killed 50 to 100 million of them—three to five percent of the world's population —making it one of the deadliest natural disasters in human history. The close quarters and massive troop movements of World War I hastened the pandemic and probably both increased transmission and augmented mutation; the war may also have increased the lethality of the virus. Some speculate the soldiers' immune systems were weakened by malnourishment, as well as the stresses of combat and chemical attacks, increasing their susceptibility.

3) ‘Ask the Expert’ Panel, including Andy Robertshaw (ex-Time Team) to look at artefacts brought by the public
4) These events the public attended and cycled around depending on their interest:

<table>
<thead>
<tr>
<th>Event</th>
<th>Description</th>
<th>Event Lead</th>
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<tbody>
<tr>
<td>1.</td>
<td>Walk through <strong>WW1 trench/dugout</strong> with learners to experience what it was like for soldiers to live in the trenches</td>
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<td></td>
<td>Event lead: Andy Robertshaw</td>
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<td>2.</td>
<td><strong>WW1 indoor</strong> ‘underground offensive mining tunnel’ for learners to experience what mining under the Western Front was like, complete with short talk about how soldiers from Stoke did it</td>
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<td>Event lead: Jamie Pringle</td>
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<td>3.</td>
<td>Talk about <strong>explosives development</strong> and demonstration of explosives in action (outdoors!)</td>
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<td></td>
<td>Event lead: Richard Darton</td>
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<td>4.</td>
<td>Use of <strong>metal detectors</strong> to find remnants of WW1 battlefield artefacts for learners to use (includes take-home WW1 coins)</td>
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<td>Event lead: Kris Wisniewski</td>
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5. Using **battlefield archaeology** to uncover the past, opportunity for learners to have a go at archaeology

   **Event lead: Jon Goodwin**

6. **WW1 Military First Aid post** to talk about how they treated injuries and getting young learners involved (JP son pictured here)

   **Event lead: Military Historian experts**

7. Making various **molecules of poison gases** used in WW1

   **Event lead: David Thompson**

8. Showing how **periscopes** work with contemporary one (right) and letting learners make their own to take home (left)

   **Event lead: Craig Adam**
1st April 2017 event (see interim project report for images): visitor numbers:

‘Base’ Activities for visitors – these included:

- Visitors making own WW1 badges
- Newcastle-under-lyme branch of the Western Front Association sourcing online records of visitors relatives who served in WW1 and identified items brought by the public
- Making take-home WW1 replica periscopes
- WW1 recruiting centre
- Re-enactors telling story of how airplanes developed in WW1 (inc. SE5a plane replica)
- Rubber band guns exhibit to explain about projectiles, trajectories and distance
- Making molecules of various Poison gases used in The Great War
- Microscopes to look at insect life in the trenches and comparing striations on bullet casings
- Metal detecting for ‘hidden’ Great War artifacts, including take-home items of pre-1918 pennies
- Demonstrations (with audience volunteers) of first aid in the Trenches, here showing head wounds
- Archaeological excavations of ‘Great War artefacts’
- Above-ground mining tunnel (with sound) for younger visitors to experience what it was like
- ‘Ask the Expert’ Panel, including Andy Robertshaw (ex-Time Team) to look at artefacts brought by the public

Two public lectures were given, ‘Science Fiction and Fantasy Writers in the Great War’ public lecture by Prof. Edward James (Staffordshire University) and ‘Arnold Bennett at the Front’ public lecture by Ray Johnson.

Individual feedback comments from walk-through questionnaires:

Caitlyn (15), Frankie (7) and George (10) “enjoyed most things but the boys favourite was definitely the SE5A (biplane). They found out about the exhibition on Facebook.”

Lee (9), Doug (10) and Sarah (9) “enjoyed making molecules, but didn’t like looking down the microscope at bugs!”.

Natalie (adult) said “her favourite was the trench tunnel!”

Megan (10) “ was looking forward to the elastic band guns but was very proud of the periscope she had made. Her mum found out about the exhibition online.”

“Daisy (7) was too busy in the archaeology trench to talk but was clearly enjoying herself!”

Rachel and Stephen (adults) “were surprised by the diversity of the exhibits and activities and please to see the children getting involved. Learnt about the activities online.”

Gemma (10) – “ I m a history buff and so I like the WW1 medical and looking forward to archaeology. My teacher at school told me this event was on today.”

Alison (8) said “she liked everything, but making badges was best”.

Sophie (9) and Sarah (7) said “they liked the bugs, molecules and microscopes – their Mum added that it was an extra treat because they didn’t know the exhibition was on.”
Carers and children from ‘Action for Children’ Corey (10), Maisie-Lou (11), Jordan (16), Hayden (15), Ethan (13) – “had only seen the aircraft and the metal detector but were looking forward to the tunnel and the bugs under the microscope. They learnt about the exhibition when one the careers googles ‘whats’ on in stoke’”.

Melanie (8) has family connections – “her grandad is dressed up as a soldier! Bit she enjoyed all the activities.”

Isaac (8) and Jackson (10) “enjoyed most things, but being active boys the elastic band guns were definitely favourite!”

Feedback from ‘Ask the Expert Panel’

- It was great to be able to help out with the event on Saturday. From the expert panel perspective it was an interesting day. For your information/records - I have attached details of individuals from a selection of enquiries we received from members of the public, who came to ask questions about relatives or individuals who had been involved in The First World War.
- There was quite a heavy Staffordshire bias - approximately 41% of the individuals listed were associated with Staffordshire regiments.
- It was interesting to see that 2 individuals associated with the North Staffordshire Regiment were members of the 7th Battalion, which was the only battalion of either Staffs Regiment that served at Gallipoli. Indeed one of the enquiries was about a soldier that had in fact died there.
- Mel - regarding the framed memorial photograph, this would seem highly likely to belong to a member of the 7th Battalion North Staffs. The shoulder title corresponds with that of the Staffs. It was not possible to identify this 100%, but if the buttons on the image of the soldier could be scanned/photographed and enlarged it might be possible to make out a shape of the badge on button. This might be able to be then established as a Staffs badge. The information that came with the item (the individual dying in Mesopotamia) would also correlate to this. I have checked on the Commonwealth War Graves Website and there are 537 individuals belonging to the 7th Battalion North Staffs, who are buried or commemorated at the Basra and Amara cemeteries and that could be the individual in the photo.
- The 7th Battalion was a New Armies Unit: 7th (Service) Battalion. Formed at Lichfield on 29 August 1914 as part of K1 and came under orders of 39th Brigade in 13th (Western) Division. Moved to Tidworth but by January 1915 was in billets in Basingstoke. Moved to Blackdown (Aldershot) in February 1915. Sailed from Avonmouth in June 1915 and landed on Gallipoli next month. January 1916 : Division evacuated from Gallipoli and moved to Egypt. July 1918 : Brigade transferred to North Persia Force
- Interestingly, we had 2 members of the public (both ladies) who commented on the shell adornments as being wedding jewellery. One lady who was of Cherokee Indian descent and commented that the shell jewellery was very similar to wedding adornments made for Cherokee Indian weddings!
Photographs of 1st April 2017 event at Stoke Potteries & Art Museum, Hanley, Stoke-on-Trent

Younger visitors colouring in their own WW1 badges in the badge making activity

Newcastle-under-lyme branch of the Western Front Association sourcing online records of visitors relatives who served in WW1 and identifying items brought by the public
Visitors making their own take-away periscope with aid of student volunteer helpers (White suits) and reproduction one in foreground

Local enthusiast explaining WW1 contemporary items to a visitor.
A young soldier being recruited into the army!
Re-enactors telling the story of how airplanes developed in WW1 (plus medic on left)

My son carrying my hat!
c) Record of activities undertaken at the 1st April 2017 event

4) ‘Science Fiction and Fantasy Writers in the Great War’ public lecture by Prof. Edward James (Staffordshire University).

J.R.R. Tolkien was perhaps the most famous veteran of the First World War to respond to the horrors he had experienced by writing fantasy; but there were other writers whose reaction was to write about the even more terrible wars to come in the future. This talk looks at the lives of over a hundred writers, of all nationalities, who were directly involved in the war, and shows how varied their experiences were: not just fighting, but acting as doctors, ambulance drivers, nurses, spies and propagandists.

5) ‘Arnold Bennett at the Front’ public lecture by Ray Johnson.

In June 1915 Arnold Bennett spent three weeks touring the Western Front in France and Belgium and published his book "Over There" based on his experiences. Bennett’s great powers of observation and detail proved an important insight into how the war was progressing, complementing in plain terms the propagandist reports of the press of the day.

In this special presentation Ray Johnson will relive the experiences of Bennett in a first person interpretation. Together with archive images and film this talk will illustrate a personal account of the Great War through the eyes of the acclaimed author.

6) ‘Ask the Expert’ Panel, including Andy Robertshaw (ex-Time Team) and the Newcastle-under-lyme Branch of the Western Front Association to look at artefacts brought by the public and print out Memorial Scrolls of relatives.
4) These events the public attended and cycled around depending on their interest:

1. **WW1 indoor** ‘underground offensive mining tunnel’ for learners to experience what mining under the Western Front was like, complete with short talk about how soldiers from Stoke did it

   **Event lead: Peter Doyle**

2. Use of rubber band guns to hit target to explain about projectiles, trajectories and distance

   **Event lead: David Thompson**

3. **Use of metal detectors** to find remnants of WW1 battlefield artefacts for learners to use (includes take-home WW1 coins)

   **Event lead: Kris Wisniewski**
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**Event lead: Craig Adam**

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<th>9. <strong>Replica biplane</strong> showpiece exhibit outside the Museum for the day</th>
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d) See the website for online materials, PDF copies of the various activity posters, 3D virtual trench panoramas, etc: see [http://www.csistoke.org.uk/](http://www.csistoke.org.uk/)
4. Project Review

What worked well/why: The day events themselves went very well, with a constant throughput of visitors, who generally enjoyed the activities and learning environment, as evidenced by the many positive visitor questionnaire replies (see above). Generally this was because the events were highly organised, pre-planned and activity 'bases' set up before the day itself. A co-ordinated marketing campaign was also undertaken through Facebook, local news outlets, BBC Stoke (with some management team member also having radio interviews beforehand), local public bus shelter advertisements, dissemination of events through the local primary and high school networks, as well as dissemination in both the major University campuses involved for staff, students and visitors.

Example of Keele University Facebook reach for the 2017 event.
What didn’t work/why: (1) The main issue that did not go to plan was the outdoor replica trench system, funded by Stoke-on-Trent council. Whilst this was successfully used for the first 2015 event, unfortunately it subsequently became unusable due to a rough sleeper taking residence. It was sadly condemned by the S-o-T council and demolished. A replica SE5a WW1 plane was therefore hired to be the frontispiece for the 2nd 2017 event which was a big draw for both visitors and indeed passers-by. (2) Visitor numbers were comparable (~800) to other events held at the museum, with the 2017 being more successful in terms of visitor numbers. Increasing numbers for a well-advertised and free further was not achievable.

Deadweight: We would argue that, without the organised project events, visitors would not be aware of the science behind WW1. Stoke-on-Trent does not commonly exhibit national material, or indeed host regional ones (closest being the Staffordshire Regt. Museum in Stafford), and does not perform well in many socio-economic group rankings nationally, so it would be difficult to see how visitors would be aware of this otherwise.
5. Summary of lesson learnt

The events went well due to being properly planned beforehand, the individual materials/specific activities being organised and staffed, and the ‘big ticket’ items of outdoor/indoor trenches and the plane replica were a significant draw for people to attend. It was difficult to quantify (although see above) but marketing increased visitor numbers, judging by footfall and visitor evaluation comments.