

Carbon Literacy for Labs

Carbon Literacy
Project



MANCHESTER
1824

The University of Manchester

Pilot Course Impact Assessment 2019

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This assessment document reviews the pilot initiative of the **world's first Carbon Literacy for Labs** initiative, held at The University of Manchester during October – November 2018.

This is an independent study conducted by The Carbon Literacy Project based upon the evidence provided by The University of Manchester. This evidence was collected during the seven Carbon Literacy for Labs day workshops that comprised the pilot. All data has been anonymised.

Acknowledgments

Special thanks go to...

The University of Manchester's Faculty of Science and Social Responsibility Fund for generously funding this pilot project including course creation, materials, certification costs and delivery. Such costs are likely to have been regained already through implementation of Carbon Literate actions across the Faculty.

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Data analysis and report production by **Georgia Gage** (Carbon Literacy Volunteer).



Carbon Literacy for Labs is a **low-carbon culture change initiative**. It is a certified course, under The Carbon Literacy Project, that inspires and promotes sustainable laboratory choices and behaviours. The one-day course **delivers relevant climate change knowledge, effects and solutions** to laboratory groups across The University of Manchester campus.

Why should we target labs? Laboratory staff and students typically use large amounts of energy and resource in their work. Laboratory personnel are innovators, teachers and leaders, ideally positioned to use and share their Carbon Literacy with others.

A Carbon Literate lab will display its values clearly when seeking research grants. A certified Carbon Literate lab user has an awareness of the everyday choices that can reduce the climate impact of their research and can share this learning with others.

A Carbon Literate lab can expect to save grant money alongside carbon emissions by reducing:



energy



consumption of materials
and chemicals



equipment wear

The University of Manchester **benefits directly** from the **reduction in energy and resources**, and increase in recycling and low-carbon behaviour of its Carbon Literate labs. Construction company Jacobs UK Ltd estimate a minimum of 5% savings of resource for each employee that has received high-quality environmental training. They deem Carbon Literacy to be the highest quality environmental training on the current market.

The Pilot Initiative (19th October–14th November 2018)

A pilot course was delivered over 7 days of training to 76 voluntary participants at The University of Manchester. Funding was awarded by The University of Manchester's Faculty of Science and Engineering Social Responsibility Fund to finance development and the dissemination of the Carbon Literacy for Labs pilot.

Aims and Objectives



The aims and objectives of this pilot Carbon Literacy for Labs course were chiefly to **reduce the carbon emissions of laboratories** and to set in a motion a **low carbon culture** across researchers and staff that can be shared and passed on.

- To have the trainers deliver Carbon Literacy to a minimum of 50 staff/student lab workers across campus.

This target was exceeded by 48%; 76 students and University employees attended this course, 72 (95%) of these participants achieved their Carbon Literacy certificate.

- To create the world's first certified Carbon Literate lab groups.

72 researchers and employees belonging to more than 25 different lab groups at The University of Manchester are now certified as Carbon Literate. Additionally, entire lab teams earned their Carbon Literacy status.

- To reduce energy consumption, carbon emissions and resource usage and to increase recycling and other low-carbon behaviour across campus (scalable to all labs across campus, and beyond).

Each Carbon Literate lab user has created both a personal action (to immediately reduce the carbon footprint of their personal lab space/workplace) and a group action (to reduce the carbon footprint of their entire lab team). The training has therefore created at least 144 significant carbon reduction actions to date.

- To train a minimum of two student volunteers to become [Certified Carbon Literacy Trainers](#) (to ensure sustainability and scalability).

Two student volunteers trained by The Carbon Literacy Project delivered the majority of the Carbon Literacy training in this pilot to their peers and colleagues on the course.

- To ensure the programme is replicable and scalable.

The two trained student volunteers are capable of providing ongoing Carbon Literacy training to labs across campus. The Carbon Literacy Project is able and willing to support further training of trainers (see page 16).

- To deliver direct and immediate benefits to The University of Manchester through energy reduction, waste reduction, emissions reduction and a healthier, happier workforce.

80% of participants think The University of Manchester should be doing more to tackle climate change and have ideas to share on how to do so.

- To deliver direct and immediate benefits to each Carbon Literate lab user and their colleagues, including and not limited to happier and healthier working lifestyle, lower emissions, team-building, CV-building and enhancing student experience.

91% of participants gave positive feedback about the course, 80% said they enjoyed it and 64% said they would explicitly recommend the course to colleagues.

- To deliver Carbon Literacy to these learners through a minimum of 5 training days.

7 full days of training were delivered.

- To record each learner's 'journey' by completing pre-course and post-course questionnaires and to write a full impact assessment following the pilot.

This report includes an analysis of the data collected across the pre and post course questionnaires.

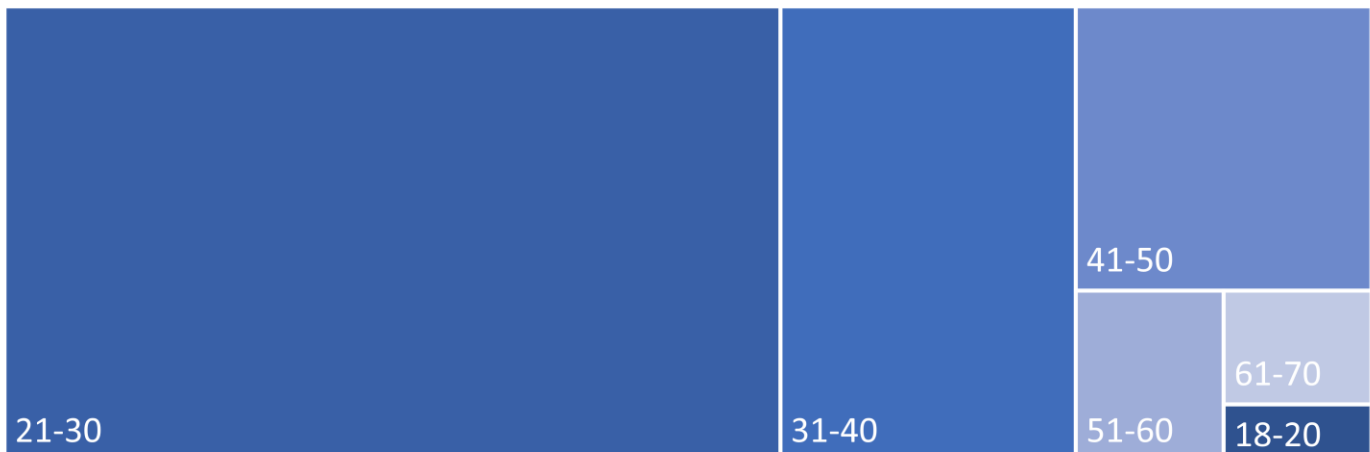
Participants



76 researchers and employees who work in labs at The University of Manchester attended Carbon Literacy for Labs training over seven days. **72 of them (95%) achieved their Carbon Literacy certificate.** At the time of completing this report, only 64 had been certified. The following analysis is carried out on these 64 participants.



Age Groups

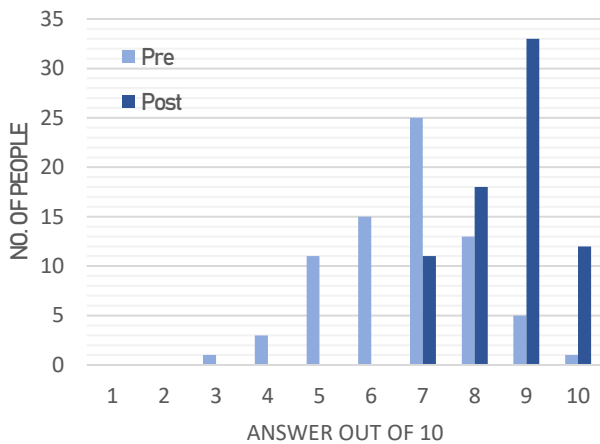


Impact on Learners

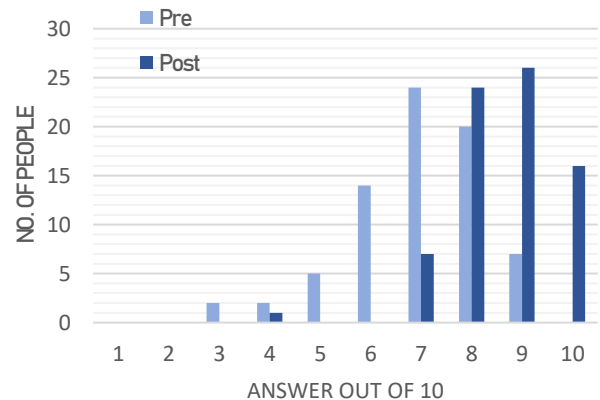


Questions 1 – 6 of the pre-course and post-course questionnaires assess how much the learners feel they know about climate change and how motivated they feel to take action. The impact on the learners was assessed by measuring the change in answers across the pre- and post-course questionnaires. Learners were asked to give a number from 1-10 that best represents their knowledge. 1 = *I don't know much at all*, 10 = *I know a lot*.

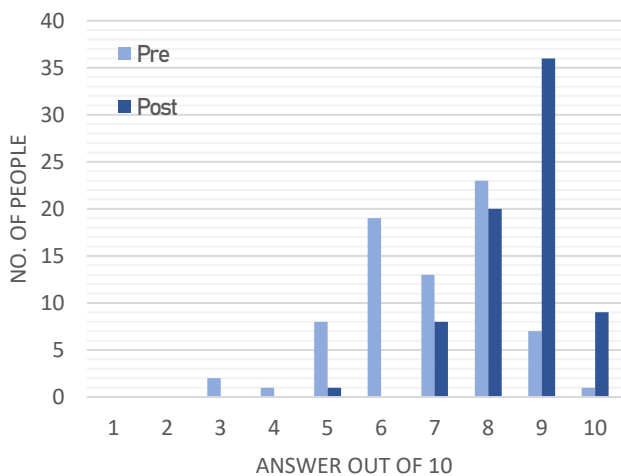
Q1. How much do you feel you know about the **issues** of climate change?



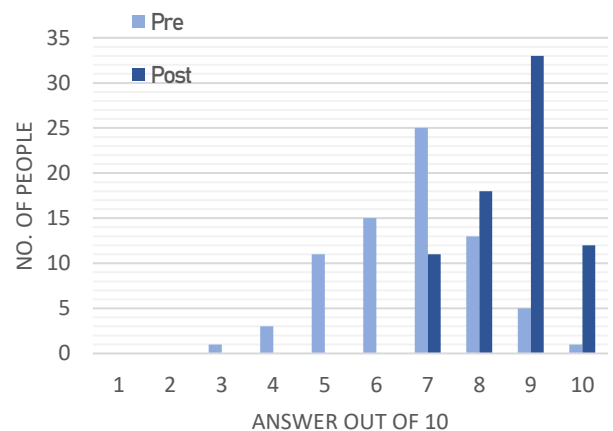
Q2. How much do you feel you know about the **causes** of climate change?



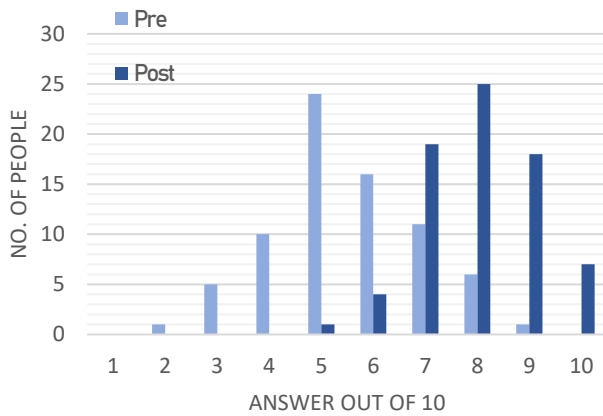
Q3. How much do you feel you know about the **impact** climate change is having?



Q4. How much do you feel you know about the **benefits** to you of taking action to reduce or prevent the worst effects of climate change?



Q5. How much do you feel you know about what **action** is being taken around you to reduce or prevent the worst effects of climate change?



Q6. How **motivated** do you feel to take action to reduce or prevent the worst effects of climate change?

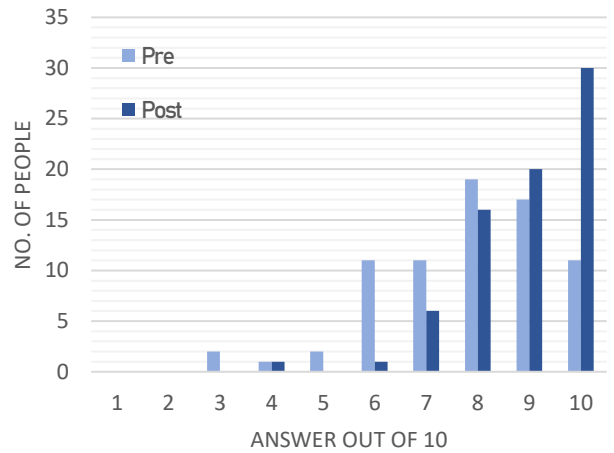


Figure 1-6: Histograms displaying the change in answers of participants over question 1 – 6 of the pre-course and post-course questionnaire.

Question	Average increase in answer from pre- and post-course questionnaires
Q1	1.9
Q2	1.7
Q3	1.7
Q4	2.4
Q5	2.5
Q6	1.1

Table 1: Table displaying the average increase in answers out of 10 across questions 1 – 6 of the pre-course and post-course questionnaires.

After completing the course, learners felt their **knowledge** of the **issues, causes and impacts** of climate change (Q1 – 3) **increased** by a minimum of 17%.

The questions that saw the largest increase were Q4 and Q5 indicating that learners felt they learnt the most about the **benefits** of climate change action and about **action already being taken to tackle climate change**.

Q6 saw a small increase indicating there was little change in the learners' **motivation** to take action to reduce the worst effects of climate change. However, in the pre-course questionnaire, Q6 had the highest average answer (7.8) which suggests that learners already felt motivated to take action before the course (re-enforced by the fact that they volunteered to attend Carbon Literacy training).

Before the course, learners were asked **how often they talk about climate change with their colleagues, family and friends**. After the course, they were asked **how much they feel they will now talk about climate change** with their colleagues, friends and family.

62% felt they would speak more about climate change after completing Carbon Literacy training.

36% no change.

2% decreased the amount they speak about climate change.

How often do you talk about climate change with your colleagues, family and friends?

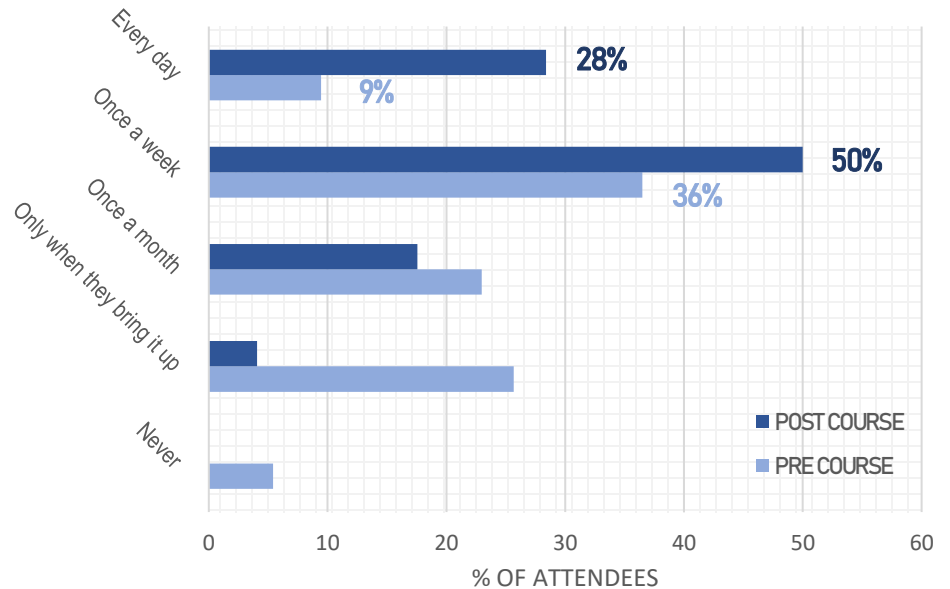
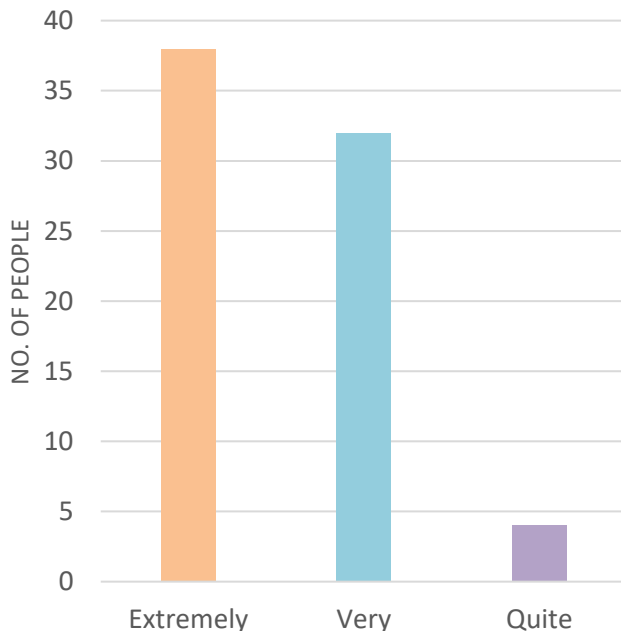


Figure 7. Histogram of how frequently learners talk about climate change with colleagues, family and friends, displaying pre-course and post-course results.

Post-Course Only Questions



After receiving Carbon Literacy training, learners were asked **how important they now feel taking action on climate change is in their work life**.

Extremely	38	51%
Very	32	43%
Quite	4	5%
A Little Bit	0	0
Not at All	0	0

Figure 8. Info-graphic displaying how important learners feel taking action on climate change is in their work life after receiving Carbon Literacy training.

Learners were asked **how confident they now feel about identifying the carbon impact of their role in the lab, following Carbon Literacy training.**

91% of participants felt their confidence increase after completing Carbon Literacy training.

They were asked to describe their confidence as either extremely confident, very confident, somewhat confident, slightly confident or not at all confident.

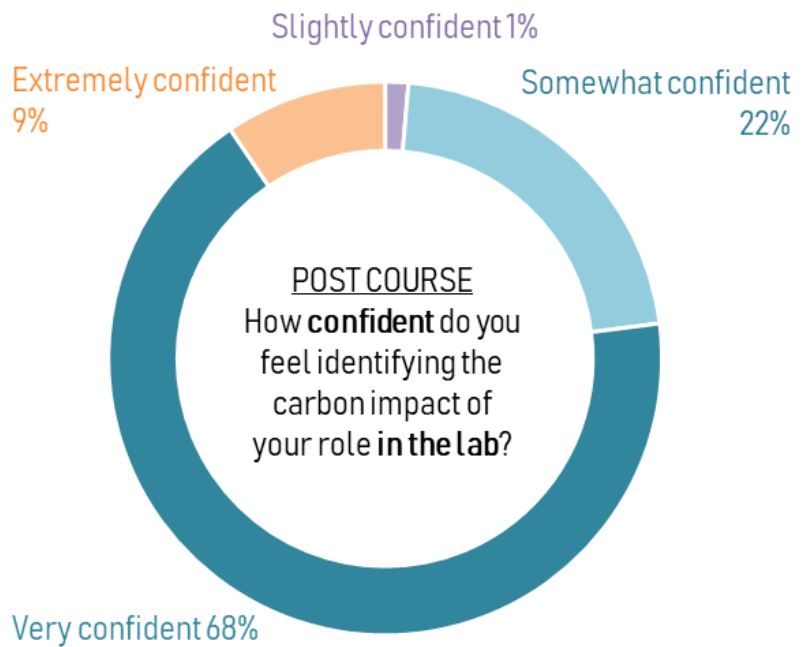


Figure 9. Answers from the post-course questionnaire describing learner's confidence in identifying the carbon impact of your role in the lab.

Learners were asked **how confident they feel talking about climate change with their colleagues, friends and family?**

61% of participants felt their confidence increase after completing Carbon Literacy training,

They were asked to describe their confidence as either extremely confident, very confident, somewhat confident, slightly confident and not at all confident.

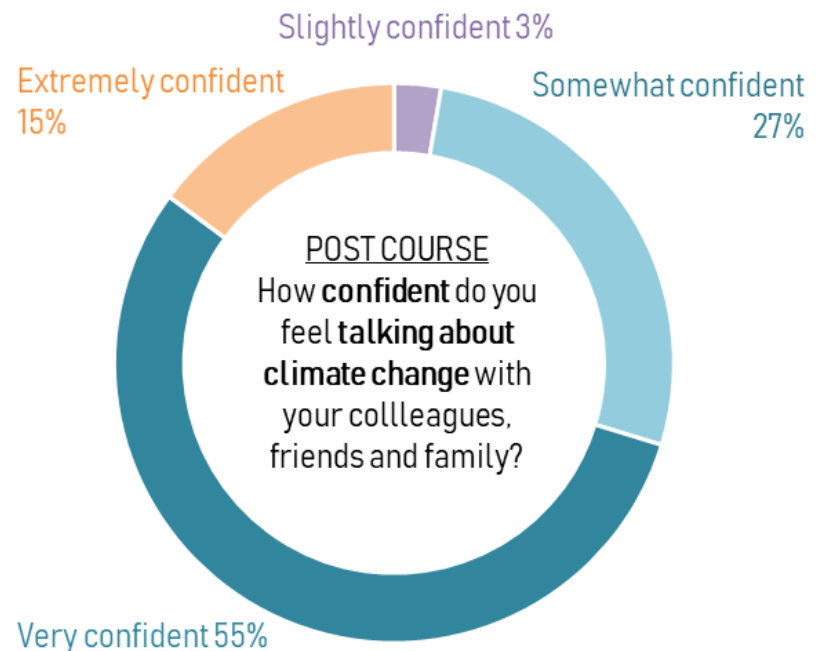


Figure 10. Answers from the post-course questionnaire describing learner's confidence in talking about climate change with their colleagues, friends and family.

Summary of Impact

Overall the Carbon Literacy for Labs course had a positive impact on learners. All learners felt that their knowledge of the issues, causes and impacts of climate change increased and all learners felt they knew more about the benefits of taking climate change action after completing the training.

The majority of learners (97%) felt more motivated to take action to reduce or prevent the worst effects of climate change after completing Carbon Literacy training.

91% of learners felt their confidence increased when identifying carbon impacts in their lab role and 61% felt their confidence increased in talking about climate change with colleagues, family and friends.

61% of learners felt they would talk about climate change more with colleagues, friends and family after Carbon Literacy training.

After receiving Carbon Literacy training, 94% of learners felt that taking action on climate change in their work life was either **extremely important** or **very important**.

Impact on The University



“We have a collective of bright scientific minds; there must be a wealth of untapped ideas that The University of Manchester must do it's best to harness.”

Carbon Literacy for Labs participant

In order to gauge the participants awareness of climate action already taking place within The University, participants were asked their views on The University of Manchester’s sustainability initiatives.

Before receiving Carbon Literacy training, learners were asked if they could **list any positive things The University of Manchester are doing to tackle climate change.**

86% of participants could list at least one action The University of Manchester are doing to tackle climate change.

Actions and Initiatives Known to Participants

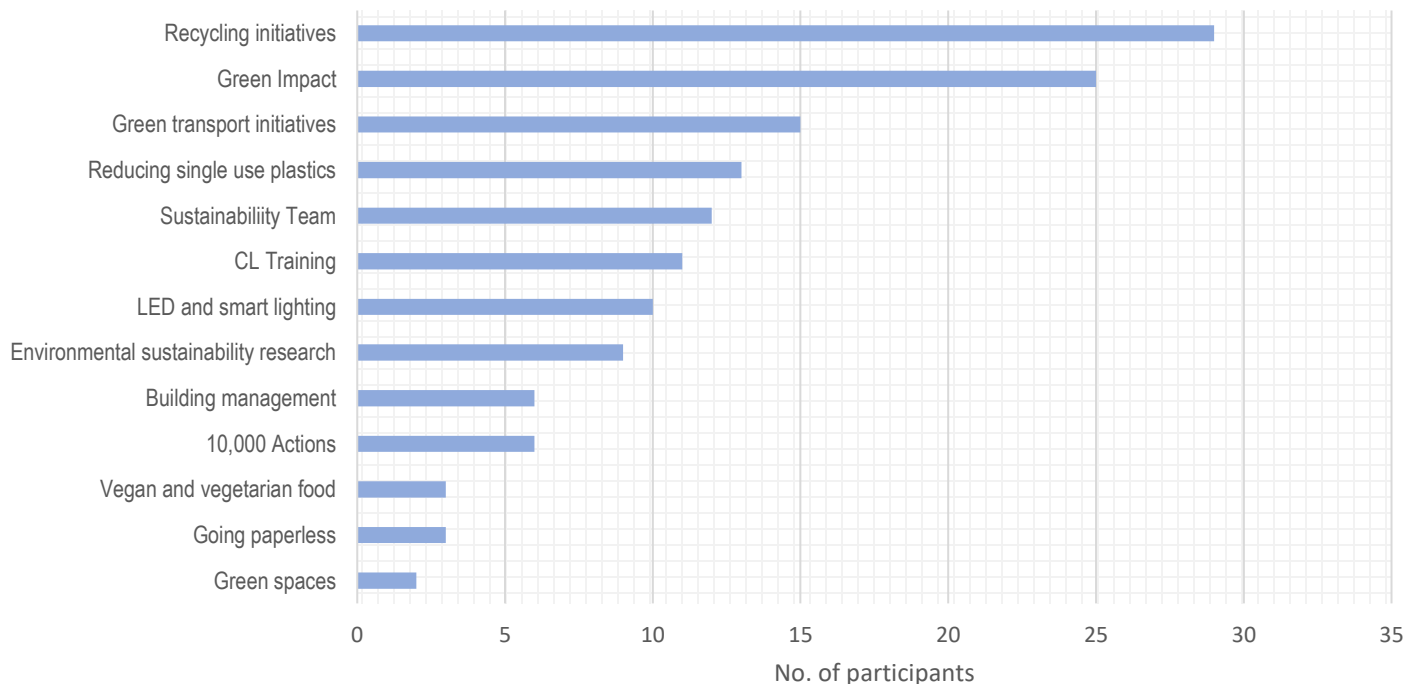


Figure 11. Histogram displaying positive actions The University is taking to combat climate change listed by participants before receiving Carbon Literacy training.

Learners were asked if they felt The University **should be doing more to tackle climate change**.

This question was in the pre-course and post course questionnaire.

PRE-COURSE: 54% felt The University should do more

POST COURSE: 84% felt The University should do more.

Learners were asked for **suggestions of how The University could do more**.

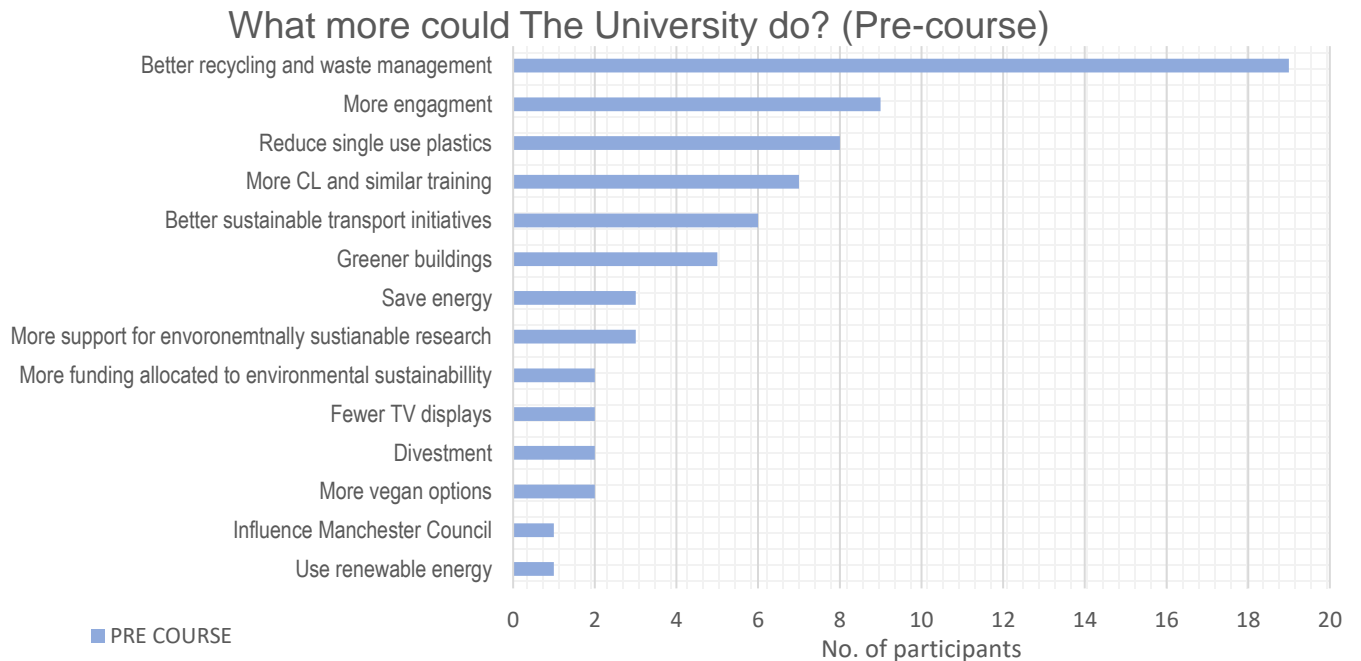


Figure 12. Histogram displaying what participants listed The University could do more of to tackle climate change before the course.

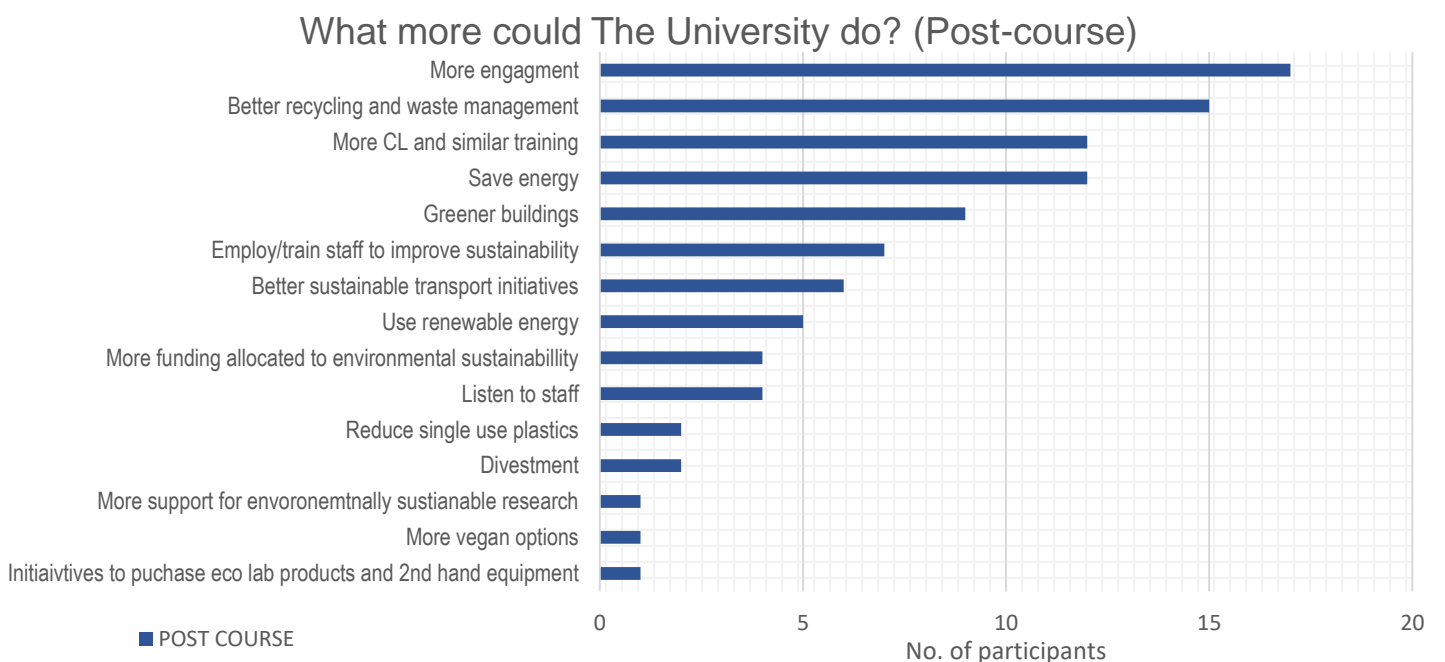


Figure 13. Histogram displaying what participants listed The University could do more of to tackle climate change after the course.

After receiving Carbon Literacy training, participants ideas of what more The University could do to tackle climate change shifted away from actions involving improving recycling, waste management and reducing single use plastics and towards actions to improving engagement, providing more training (including Carbon Literacy training), saving energy and improving energy efficiency of buildings. This can be seen in Figure 14 which compares the actions listed by participants before and after receiving Carbon Literacy training.

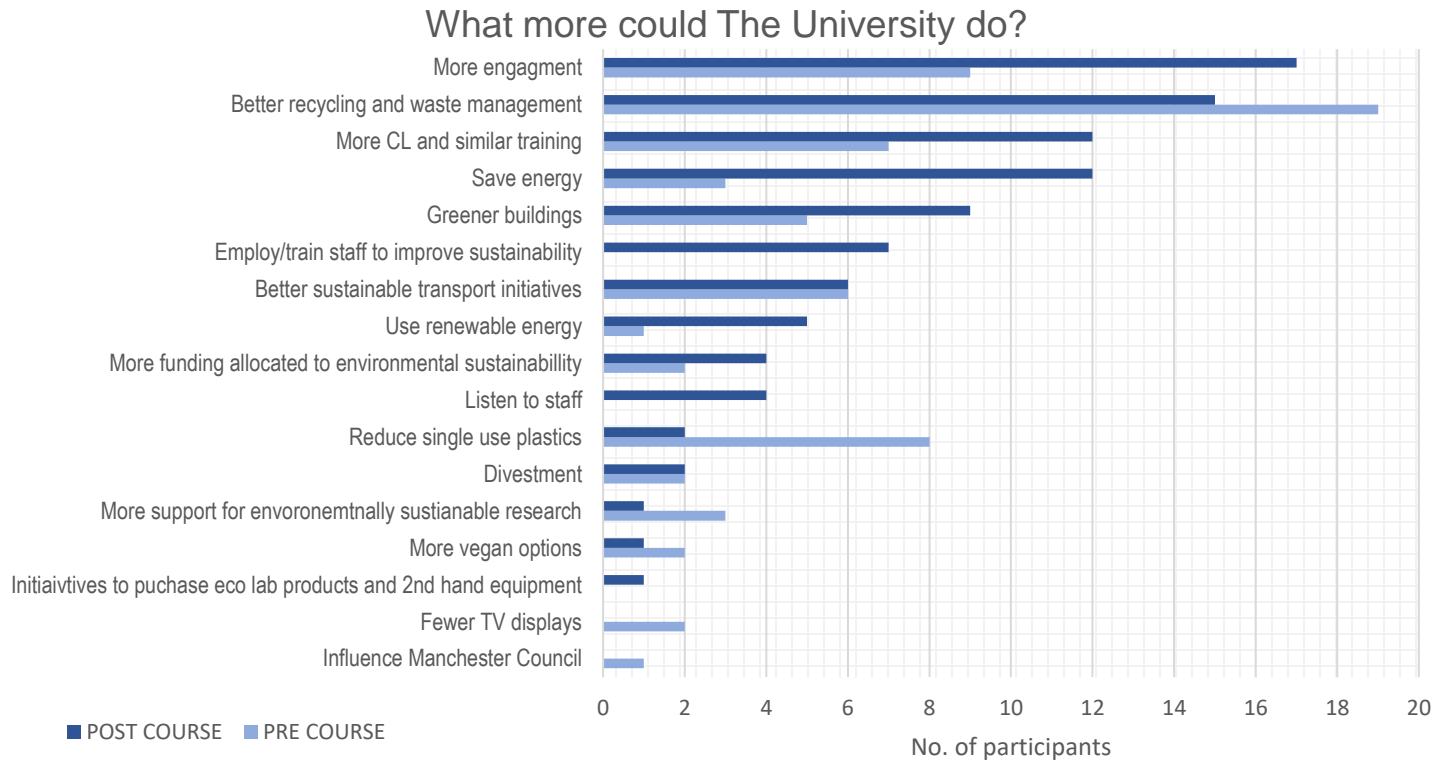


Figure 14. Histogram displaying what participants listed The University could do more of to tackle climate change before and after the course.

Learner Testimonials and Feedback

“”

“This was an amazing course which has exceeded my expectations. I would encourage anyone to attend no matter their experience or prior knowledge.”

Carbon Literacy for Labs participant

“Very interesting to sit down for a day and immerse in the topic. Activities were good, interactive, got people talking.”

“Really enjoyed the course! It’s very engaging and motivating.”

“I would definitely recommend this training to other colleagues.”

“I enjoyed the course and I think it’s an excellent initiative. I will recommend to other colleagues.”

“I really enjoyed the course. It was very informative, entertaining and fun. The trainers were all great!”

"This is one of the best courses I have had so far. Maybe a bit more time management at the end otherwise, it's flawless."

Feedback

91% of participants gave at least one positive feedback about the Carbon Literacy for Labs course. The remaining 9% gave constructive or neutral feedback.

64% said explicitly that they would recommend Carbon Literacy training to a colleague.

80% agreed that they enjoyed the Carbon Literacy for Labs course.

Some participants suggested areas in which the course could be improved; these are noted in the table below.

Feedback	Addressed
Better time management	As this was a pilot course, it is hoped that the time management will improve as the trainers gain experience.
More suggestions of actions to take	<p>The Carbon Literacy for Labs course is designed to educate and inspire action. Any actions then taken are by the learners themselves.</p> <p>A solution could be to develop a lunch group for those who attended so they can share ideas and take action as a group.</p>
More specific to lab users	The Carbon Literacy for Labs course was designed to help lab users make low-carbon choices in the lab and in their personal lives. It was written in view of the fact that people may be coming from different levels of knowledge. Future iterations to the course materials will bear this piece of feedback in mind.
More on economic impacts of sustainability for labs	Look to include information on economic impacts of sustainability for labs.
More technical information, facts and graphs	Look to include more technical information and graphs. The course was written for a general scientific audience so any graphs or technical data included must be suitable for a lay audience.
More content on strategies to influence colleagues.	Look to include more conversational techniques and strategies to influence colleagues.
Shorten course	<p>Carbon Literacy courses must consist of a days' worth of learning to be accredited as a Carbon Literacy course – an element of the (published) Carbon Literacy Standard.</p> <p>CL training can take many forms – 2 half day sessions, half e-learning half face to face, 2 hours each morning for a week. Different variations of CL for Labs could be developed.</p>
Lengthen course to two days	Learners could continue their involvement and learning by meeting in a group to discuss further action.
More up to date material	Look to update material as more information arises.
Some videos unnecessary and repetitive	Look to consolidate video.

Actions Pledged by Learners



Each learner pledged at least one significant **personal action** (to immediately reduce the carbon footprint of their personal lab space/workplace) and at least one significant **group action** (to reduce the carbon footprint of their entire lab team). The training has therefore **created at least 144 significant carbon reduction actions**. A sample of these actions is listed below.

The most common action was to distribute carbon reduction information across The University of Manchester labs and campus.

“I will include Carbon Literacy information in lab induction material to ~300 undergraduates and ~100 post-graduate students per year.”

“Initiate an MIB building Green Impact team and make the case to management for reducing carbon/energy wastage building wide.”

“I will be including lab sustainability training during my induction of new starters as well as improving signage around the lab to remind people.”

“I will spread awareness of these unnecessary carbon costs to my entire lab group through lab meetings and inductions to ensure we are not wasting energy unnecessarily.”

“I am going to work with my departments to get more Carbon Literacy training and to become a Carbon Literacy trainer myself.”

“I will start to push the labs that I work in to follow Green Impact and start making changes to the way the labs work.”



The 'Carbon Literacy for Labs' initiative aligns strongly with all the core strategies in The University's **Social Responsibility agenda**.

1. **Research with impact:** A Carbon Literate lab user is more likely to engage in research that makes a **positive contribution to society** and tackling issues with real-world impact.
2. **Socially responsible graduates:** A Carbon Literate graduate is **more employable**, informed and responsible, having **developed ethical, social and environmental leadership skills** through the programme. A Carbon Literate researcher uses their knowledge and Carbon Literacy to positively contribute to their current and future places of work.
3. **Engaging communities:** A Carbon Literate lab user transfers their skills to their communities, either directly (delivering Carbon Literacy courses, including through public engagement initiatives) or indirectly by displaying their low-carbon behaviour. A Carbon Literate lab user engages with staff, colleagues, students, friends and family around them to share their knowledge and values, **building our low-carbon culture, to the benefit of us all**.
4. **Responsible Processes:** A Carbon Literate lab user has the knowledge and tools to ensure **responsible development, purchasing, resource and energy efficiency** is achieved to the highest levels and understands the risk to the environment if carbon intensive choices are made. Carbon Literacy is **globally accessible**, regardless of the sexuality, race, religion, gender, ability or economic status of those that engage.
5. **Environmental Sustainability:** A Carbon Literate lab user has been trained to **make every-day positive and sustainable choices** that have a positive impact on the environment directly (changing immediate behaviour) and indirectly (influencing those around them).



Replicability

This pilot study is **wholly replicable**, immediately to other laboratories across The University of Manchester's campus and scalable to deliver beyond this. Through proven benefits to lab members, leaders and The University of Manchester via this initial roll-out, the created and accredited 'Carbon Literacy for Labs' course can now be made available to other labs at cost price (max. £10/pp to cover certification fees) in the absence of future funding. The small cost of which can be easily reclaimed by the lab group/PI through implementation of the Carbon Literate actions that will ensue.

Next Steps;

1. Hand over Carbon Literacy for Labs course materials and IP to The University of Manchester.
2. We advise The University of Manchester to implement changes based on learner feedback. For example, Tyndall student volunteers updating the climate change science in view of the latest IPCC report; The University's Media Centre to shoot footage of an example laboratory to teach good practise.
3. Discuss and outline clear aims for Carbon Literacy rollout at The University of Manchester, using Carbon Literacy for Labs, 10,000 Actions, Green Impact and LEAF as tools to assist one another.

Immediate Actions

Some common actions pledged by participants can be implemented immediately to create carbon savings:

- Include carbon saving practices in lab inductions across campus.
- Introduce some signage within labs to alert people of the energy waste if energy-intensive equipment is left on.
- Implement better waste management and recycling designed for common lab waste.
- Elect a lab user within each lab group to ensure low carbon choices and actions are being made.



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