

Jenesys
Associates

Evaluation of Cheers Physics Beermat Campaign

IOP Institute of Physics

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1 Introduction

The Institute of Physics (IOP) Physics in Society team aims to bring positive experiences of physics to public audiences who do not expect to be exposed to physics. In December 2013, they launched the Cheers Physics beermat campaign aimed at engaging 25 to 40 year olds with physics. 135,000 beer mats, printed with questions showing how physics can be found in the pub environment, were distributed via three breweries to 230 pubs across the UK.

The mats were produced in five different designs (see Appendix A), each asking a question about a beer-related physics fact. They were accompanied by related online activities and information. The reverse side of each mat was printed with a QR code, which directed readers to the relevant Cheers Physics page on physics.org, where they could find the answer to the questions, read more beer and physics facts and discover a related “See it in Action” experiment that they could do in a pub. The reverse also showed the #cheersphysics and the physics.org web address to encourage Twitter activity and visits to other areas of the website.

Cheers Physics aimed to communicate the following messages to pub customers and online visitors aged 25 to 40.

1. Physics has a positive impact on our lives. This includes improvements to the production, distribution and enjoyment of beer.
2. Physics is all around us, even in places where you would least expect, such as beer and the pub.

The campaign’s stated objectives were to:

1. Create and distribute at least 50,000 mats to pubs across the country where the target audience is likely to frequent.
2. Design five experiments for the target audience to do in the pub and include them on the answer webpages.
3. Generate discussion, in line with IOP’s aims, in pubs that the target audience frequents.
4. Generate discussion, in line with IOP’s aims, across different social media sites.

The IOP commissioned Jenesys Associates to evaluate the effectiveness of the campaign and this report documents their findings.

2 The evaluation

2.1 Evaluation aims

The evaluation sought to:

- Evaluate the impacts of the December 2013 Cheers Physics campaign on the target audience of adults aged 25 to 40
- Assess the effectiveness of Cheers Physics in communicating the campaign messages (see above) to the target audience
- Identify lessons that can be used to inform future similar activities targeted at adults aged 25 to 40

2.2 Evaluation questions

1. Who is interacting with the beer mats (e.g. age, location, attitudes to science/physics, level of science/physics education) and why (what are their motivations/reasons)?
2. What are the target audience's general impressions of the beer mats and their content?
3. What, if anything, are audiences doing as a result of the beer mats, and why or why not? Are they discussing physics (in person and via social media), accessing the website, using the QR code or trying out the experiments?
4. What impact is the campaign having on audience understanding and attitudes towards physics generally and the role physics plays in pubs/beer specifically?
5. How appropriate are the Cheers Physics beer mats, QR code, website and social media channels as media for communication of the project messages?
6. Which aspects of the Cheers Physics campaign are most and least successful and why?
7. What lessons or good practices are there from Cheers Physics that would be of use to future campaigns/practitioners, including those targeted at people aged 25 to 40?

2.3 Evaluation methodology and metrics

The period of the evaluation was originally intended to be 9–22 December 2013 (weeks two to four of the Cheers Physics campaign). However, some pubs did not receive the beer mats until week four and one brewery was not able to supply a list of participating pubs until week six. As a result, the evaluation took place between 10 December 2013 and 30 January 2014.

Pub visits

A representative sample of 11 pubs was visited to conduct observations and surveys or interviews with pub customers and staff. The sample encompassed urban and suburban pubs to include customers who visit pubs in town or city centres and residential areas, and to obtain feedback from different social groups, i.e. families, friends and colleagues. Pubs were visited at peak times to ensure significant numbers of customers. Lunchtime, evening, weekend and mid-week visits were arranged enabling the broadest possible mix of customers to be represented. Pubs were contacted ahead of visits to secure their agreement and to ensure that they were using the Cheers Physics beer mats.

Observations

Observations were conducted in 11 pubs to provide a basic profile of customer demographics and reactions and provide context for the other evaluative processes.

Customer questionnaire/interviews

Hard-copy questionnaires and tablet computers were used to survey a total of 132 customers in 11 pubs. 55 customers in the target age group were interviewed to gather more detailed explanations about their reactions to the campaign. The questionnaires and interviews were completed by customers who were interacting and not interacting with the beer mats.

Online survey

An adapted version of the customer survey was made available via a link from the Cheers Physics page at physics.org. A total of 33 responses were received between 9 December 2013 and 30 January 2014, when the survey closed.

Pub staff interviews

Interviews with 44 pub staff who had seen the mats captured their own reactions and their opinions about how the mats were received and used by customers. 11 interviews took place face to face during evaluators' visits to pubs and 33 were conducted via phone.

Web statistics

Traffic to the physics.org website from the QR codes and use of #cheersphysics on Twitter was recorded for the evaluation period.

Reporting and analysis

Quantitative data are presented graphically in this report. Data from answers to open questions were coded and analysed to identify themes and relevant quotes. All data have been anonymised and all customer quotes are taken from the target 25 to 40 age group.

Copies of the evaluation instruments can be found in Appendix B.

3 Findings: effectiveness of beer mat campaign

3.1 Participating pubs

Three breweries reported that they had distributed the beer mats to 230 pubs (500 mats per pub) during December 2013. 14 of the pubs were located in city centres in England and Scotland, with the remainder being in other urban or suburban locations in England, mainly in the North West and West Midlands. A breakdown by brewery is shown below.

Fig. 1. Pubs by brewery n=230

Brewery	Number of pubs
Black Country	31
Brew Dog	12
Thwaites	187
<i>Total</i>	<i>230</i>

A total of 61 pubs (including the 11 that were subsequently visited) were contacted to find out if they had received or used the mats and if they had customers in the target age group. The following table shows that most had received and were using the mats. Seven of the pubs that were not using them said they were using up stocks of other beer mats, and that they probably would use the Cheers Physics mats in the future. Two pubs reported that they were not using the mats as they did not match their corporate branding and one said they did not like the mats and thought they were patronising to their customers.

Fig. 2. Use of beer mats n=61

Brewery	Number of pubs
Received and used	44
Received and not used	10
Not received	7
<i>Total</i>	<i>61</i>

Staff at 33 pubs that had received mats were interviewed about their opinions and the percentage of their customers that were in the target age range of 25 to 40. City pubs were most likely to report that more than 60% of their customers were in the target age group.

Fig. 3. Customers in target age range n=33

% in target age group	Number of pubs
0 to 20%	1
21 to 40%	15
41 to 60%	11
61% plus	6
<i>Total</i>	33

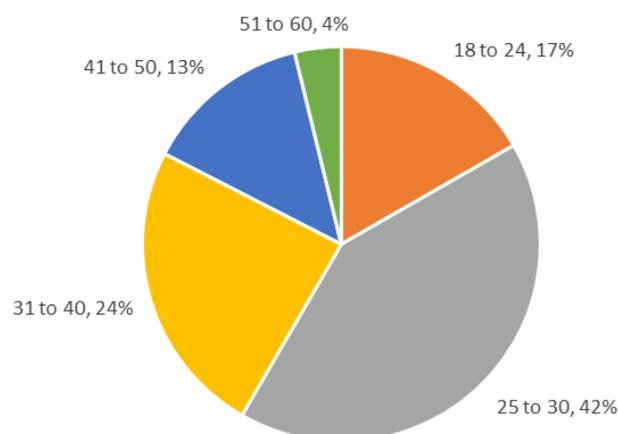
All five designs of beer mats were being used in each of the 11 visited pubs. In three of these pubs it was corporate policy to keep beer mats piled on the bar for customers to take and use if they wish. In the other eight, the beer mats were distributed at random on tables and bars.

3.2 Customer demographics

132 customers completed a questionnaire. 62% (82) were male and 38% (50) were female, which was representative of the total observed audience in the visited pubs. 95% (125) of respondents came from the UK and 5% (7) were from overseas. Six of the non-UK respondents were in the target age group.

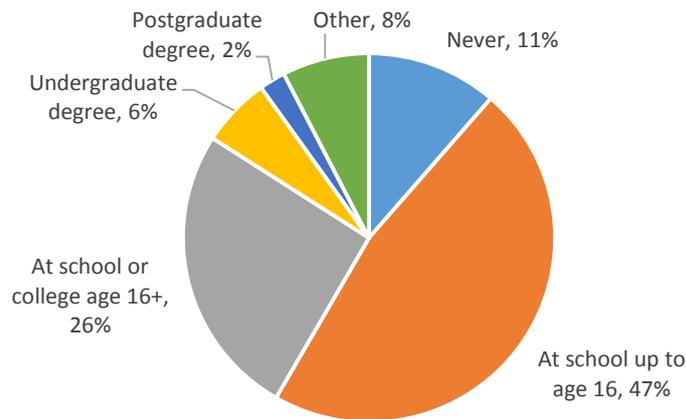
As the following graph shows, 66% (87) of respondents were in the target 25 to 40 age group.

Fig. 4. Age profile of questionnaire respondents (n=132)



A majority of questionnaire respondents (89%, 117) had studied physics at some level. It should be noted that those who selected “at school up to age 16” included respondents who had not taken any formal qualification (e.g. GCSE) or had studied physics as part of a general science course. In the target age group, 89% had studied physics at some level.

Fig. 5. Physics background of respondents (n=132)



Customers had a mixed reaction when asked if they liked physics, with the most common reaction being that physics is something that is interesting rather than likeable or enjoyable.

I'd say I was interested in it or some parts of it, more than liking it. It's fascinating to see what science can do (female, 31 to 40).

Physics is important because it has such an impact on the technology we all use in our lives, so I like it from that point of view, what it can do for us (male, 25 to 30).

It's quite cool – fascinating – to see what it can do (female, 25 to 30).

The next most common opinions were to be neutral about liking or disliking physics. Most of those who disliked physics said they did not like it at school.

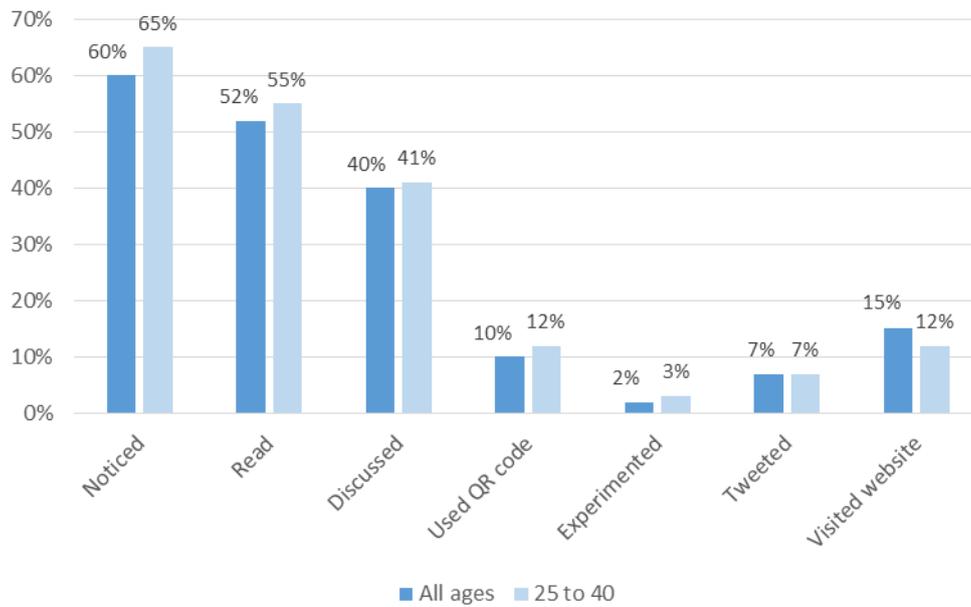
3.3 Customer reactions

To determine their initial reactions, questionnaire respondents were asked if they had noticed, read or discussed the beer mats. To gauge the impacts of the mats, respondents were also asked if they had used a QR code, tried a “See in Action” experiment, tweeted or visited the Cheers Physics website. As shown in figure 6, those in the target age group were slightly more likely than the whole sample to have noticed, read or discussed the mats, or used the QR code or tried an experiment.

The percentages of respondents who had used a QR code, tweeted, visited the website or carried out an experiment were lower than those who had noticed, read or discussed the beer mats.

All respondents who had used a QR code had visited the website. However, 5% (7) had visited the website but not used a QR code, having searched for Cheers Physics or used the physics.org URL from the beer mat. Of these, six were in the target age group.

Fig. 6. Respondents' reactions (n=132)



In interview, customers who had noticed or read the mats said they were attracted by the eye-catching designs or interesting subject matter. This view was shared by pub staff, who also commented that for this reason the mats had been popular with collectors.

They are really bright and different looking. I noticed them straight away (male, age 31 to 40).

It's not something you usually see in a pub. They look different and I like them (female, age 25 to 30).

The collectors really liked them and they seem popular with all ages (pub staff).

The fact they all went within a week or 2 suggests that they were popular and taken or used extensively (pub staff).

The most-common reactions observed by the evaluators and pub staff were customers talking about the mats to other customers or asking pub staff for answers to the questions. Most of the observed or reported conversations were short and, when asked, interview subjects indicated that they discussed the unusual nature of the mats and answers to the questions.

We talked about the glass one because we all thought the answer was different (male, age 25 to 30).

We couldn't agree on the answer about carbon dioxide so we talked about that for a bit. We also had a bit of a conversation about our favourite one (female, age 31 to 40).

I would say they were a talking point, but I didn't see any really in-depth discussions (pub staff).

The main explanations for customers not having noticed or read the beer mats were not usually being interested in beer mats or being too busy socialising.

I never look at beer mats to be honest (male, age 25 to 30).

When you are chatting to friends it's not something I'd normally do (female, age 31 to 40).

A minority of customers commented that the pubs were busy in the pre-Christmas period and that they could be more likely to notice or discuss the mats during quieter periods. This opinion was also expressed by some pub staff.

Customers who were not previously engaged with mats were often observed reading and discussing them after completing a questionnaire or being interviewed.

Only a minority of interview subjects had used a QR code, either on the mats or ever. Customers' explanations for not having used these codes were varied. They included not having a smartphone, there being no Wi-Fi or 3G signal, not having a QR-code reader, the unreliability of QR readers and not being sufficiently interested to find out the answer. Customers and pub staff reported that the need to use a QR code to access an answer was the main weakness in the campaign, with pub staff and evaluators' observations suggesting that opinions and feedback about QR codes were not age-related.

I've never needed to use one [a QR code] for anything and so I wouldn't know where to begin (male, age 25 to 30).

I have a PhD in computer science and I don't use one. I've never seen the need. There are too many steps in the process, you have to download a scanner then scan and then you eventually get to the website (female, age 31 to 40).

I think they were everywhere a few years ago, but I haven't used the QR reader on my phone for ages. Until you asked me I'd sort of forgotten about it (male, age 31 to 40).

QR codes are technology with no real demand or need. I've never needed one and I use technology a lot (female, age 25 to 30).

At first there was interest [from customers] but you had to use the QR code and it dropped off once they realised that (pub staff).

QR codes are like minidisks compared to downloading. They've been replaced by things like NFC (pub staff).

Pub staff said they were sometimes asked for the answers and that customers would have preferred them to know than being required to use a QR code to find out.

The most common customer explanation for not tweeting was not being a user of Twitter. Customers who gave this answer included those without smartphones and those who own them but do not use this form of social media or social media at all. Customers who did use Twitter, but had not tweeted about the mats, said they could not think of a reason to do so. None of the interviewed pub staff had tweeted about Cheers Physics. They included staff

who had tweeted during the campaign period about other related subjects, such as facts about beer and brewing.

Customers who had visited the Cheers Physics website liked it, but none had visited other areas of physics.org. None of the interviewed pub staff had visited the site. The visual style of the site and its content received positive comments from customers who had visited.

It's quite cool, I like that there are other facts about beer, but the main thing is you get the answers (male age 25 to 30).

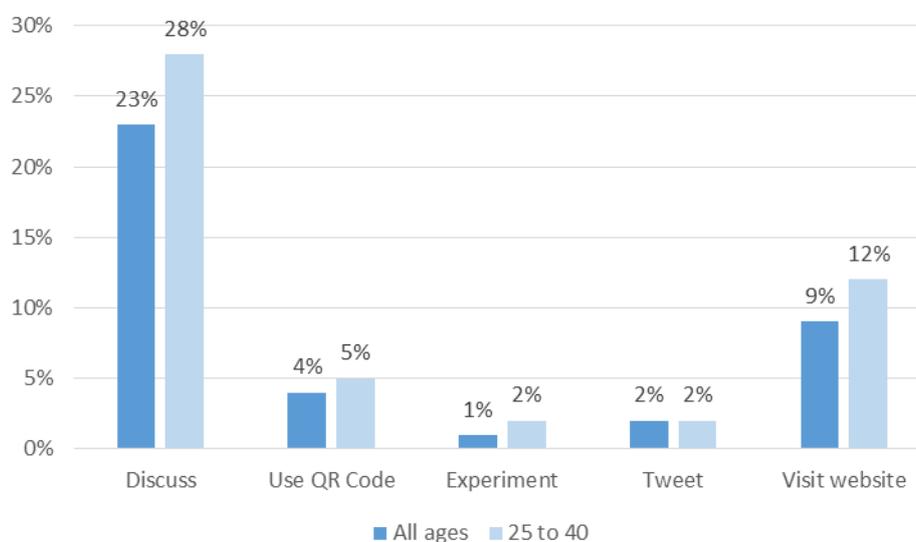
The site is really nice, maybe it needs to be promoted in other ways, not just the beer mats, as the response from that must be pretty random (female, age 31 to 40).

All questionnaire respondents who had tried an experiment (2%, 3) were interviewed. They were all members of the same social group who had tried the different glasses experiment, which they reported to be fun and enjoyable. They said it was important that the experiments did not involve any wastage of beer or food. Interview subjects who had not tried the experiments either said that it was not the sort of thing they would do or said they had not used the QR code and so did not know about the experiments. None of the pub staff who were interviewed had seen any customers trying an experiment.

3.4 Customer intentions

The questionnaire asked respondents who had not reacted to the mats in any way if they were likely to do so in the future. As shown in figure 7, they were more likely to discuss the mats than have any other intentions.

Fig. 7. Respondents' reactions (n=132)



Customers who were interviewed indicated that they could be more likely to tweet or visit the website if there was some sort of incentive, such as a competition or entry into a prize draw. They said that the prize did not have to be large. Pub staff expressed the same views.

You need more of a reason to do any of these things. Having a prize would be good and it does not need to be a big prize (female, age 31 to 40).

If there was a competition linked to the beer mats and it was advertised on posters around the pub, you'd get more people doing this stuff (male, age 25 to 30).

Maybe having a competition or draw would encourage them to visit the website. Honestly these things work well and the prizes don't have to be significant (pub staff).

In some pubs, where there was no reliable Wi-Fi or 3G signal, or no signal at all, customers and pub staff pointed out that all they could do was read or discuss the mats.

During interviews, some customers suggested that they could be more likely to try the experiments if they were printed on the beer mats and it was not necessary to go through the QR code or website to find them. It was suggested that having occasional demonstrations of the experiments in the pub could also encourage customers to try the experiments. Some customers suggested that having a competition for the best photograph of an experiment could have encouraged people to try them out and tweet pictures. A small number suggested that they would definitely try the experiments if they were printed on the beer mats as that would make them easier to find.

Maybe a poster advertising a prize for the best picture of an experiment in this pub would encourage people to try one (female, age 25 to 30).

We'd be more likely to do an experiment if they were printed on the beer mats and easy to find. That would surely get more people talking (male, age 31 to 40).

Some customers and pub staff thought that there was too much different information on the reverse of the beer mats, which promoted QR codes, twitter and the website, along with three logos. They felt that reactions and responses may have been enhanced if there was only one action described, as customers would have known more clearly what they were expected to do.

It's all a bit confusing. Do they want me to tweet, visit the website? The QR thing is the biggest item, but I don't use them (male, age 25 to 30).

They [customers] liked them, but they weren't really sure what they were supposed to do (pub staff).

3.5 Campaign messages

The questionnaire asked respondents to describe the main messages of the Cheers Physics beer mats. 108 customers answered this question and their responses were categorised as shown in the following table. Note that some responses described more than one message. Responses were similar across all age groups and the quotes are taken from the target age group.

Fig. 8. Respondents' understanding of campaign messages (n=108)

Category	Number
Linking physics with beer or pubs	26
Linking science with beer or pubs	22
Promoting physics specifically	18
Promoting science generally	15
Publicising a website	13
Publicising organisations (IOP, Beer Academy, etc.)	11
Encouraging discussion about physics/science	10
Don't know	10

Examples of responses that linked physics or science with beer or pubs were:

How brewers use physics to make and package beer (male, 31 to 40).

That making beer is a scientific thing or process (female, 25 to 30).

They were telling us about the science of beer and beermaking (male, 25 to 30).

Some ideas about how physics is in beer (female, 31 to 40).

Most responses that were categorised as promotion of science or physics mentioned applications in everyday life or the fact that the mats were aiming to increase audience interest in these subjects.

They are telling us that physics and science are everywhere (female, 31 to 40).

I think they are encouraging us to think about where we might see science being used (female, 25 to 30).

They are trying to make physics more exciting and appealing (male, 25 to 30).

To get people to think that science, and physics particularly, is interesting and in lots of places that you might not obviously think of (female, 31 to 40).

Interview feedback indicated that the link between physics and beer or other areas of everyday life was not something that most customers had thought about previously.

I suppose it is obvious once you think about it, but I had never thought of physics in this way before – as something connected to beer and how it is made (female, 25 to 40).

It's just not one of those things you think about. You drink your drink without really thinking about how it is made and what's in it, let alone what glass is best for it or what makes it that colour (male, 25 to 30).

When you think hard about it, physics is probably in lots of other places that you'd never thought of before (male, 31 to 40).

10 questionnaire responses mentioned that the mats were trying to get people to discuss or talk about physics or science.

I think they are trying to get more people to talk or think about science (female, 25 to 30).

To promote and start a discussion in the pub about science, mainly physics because it mentions physics on the beer mats (male, 25 to 30).

They are selling science and getting people talking (female, 31 to 40).

This point was also mentioned in interviews, where the relevance of a location where conversation takes place was highlighted.

In the pub you talk about loads of different stuff. I guess they want physics to be one of the things people talk about (male, 31 to 40).

If you look around most people are talking, so I think it's about getting them to talk about physics somewhere where they would talk naturally or usually (female, 25 to 30).

Pub staff were also asked about the campaign messages. All said that the beer mats were promoting physics, with some also commenting that they were possibly promoting the organisations whose logos appeared on the mats.

They are obviously promoting physics, but what about the Beer Academy. Their logo is on there, is it about promoting them to (pub staff).

I would say they are promoting links between physics and beer and maybe the organisations on the back of the mats (pub staff).

In this context, some pub staff asked questions about the role of the Beer Academy and British Beer Pub Association in the campaign, suggesting that as their logos were on the mats, they should have an explicit, active role. A few also wondered if the mats should feature their brewery's logo as this could have increased brewery involvement in the campaign, which could have been used to enhance staff and customer interest and engagement.

4 Findings: online activities

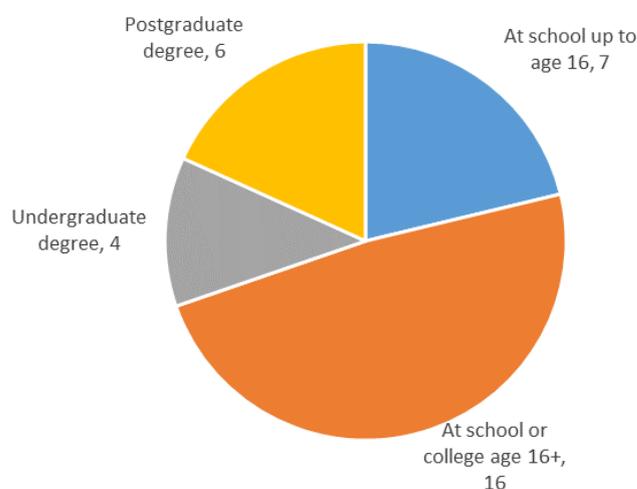
4.1 Online survey

There were 33 responses to an online survey that was linked to the Cheers Physics section of physics.org. 17 respondents (52%) were in the target 25 to 40 age group, with 10 (30%) being older and 6 (18%) younger.

10 respondents (30%) were female, 21 (64%) were male and two respondents preferred not to state their gender. 14 (42%) lived in the UK and 19 (58%) came from overseas, with USA (8, 24%) and India (4, 12%) being the most common overseas locations.

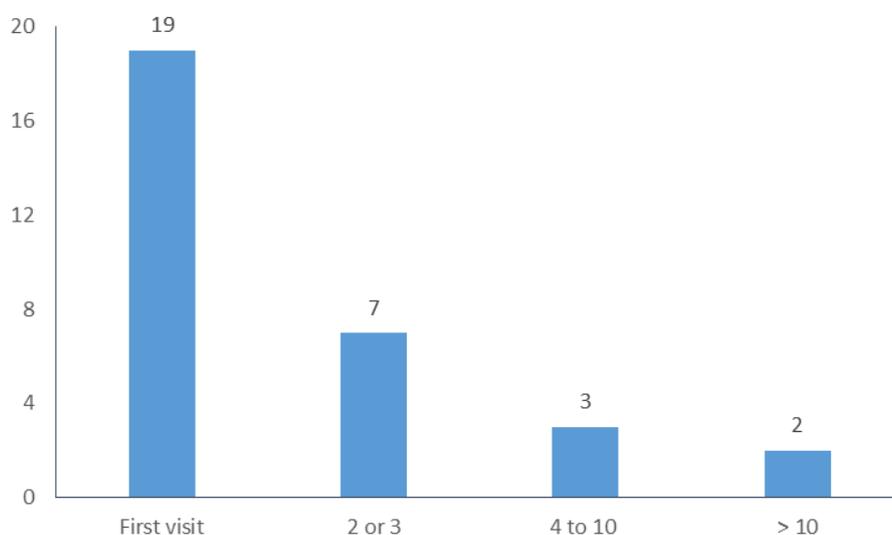
All respondents had studied physics at some level, with a majority (26, 79%) having studied it beyond the age of 16.

Fig. 9. Physics background of survey respondents (n=33)



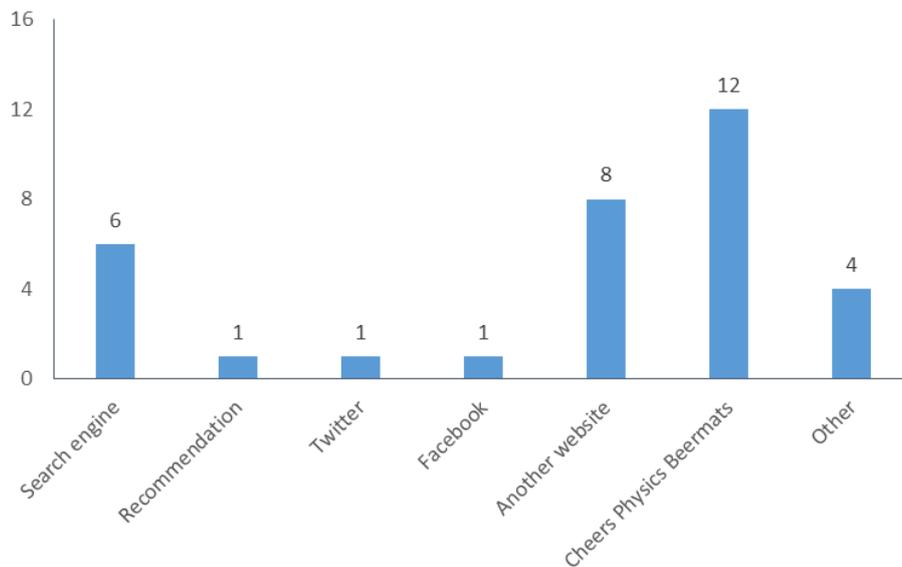
Most respondents (19, 58%) were visiting the Cheers Physics website for the first time. Two respondents who had visited more than 10 times were in the 25 to 30 age group, based in the UK and had studied physics at postgraduate level.

Fig. 10. Visits to the Cheers Physics website (n=33)



12 respondents (36%) had heard about the Cheers Physics website via the beer mats. They were all based in the UK and half (6, 18%) were in the target age group. The two other UK-based respondents had learned about the website through “recommendation”. Descriptions of “other” methods were Gmail and physics.org.

Fig. 11. How respondents heard about the Cheers Physics website (n=33)



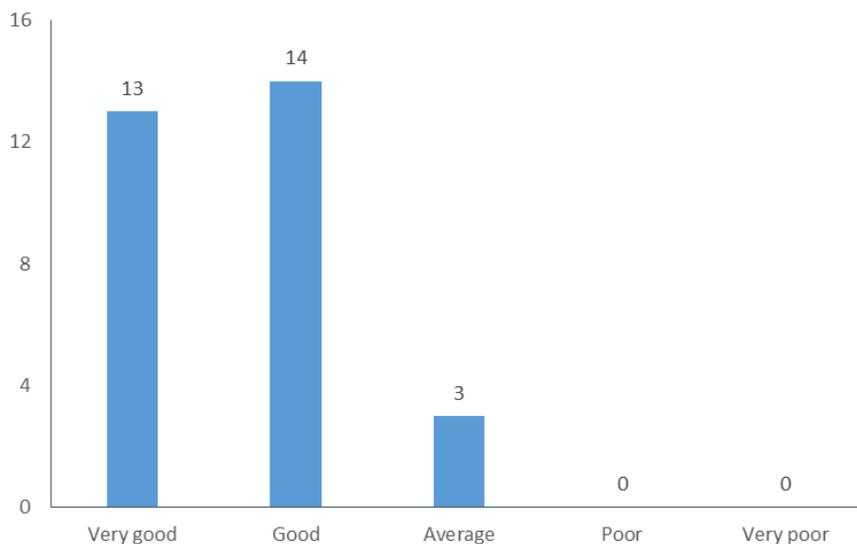
Respondents rated the Cheers Physics website positively. Their explanations highlighted the site’s content and appearance, although there were a few suggestions that its accessibility for smartphone users could be improved.

Interesting material! And different! (male, age 31 to 40).

Interesting topic. Clean interface (female, age 31 to 40).

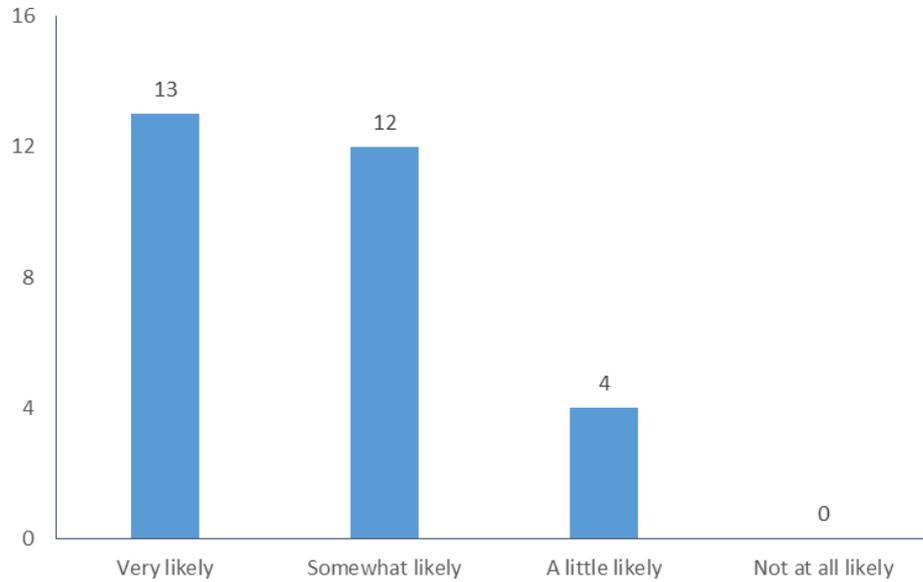
It’s pretty good, but could be more mobile friendly. It’s a bit jerky (male, age 25 to 30).

Fig. 11. Respondents’ rating of Cheers Physics website (n=33)



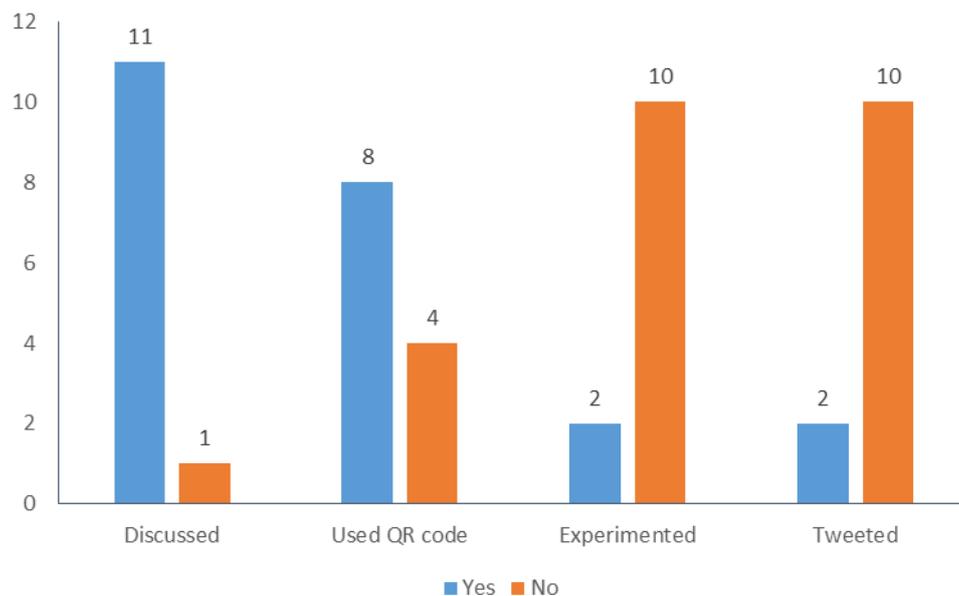
The survey asked respondents how likely they were to visit the rest of the physics.org website. 29 people answered and most selected “very” or “somewhat” likely. All four respondents who chose “a little likely” were based in the UK and aged 25 to 30.

Fig. 12. Likelihood of exploring physics.org (n=29)



Respondents who had found out about the website via the Cheers Physics beer mats were asked if they had discussed them, used the QR codes, tweeted or tried an experiment. Most had discussed the mats or used a QR code. Only a minority had tweeted or tried an experiment. These reactions were the same across all age groups.

Fig. 13. Respondents’ reactions to Cheers Physics beer mats (n=12)



Most respondents who had not completed one of the nominated actions indicated that they were the unlikely to do so in the future.

4.2 Website and social media

Google Analytics reported that a total of 6185 individual visitors had viewed the *Cheers Physics* webpages between 1 December 2013 and 31 January 2014. The percentage of visitors who viewed one page only ranged from 66.7% for “bubbles” to 82.9% for the index page.

Fig. 14. Visits to Cheers Physics webpages

Page	Number of visits	Average time spent on page
Cheers Physics landing page	3,277	
Why is the bottom of your beer bottle bumpy?	558	2min 14sec
How much CO ₂ is there in your pint?	601	2min 4sec
Which type of glass does your beer prefer?	542	3min 36sec
If beer is brown why is the head white?	714	1min 58sec
Are the bubbles rising or falling in your pint of stout?	493	2min 16sec
<i>Total</i>	<i>6185</i>	

An analysis of bit.ly links for the QR codes showed that they were scanned a total of 2464 times during the evaluation period. The number of scans was highest for “head” at 658 and lowest for “bubbles” at 400.

Fig. 15. Use of Cheers Physics QR codes

Code	Number of clicks
Why is the bottom of your beer bottle bumpy?	451
How much CO ₂ is there in your pint?	543
Which type of glass does your beer prefer?	412
If beer is brown why is the head white?	658
Are the bubbles rising or falling in your pint of stout?	400
<i>Total</i>	<i>2464</i>

Website and QR-code activity peaked at weekends and during the days between Christmas and New Year.

A low level of Twitter activity was recorded between 1 December 2013 and 31 January 2014, which is unsurprising as there was no planned proactive Twitter campaign. All tweets were positive.

5 Findings: targeting 25 to 40 year olds

During interviews, customers and pub staff were asked what they thought worked well about the Cheers Physics campaign in engaging the target 25 to 40 age group and how they thought it or other physics activities aimed at this age group could be improved. Their answers identified a number of success factors and lessons, and suggested some opportunities for maximising engagement and impacts for the target group.

None of the customers could think of a science activity or message that was targeted specifically at the general population in their age group. However, they could describe activities aimed at younger people, including school and university students, and at families with school-age children. Some also mentioned activities that they thought were targeting those in their age group with an expressed interest in science.

There's nothing just for us. Museums and places do sciencey things for families and school kids, but I can't think of anything just for us (male, 25 to 30).

I'm not aware of anything specifically for ordinary people of my age, other than talks and TV programmes about science, but you've got to be already interested to like those (female, 31 to 40).

I honestly can't think of anything general just for us – people who aren't scientists or geeks (female, 25 to 30).

The beer mats and website were thought to be visually appealing and intriguing for the target age group. The relationship between physics and everyday life, especially beer or pubs, was also thought to be relevant to them. However, the requirement to use QR codes and the lack of a competition or prize incentive were significant barriers to further engagement or action by the target group. It was also suggested that the target age group want a straightforward message and were sometimes confused about what they were expected to do in Cheers Physics as there were several options printed on the mats.

You have to make it as easy as possible for people to know what you want them to do. One big simple action is a lot better than lots of options (female, 31 to 40).

The best beer mat campaigns are the simplest ones that promote one beer or one brewery or one competition. They don't confuse anyone (pub staff).

Customers and pub staff who use Twitter said that the target age group needs to be motivated to tweet. They reported that there was insufficient stimulus for them to tweet about the Cheers Physics campaign. Some suggested that a series of regular tweets to pub Twitter accounts or beer interest groups with significant numbers of members or followers would have increased tweets and promoted awareness of the mats. Customers in the target age group who do not use Twitter or do not have smartphones said it was important for campaigns to include outcomes or actions that did not rely on the use of these technologies or social media.

You have to make it worth my while. Why should I tweet? What's in it for me? I don't mean a financial reward, but are others with similar interests tweeting – is there really something to talk about? If they are then I'm more likely to (male, 25 to 30).

If the Institute of Physics or Beer Academy was regularly tweeting about it to other 'beer' twitter feeds, then it would stimulate a lot more interest (male, 31 to 40).

Don't forget that you have to have something for people who don't have smartphones, and there have been quite a few in your age group (pub staff).

Generally, taking physics to locations where 25 to 40 year olds are usually to be found in groups was deemed to be a good idea. It was pointed out that members of this age group are financially independent, and have the time and resources to participate in hobbies or join groups around particular interests. A number of “communities of interest” where physics is relevant or applied were suggested as providing opportunities for targeting groups of 25 to 40 year olds. Most of these “communities” were based around conventional social activities, such as sports teams, arts groups or craft hobby groups, but they also included communities such as tattoo clubs, Goths, gamers and parents or expectant parents. In all cases it was stressed that the link between physics and these groups needed to be genuine as well as interesting or provocative, and be presented or delivered at the locations or forums where the groups usually convene.

If you think about it, we're here because we like pubs and socialising. You could do something similar in other places – places where people meet up and talk about a subject and do something together (female, 25 to 30).

Obviously you need to have something interesting for us to talk about or do, but once you've made the connection between physics and whatever it is – football, knitting or whatever – I reckon there'd be loads of things that we'd enjoy (male, 31 to 40).

All of the suggested “communities of interest” were characterised by their social nature and in many cases there was also sharing of knowledge or experience. Customers and pub staff suggested that these characteristics could be useful in any physics engagement activity.

Often you are learning something as well as enjoying yourself when you do a hobby like art or crafts. If you could learn about physics at the same time as you learn the craft and enjoy yourself that would work perfectly (female, 31 to 40).

Anywhere that people are going along to gain some new knowledge and have a good time would be suitable to use for an interesting physics story (male, age 25 to 30).

Customers indicated that some form of proactive intervention or facilitation by an expert or “knowledge gatekeeper” within Cheers Physics would have increased their engagement and could have stimulated more discussion as well as improved their understanding of campaign messages and what was expected of them. They suggested that this expert intervention could have taken the form of pub staff having greater understanding of the campaign or scientists visiting pubs to demonstrate simple experiments. Some pub staff also indicated

that they would like to have known more about the campaign so they could have played a more active role in promoting and communicating messages.

The bar staff really didn't know much about the mats. It would be helpful if there was someone who could answer questions or explain a bit more about the mats and their purpose (male, 31 to 40).

You can't expect the bar staff to know everything about the mats. Something like a scientist showing some of the experiments would be good. It could be quite entertaining as well as help more people to realise what the mats are all about (male, 25 to 30).

I think they were looking for an expert to have the answers. In the pub that is the person behind the bar, which is why they were asking us the answers. You could see that happening in other situations where someone else is expected to have more knowledge, like a class or hobby club (pub staff).

Staff and customers mentioned that any form of physics communication campaign would benefit from supporting materials, such as posters and activities like quizzes that pubs could use themselves to promote the messages and possible actions.

It was generally felt that activities targeted at 25 to 40 year olds should not be patronising or condescending. Customers in the 25 to 30 age group were particularly keen to highlight that targeting should be specific to the age group and not aimed primarily at students.

If you are after that age group particularly then you need to make it clear that whatever you are doing isn't a student thing, but is for a different, older age group (female, 25 to 30).

We're not students anymore, so whatever it is should be clearly promoted as being aimed at us (male, 25 to 30).

Customers in the 31 to 40 age group highlighted that some of them were new or expectant parents and suggested that this status could be exploited.

If you are about to have or have just had kids, then that is a powerful part of your life. Anything that presses the new-parent buttons would have the best chance of working (female, 31 to 40).

You do have people in this age group with a common bond of being parents or nearly parents. There must be some story for the role of physics in the lifecycle from conception to primary school (male, 31 to 40).

6 Conclusions

This section summarises Cheers Physics' achievements in communicating the stated messages and achieving the desired objectives. It then draws some more general conclusions.

6.1 Messages and objectives

Message 1. Physics has a positive impact on our lives. This includes improvements to the production, distribution and enjoyment of beer. Pub customers and staff thought that the mats were linking physics with beer or pubs. 24% of customers reported that this was the main message of the mats, suggesting that they understood that physics has an impact on this aspect of their lives. While no-one explicitly described a "positive impact" of physics, the fact that customers connected physics to a social, enjoyable activity and a sociable location suggests that the impact is positive.

Message 2. Physics is all around us, even in places where you would least expect, such as beer and the pub. Most customers had not previously thought about the connection between physics and pubs or beer, indicating that this was unexpected and was a direct impact of the campaign. Most of the 17% of customers who thought the beer mats were promoting physics made a connection between physics and everyday uses or applications.

Objective 1. Create and distribute at least 50,000 mats to pubs across the country where the target audience is likely to frequent. Cheers Physics distributed 135,000 beer mats to a total of 230 pubs in England and Scotland. Just over half of pubs that were contacted reported that 40% or more of their customers were in the target age group of 25 to 40, with 18% having more than 60% of customers in this age group. City pubs were most likely to report that over 60% of their customers were age 25 to 40.

Objective 2. Design five experiments for the target audience to do in the pub and include them on the answer webpages. Five experiments were designed and included on the Cheers Physics pages of physics.org. No-one was observed carrying out these experiments by pub staff or during evaluation visits to pubs and 2% of customers reported that they had tried one. 85% of customers and 100% of pub staff had not visited the website and were not aware of the experiments.

Objective 3. Generate discussion, in line with IOP's aims, in pubs that the target audience frequent. 40% of customers (41% of the target age group) had discussed the mats with other customers or pub staff. This was the most-common response observed by the evaluators and pub staff. The attention of customers and pub staff was drawn to the mats by the evaluation, which in some cases increased the number and extended the length of discussions that were observed.

Objective 4. Generate discussion, in line with IOP's aims, across different social media sites. There were no significant discussions about Cheers Physics on Twitter and there was no planned proactive Twitter campaign by IOP aimed at starting discussion. None of the participating pubs or breweries tweeted about Cheers Physics. All of the observed tweets were positive.

6.2 General conclusions

Distributing the beer mats was the responsibility of the breweries and IOP had no influence over which pubs were targeted, meaning that the mats were sent to pubs that did not use them or did not have a significant number of customers in the target age range.

Most customers (60%) had noticed the Cheers Physics beer mats and 52% had read them. These figures are slightly lower than the percentages in the target 25 to 40 age group, which were 65% and 55%, respectively. Customers were attracted by the colourful appearance and the content of the mats, which was deemed to be unusual and interesting, as well as being relevant and appealing to the target age group.

The main impact of the beer mats was to stimulate discussions among customers, and between customers and pub staff. 40% of customers (41% of 25 to 40 year olds) had discussed the mats. Other impacts were less significant with 10% of customers accessing the website, 10% using a QR code, 7% tweeting and 2% trying a Cheers Physics experiment. A majority of visitors to the website rated it positively.

Cheers Physics had positive impacts on the understanding of customers who engaged with the beer mats. Only 10% could not describe a main message. 26% thought the mats were linking physics with beer or pubs and 17% thought they were promoting physics, including promoting the role of physics in everyday life.

39% of individual visitors to the Cheers Physics webpages had scanned a QR code, which was an average rate of 249 scans per design. Most visitors to the website rated it positively.

In summary, Cheers Physics produced and distributed five designs of beer mats, which stimulated discussion among pub customers, including those in the target 25 to 40 age group. The beer mats and an accompanying website encouraged those who engaged with them to think about how physics relates to pubs and beer. Other impacts were less successful. The QR codes were not widely used and were deemed to be a significant barrier to further engagement. The numbers of customers who tweeted or tried an experiment was low. A number of suggestions were made about how these less successful impacts and the overall campaign could be enhanced. For customers who engaged with the mats, they effectively communicated messages about links between physics and beer or brewing and encouraged recognition about the role of physics in everyday life.

7 Recommendations

This section summarises some learning points and good practice for IOP and others who want to run beermat campaigns or target adults in the 25 to 40 age group.

Success Factors – Beermat Campaign

- Target pubs that are visited by significant numbers of your intended audience
- Have several designs to maximise opportunities for engagement
- Print questions on mats to stimulate discussion
- Use alternatives to QR codes to promote website visits and to enable those without smartphones or tablets to interact
- Ensure pub staff are well briefed, and directly briefed if possible, to maximise their understanding of the campaign
- Provide accompanying materials and suggestions for pub staff to promote the beer mats and activities locally
- Consider an incentive to encourage participation in online activities
- Incorporate a proactive social media campaign targeted at pubs, beer groups and customers
- Make the role of any partners clear and use them to target customers directly

Success Factors – Targeting 25 to 40 year olds

- Target existing “communities of interest”
- Integrate physics into other activities or interests undertaken by groups of 25 to 40 year olds
- Exploit the opportunity for communication presented by activities that already incorporate socialising and knowledge exchange
- Make it explicitly clear exactly what actions or responses are expected from audiences
- Identify knowledge “gatekeepers” and ensure they are fully briefed and engaged with the aims of any campaign
- Adopt a proactive approach to online and social media communications
- Ensure access to relevant information and messages is available on- and offline

8 Appendix A: Beermat designs



The bumps make your bottle...



- a. Stronger
- b. Easier to recycle
- c. Easier to transport

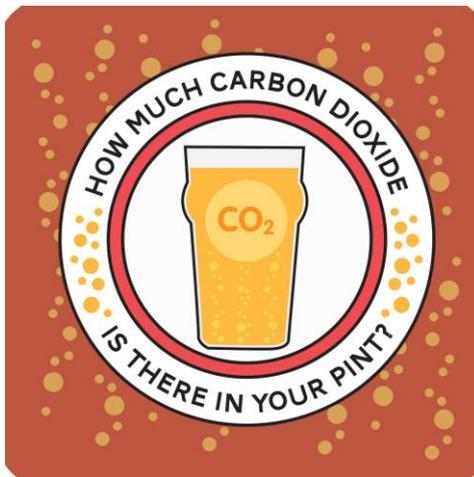
← SCAN FOR ANSWER

#cheersphysics
Get more pint-sized physics at physics.org



www.beeracademy.co.uk

IOP Institute of Physics

How much carbon dioxide is there in your pint?



- a. Three quarters of a pint
- b. A pint
- c. Two and a half pints

← SCAN FOR ANSWER

#cheersphysics
Get more pint-sized physics at physics.org



www.beeracademy.co.uk

IOP Institute of Physics




Which type of glass does your beer prefer?



← SCAN FOR ANSWER



← SCAN FOR ANSWER

#cheersphysics
Get more pint-sized physics at physics.org



www.beeracademy.co.uk

IOP Institute of Physics





Is the foamy head white because...



- a) Carbon dioxide in the bubbles emits light?
- b) Yeast is white?
- c) Bubbles scatter the light?

← SCAN FOR ANSWER

#cheersphysics
Get more pint-sized physics at physics.org



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IOP Institute of Physics



BRITISH BEER & PUB ASSOCIATION



Are the bubbles in your pint of stout rising or falling?



← SCAN FOR ANSWER

#cheersphysics
Get more pint-sized physics at physics.org



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IOP Institute of Physics



BRITISH BEER & PUB ASSOCIATION

9 Appendix B: Evaluation instruments

9.1 Customer survey questionnaire

Firstly, we'd like to know something about you to provide some context for your answers.

What is your age?

- Under 18
- 18 to 24
- 25 to 30
- 31 to 40
- 41 to 50
- 51 to 60
- 61 to 70
- 71+
- Prefer not to say

What is your gender?

- Female
- Male
- Prefer not to say

Where do you live?

- UK
- Outside UK

[If UK] What is the first part of your postcode? (e.g. SN10).....

[If outside UK] Which country do you live in?.....

Have you ever studied physics?

- Never studied
- At school up to age 16
- At school age 16 +
- Undergraduate degree
- Postgraduate degree
- Other (please describe).....

Secondly, we'd like to know what you think of the beer mats.

Have you...

Noticed them?	Yes	No
Read them?	Yes	No
Discussed them with anyone else in the pub?	Yes	No
Used a QR code to find out the answer(s) to the question(s)?	Yes	No
Tried a "See It In Action" experiment from the Cheers Physics website	Yes	No
Tweeted using #cheersphysics?	Yes	No
Visited the physics.org website?	Yes	No

If you haven't read the beermats, do you think you will? Yes No
Why or why not?

If you haven't discussed the beermats with anyone else, do you think you will? Yes No
Why or why not?

If you haven't used a QR code, do you think you will? Yes No
Why or why not?

If you haven't tried a "See It In Action" experiment from the Cheers Physics website, do you think you will? Yes No
Why or why not?

If you haven't visited the physics.org website, do you think you will? Yes No
Why or why not?

What do you think are the main messages of the beermats?
.....

Anything else you'd like to say about the beermats?
.....

9.2 Customer interview questions

To provide further context and understanding of survey responses for those aged 25 to 40.

Do you usually...

Notice beermats?

Read beermats? – Prompt: why/why not

Discuss beermats with anyone else? – Prompt: why/why not

Use QR codes? Prompt: in what circumstances

Tweet? Prompt: in what circumstances

How would you describe...

Your interest in science generally? Prompt: love, like, neither like nor dislike, dislike, hate

.....

Your interest in physics specifically? Prompt: love, like, neither like nor dislike, dislike, hate

.....

What do you think is the main aim of the beermats?

.....

What if anything, do you think works well about the beermats in the context of promoting physics to 25 to 40 year olds?

.....

What if anything, do you think could be improved about the beer mats in the context of promoting physics to 25 to 40 year olds?

.....

9.3 Pub staff questions

What proportion of your customers do you think are in the age range 25 to 40?

0% to 20%

Between 20% and 40%

Between 40% and 60%

Between 60% and 80%

80% plus

Have you noticed...

Any customers reading the mats?	Yes	No
Any customers discussing the mats with anyone else in the pub?	Yes	No
Any customers using a QR code to find out the answer(s) to the question(s)?	Yes	No
Any customers tweeting about the mats	Yes	No

What positive reactions, if any, have you heard or seen from your customers about the beer mats?

.....

What negative reactions, if any, have you heard or seen from your customers about the beer mats?

.....

Have you...

Discussed the mats with your customers?	Yes	No
Used a QR code to find out the answer(s) to the question(s)?	Yes	No
Tweeted using #cheersphysics?	Yes	No
Visited the physics.org website?	Yes	No

If no to any of the above, why not?.....

What do you think are the main messages of the beer mats?

.....

In your experience, what do you think makes for a successful beer mat campaign?

.....

Anything else you'd like to say about the beer mats?

.....

9.4 Online survey questions

[FOR ALL] What is your age?

Under 18
18 to 24
25 to 30
31 to 40
41 to 50
51 to 60
61 to 70
71+
Prefer not to say

[FOR ALL] What is your gender?

Female
Male
Prefer not to say

[FOR ALL] Where do you live?

UK
Outside UK

[If UK] What is the first part of your postcode? (e.g. SN10).....

[If outside UK] Which country do you live in?.....

[FOR ALL] Have you ever studied physics?

Never studied
At school up to age 16
At school age 16 +
Undergraduate degree
Postgraduate degree
Other (please describe).....

[FOR ALL] How many times have you visited the physics.org website?

First visit
Two or three times
Four to nine times
10 times or more

[FOR ALL] How did you find out about the Cheers Physics website?

Search engine
Recommendation
Link from Twitter
Link from Facebook
Link from other website
Cheers Physics beer mats
Other (please describe).....

[FOR THOSE WHO SELECT Cheers Physics beer mats ABOVE] Have you...

Discussed the beermats with anyone else?	Yes	No
Used a QR code on the mats to find out the answer(s) to the question(s)?	Yes	No
Tweeted using #cheersphysics?	Yes	No

If you have not discussed the beermats with anyone else, do you think you will?	Yes	No
Why or why not?		
If haven't used a QR code, do you think you will?	Yes	No
Why or why not?		
If haven't tweeted using #cheersphysics, do you think you will?	Yes	No
Why or why not?		

What do you think are the main messages of the beermats?

[FOR ALL] How do you rate the Cheers Physics website? Please explain your rating in the comments box.

Very good
 Good
 Average
 Poor
 Very poor
 Comments:.....

[FOR ALL] How likely are you to explore the rest of physics.org website? Please explain your answer in the comments box.

Very likely
 Somewhat likely
 A little bit likely
 Not at all likely
 Comments:.....