CSI-COP

Citizen Scientists
Investigating Cookies
& App GDPR Compliance

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CSI-COP Framework

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CO	Confidential, only for members of the CSI-COP project and the Commission Services	
CI	Classified, information as referred to in Commission Decision 2001/844/EC.	

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Version Control Table

Version Control				
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1 Executive Summary

This document provides the framework for the optimum method of applying **ECSA's (European Citizen Science Association) ten principles of citizen science engagement** for quality assurance in ethical and inclusive citizen science engagement in the CSI-COP project for the purposes of investigating the extent of online tracking. Following a dynamic recruitment drive, a diverse community of citizen scientists will gain new knowledge and practical skills through informal education provided in workshops and a MOOC (massive open online course). The expertise gained will provide an impetus to join the CSI-COP project collaborating with researchers investigating compliance of General Data Protection Regulation (GDPR) on websites and in apps. A series of activities, validating the outcomes of CSI-COP's citizen scientists, will be essential to ensure the accuracy of the exploration and findings of cookies embedded in websites and in mobile device apps.

Keywords: Android devices, apps, citizen science, cookies, data protection, digital divide, diversity, ethics, general data protection regulation, GDPR, human rights, inclusivity, online tracking, ePrivacy, privacy, tracking

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2 Introduction

This framework introduces the approach CSI-COP adopted implementing principles from the European Citizen Science Association (ECSA) to fully engage citizen scientists in the project. By complying with the General Data Protection Regulation (GDPR), following explicit explanation of their role as part of the CSI-COP project team and after gaining 'informed consent' from interested members of the public, citizen scientists will be involved in the co-investigation of the uses of cookies in websites, and in Android powered mobile devices. The findings will lead to the co-innovation of an accessible, online repository of tracking cookies across the Internet and in apps. The CSI-COP framework presents a project methodology, building on the research conducted by the project team, exploring the current best practices in citizen science engagement, and the challenges to ensuring the participation of a diverse community of citizen scientists.

Citizen science is "rapidly gaining popularity" (Davis et al., 2020) allowing amateurs to participate in voluntary work that not only benefits the citizen scientist, but also adds research value. Citizen scientists can participate at multiple levels depending on their interest, time available, and experience. Irga, Barker and Torpy (2018) report that "The involvement of non-professionals in data collection helps increase awareness" (p. 1036). Raising awareness of human rights issues in the digital age is one of the aims of the CSI-COP project, through exploring the extent of online tracking.

2.1 Best practices for an inclusive project

This framework is derived from the **CSI-COP project objectives** (see Section 2 in this report; see also https://csi-cop.eu/about/), the project **methodology** (see Section 3) and the project's **expected impacts** (see Section 4). The framework builds upon the findings from the first two CSI-COP research reports: a) on best practices in citizen science engagement (see Ignat et al., 2020), and b) the challenges faced in citizen science projects to engage a diverse community of citizen scientists (Hinsenkamp et al., 2020).

The most relevant essential practices from CSI-COP's research into citizen science projects are:

- Register CSI-COP on citizen science platforms (raise awareness)
- Approach a wide-range of organisations to reach a variety of potential volunteers (inclusivity)
- Engage citizen scientists through a human rights approach to online privacy (motivate)
- Informally educate about the GDPR (inspire)
- Organise accessible workshops, and create a massive open online course (MOOC) to train citizen scientists how to investigate cookies in websites and in apps on Android devices (gain valuable knowledge and practical skills)
- Nurture privacy champions (create a movement safeguarding online privacy)
- Arrange interactions between different communities (parent-teacher roundtables; stakeholder cafés)
- Communicate CSI-COP findings (legacy for results beyond the project lifetime).

These best practices underpin the CSI-COP project framework. They devote special attention not only to the engagement of volunteers but also to their informal education and training, because both these

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types of activities have proved to have had an important impact on the outcome of citizen science projects in the past, and on the attitudes of the participants. These include:

- "In some of the CS projects, the expected input (from the participants of the project) cannot be provided without specific skill or knowledge - such projects are offering necessary **training** to its participants and sometimes even confirm the achieved knowledge level through dedicated certificates. … The potential of citizen science projects is the improvement of citizen scientists' contribution while optimising the possibility of discovery and scientific advancement." (Ignat et al., 2020, p.20).
- "It was found that training improves the quality of the citizen scientists' outcomes (Aceves-Bueno et al., 2017, quoted in Ignat et al., 2020, p.32).

Good practices show the benefit of organising workshops for various groups potentially participating in the project, such as parents, retired persons, students, people interested in human rights, individuals concerned about online privacy and what to do about data collection, and many others. The "partnerships between different groups of professionals, such as librarians and citizen scientists can broaden perspectives, engage new audiences, and result in mutually beneficial outcomes." (Ignat et al. 2020, p.28). Workshops offer a unique opportunity to discuss, explain and raise awareness of important problems related to the purpose of cookies embedded in websites and in apps, as well as to answer individual questions in detail. Workshops were already identified at the CSI-COP proposal planning stage as an ideal way to stimulate close cooperation between citizen scientists engaged in the project and the CSI-COP partners forging a diverse multidisciplinary team to successfully realise the project objectives.

One aspect that affects involvement from the general public is the problem of '**the digital divide'**. This is the gap between individuals who do and those who do not have access to the Internet, so could be prevented from becoming aware of opportunities to enhance their skills and contribute to science projects. Hence, CSI-COP will actively reach out to prospective citizen scientists by *going to where people go* such as public spaces (shopping centres, libraries). Leveraging collaborative environments and online spaces for informal education, CSI-COP will organise workshops in six partner countries and create a MOOC. These free-to-access learning opportunities will deliver practical exercises to explore under the surface of websites and apps to uncover cookies. This will lead to gaining an understanding of what cookies are, why cookies need to be explicit about what data is collected through them, and for whom, including to third parties the collected data might be passed on.

2.2 Human rights in the digital age

Human rights considerations sit at the heart of data protection and privacy interests. In Europe, Article 8 of the ECHR[1] protects the right to privacy while Articles 7 and 8 of the Charter of Fundamental Rights[2] protects the right to privacy and data protection respectively. Article 5 of the GDPR[3] details the principles affecting the fair, transparent and lawful processing of personal data, which must be collected for a specific, explicit and legitimate purpose. Moreover, GDPR principles such as data minimization, purpose limitation, and transparency are also implicated in tracking[3]. In contrast to common use of the

[1] European Convention of Human Rights 1953 https://www.echr.coe.int/Pages/home.aspx?p=basictexts&c=
[2] Charter of Fundamental Rights 2012: https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:12012P/TXT
[3] The General Data Protection Regulation 2018 Article 5: https://eur-lex.europa.eu/eli/reg/2016/679/oj

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term (including the communities developing websites and apps), "personal" data does not only refer to directly identifiable data (e.g., name and address), but also pseudonymous data (coded and re-identifiable) are considered personal data, which should therefore not be confused with anonymous data. Furthermore, when cookies are used on a webpage to track visitors, the rules in the ePrivacy Directive[4] (in future, the ePrivacy Regulation expected 2020) are triggered. When this data is processed, other human rights come into play, for example, human dignity and equality[5], and problematic practices, such as discrimination based on grounds including race, ethnic or social origin and disability, are prohibited[6]. The fundamental rights principle of proportionality[7] is also deeply rooted in the legal protection concerning personal data.

Control over one's data is becoming increasingly complex in the digital world in view of the ubiquitous collection of data through tracking. This practice involves an imbalance of power between the businesses, that collect or process the data and thereby have access to vast amounts of personal data, and individuals from whom the data is taken, especially in the context of cookie tracking.[8] This is due to the often opaque techniques of cookie tracking whereby individuals are not aware that their personal data is being collected and processed, either how or by whom, leaving them essentially with no control over data about themselves. Individual control over personal data is linked with the GDPR principles of processing. If the purposes are sufficiently clear, predictable and disclosed, then individuals should know how and why their data is being processed and by whom so that if necessary they can enforce their rights. This project has been guided by human rights considerations in the design, engagement of citizen scientists through the recruitment procedures and project execution, and further aims to promote human rights in general, with the right to data protection in particular.

Although people might be conscious of cookies, they are unlikely to be aware of the extent of tracking while they search the web or use apps to read the news, find information on health issues or travel, play games, shop online, interact on or across social media sites and a lot more. Grounding this project in purpose, design, and execution in human rights aims to empower lay populations to more fully realize their human rights

2.3 Related work

There are numerous citizen science projects around the world which can be found from citizen science platforms and associations (e.g. SciStarter[9], Zooniverse[10], ECSA[11]). In data protection and online privacy, ongoing research and projects include:

- Dr Arvind Narayanan leading Princeton University's *Web Transparency and Accountability Project*. Narayanan's team work on 'uncovering privacy-infringing practices online' and

[4] European Directive on Privacy and Electronic Communication 2002/58/EC: https://eur-lex.europa.eu/legal-content/EN/ALL/?uri=CELEX:32002L0058
[5] Title I and Title III EU Charter of Fundamental Rights: https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:12012P/TXT
[6] Article 21 EU Charter of Fundamental Rights (link in footnote 5)
[7] Article 52 EU Charter of Fundamental Rights
[8] European Union Agency for Fundamental Rights and Council of Europe, *Handbook on European Data Protection Law* (2018), 205.
[9] https://scistarter.org/
[10] https://www.zooniverse.org/
[11] https://ecsa.citizen-science.net/

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exposing 'deceptive and misleading content online (dark patterns)' Princeton's Web Transparency and Accountability research includes the largest investigation of online tracking through analysing one million websites (Englehart and Narayanan, 2016).

- Dr. Reuben Binns, Oxford University exploration of 'Third Party Tracking in the Mobile Ecosystem' investigated a) how third party trackers are distributed across apps available through Google's Play store, b) which countries own these tracking technologies, and in which jurisdictions they are based, and whether c) different trackers exist in different genres of apps, for example, games apps, including games apps for children (Binns et al., 2018) .
- Cornell University's 'Digital Life Initiative' studies include an empirical analysis examining violations of people's privacy expectations. This work produced the paper *Unaccounted Privacy Violation: A comparative analysis of persistent identification of users across social contexts* (Sivan-Sevilla, et al., 2020).
- University College London's Dr Michael Veale, author of *When data protection by design and data subjects rights clash* (Veale, Binns & Ausloos, 2018), and co-author of *Dark Patterns after the GDPR: Scraping Consent Pop-ups and Demonstrating their Influence* (Nouwens et al., 2020).
- North Carolina State University, US, hold a grant from the National Science Foundation (NSF) allowing researchers to focus on *Trustworthy Data Practices*. This project aims to address the challenges for citizen science best practices in "data stewardship" (NCSU, 2020)
- In the press, among the many articles about data collection and online privacy, New York Times's *Privacy Project* (NYT, n.d.) has published articles including *The apps on my phone are stalking me* (Manjoo; 2020a) and *I Visited 47 Sites. Hundreds of Trackers Followed Me* (Manjoo, 2020b).

These related studies will form part of content material for the informal education provided to CSI-COP's citizen scientists. The online privacy issues drive the CSI-COP framework starting with the project's objectives and the methodology detailed in the remainder of this report.

3 CSI-COP objectives

Two specific objectives (SO) in the CSI-COP framework for setting up citizen scientists (SO1), and their engagement in accessible informal education to gain training (SO2) to investigate cookies in websites and apps in Android devices (see Methodology, section 4), as well as to co-create a classification of cookies (taxonomy). This will provide CSI-COP citizen scientists with new knowledge and practical skills to co-innovate an online freely available repository of digital trackers. The set-up involves inviting adults from across Europe and beyond to become CSI-COP citizen scientists.

SO1: Setting up CSI-COP citizen scientists

To set up the recruitment of CSI-COP's volunteers from the general public, the project will leverage the ten principles of citizen science inclusion formulated by the ECSA[12] to meet the first specific objective which is to produce a framework of good practice in citizen science engagement:

[12] ECSA Ten Principles of Citizen Science, September 2015:

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1. Citizen scientists will be involved in scientific endeavour to generate new knowledge and understanding
2. Genuine outcomes will be realised from the investigations of the citizen scientists
3. Both the citizen scientists and the CSI-COP partners will benefit from the citizen scientists' work understanding the digital search for information and in uncovering the number and type of trackers in website cookies and apps on portable smart devices.
4. Citizen scientists will be involved at multiple stages in the project from the investigations to the communication of their findings to a range of data protection stakeholders
5. Citizen scientists will receive feedback on their participation including a certificate for completed GDPR compliance training and continuous interaction through a CSI-COP forum on the project website
6. The CSI-COP approach to engaging citizen scientists will ensure a balanced set of perspectives regardless of background in a push for democratisation in the development of pro-privacy technologies
7. The findings from the citizen science engagements will be made publicly available through an open access web-based repository sharing information on the number and types of trackers in website cookies and apps that the citizen scientists find
8. Citizen scientists will be acknowledged in CSI-COP project results and publications
9. The CSI-COP initiative will be evaluated for scientific output, data quality, participant experience and wider societal and policy impact
10. The CSI-COP partners will take into consideration the legal and ethical issues surrounding copyright, intellectual property, data sharing agreements, confidentiality, attribution and the societal impact of the citizen scientists' activities.

SO2: Engagement in CSI-COP

The purpose of the second specific objective is to recruit a diverse community of citizen scientists regardless of background to investigate GDPR compliance in cookies and apps. Taking advantage of the variety of channels available to the partners, calls for participation will be announced on citizen science project announcement platforms, and through social media channels and press releases. The recruited citizen scientists will be **informally educated about the data protection and privacy rights accorded in the GDPR**[13] and receive practical training on how to uncover cookies in websites and in apps. This will be achieved through attending one of CSI-COP's free workshops, or a MOOC. The citizen science engagement phase of the project begins after the submission of this report. Prior to

https://ecsa.citizen-science.net/sites/default/files/ecsa_ten_principles_of_citizen_science.pdf
[13] https://eur-lex.europa.eu/eli/reg/2016/679/oj

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beginning the process of engaging citizen scientists, an ethics application was completed led by Coventry University (CU).

3.1 Ethical research

CU as CSI-COP coordinator applied for ethical approval for the project's activities and the project's investigative and innovation activities through CU's online ethics form (CU Ethics, 2020). The extensive application includes a series of questions addressing the ethical implications especially where it involves individuals outside the project research and innovation team. A sample of questions from CU's ethical research application are presented in Table 1 with CSI-COP's responses. The main ethical research rests on **engaging young and mature adults** who give their explicit consent after being informed of the purpose of CSI-COP and their exact role in collaborating and being part of the CSI-COP team. Among the adults CSI-COP aims to **recruit parents and teachers** to become aware of cookies that might be on educational websites used in school pedagogy, and trackers in apps for children, such as game apps. In this way, without directly engaging children, CSI-COP will gather information on websites and apps used across a wide age-range.

Table 1: CU research ethics application

Question	Response
Are you dealing with Primary Data involving people? (e.g. interviews, questionnaires, observations)	Yes
Are you dealing with Personal or Sensitive data?	No
Does the study require DBS (Disclosure & Barring Service) checks?	No
Does the study involve direct contact by any member of the research team a) With children or young people under the age of 18 years of age? b) with adults who have learning difficulties, brain injury, dementia, degenerative neurological disorders? c) with adults who are frail or physically disabled? d) with adults who are living in residential care, social care, nursing homes, re-ablement centres, hospitals or hospices	No
Are there any reasons why you cannot guarantee the full security and confidentiality of any personal or confidential data collected for the study?	No
Is there a significant possibility that any of your participants, and associated persons, could be directly or indirectly identified in the outputs or findings from this study?	No
Is there a significant possibility that a specific organisation or agency or participants could have confidential information identified, as a result of the way you write up the results of the study?	No
Will any members of the research team retain any personal of confidential data at the end of the project, other than in fully anonymised form?	No
Will you be responsible for destroying the data after study completion?	Yes

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Do you propose to recruit any participant who are: a) clients/volunteers/service users recruited through voluntary public services? b) participants living in residential care, social care, nursing homes, re-ablement centres hospitals or hospices? c) recruited by virtue of their employment in the police or armed forces? d) adults who are in prison, remanded on bail or in custody? e) who may not be able to refuse to participate in the research?	No
Will any part of your study involve collecting data by means of electronic media (e.g. the Internet, e-mail, Facebook, Twitter, online forums, etc)?	Yes
Is there a possibility that the study will encourage children under 18 to access inappropriate websites, or correspond with people who pose risk of harm?	No
Will the study incur any other risks that arise specifically from the use of electronic media?	No
Have you taken necessary precautions for secure data management, in accordance with data protection and CU Policy? Planned disposal date:	Yes 30/06/2032

3.2 Translation of participation documents

Within CU's application there are questions relating to the translation of documents from English. The questions include:

i) Are all or some of the consent forms, information leaflets and research instruments associated with this project likely to be used in languages other than English?

ii) Are these translations in lay language and likely to be clearly understood by the citizen scientists?

iii) Please describe the procedures used when undertaking research instrument translation (e.g. forward and back translation), clarifying strategies for ensuring the validity and reliability or trustworthiness of the translation.

For inclusivity and for the involvement of the general public across Europe and beyond, the citizen science participation documents, prepared in English by CU, will be translated into these languages: **Greek**, **Hungarian**, **Dutch**, **Finnish**, **Hebrew**, **Czech,** and **Spanish**. The participant documents to be translated are:

a) Participant Information Sheet (PIS) - explanation of the purpose of CSI-COP and the expected role of citizen scientists (see Appendix 1)

b) Participant Informed Consent Form (PICF) (see Appendix 2)

c) Survey forms:

   i. Survey 1 (S1): A survey prior to participation with demographic questions from citizen scientists to elicit gender, geographical location, and socio-economic information (e.g. education level) (Appendix 3-1);

   ii. Survey 2 (S2): A post-workshop survey to elicit motivation from citizen scientists to continue to the investigation phase following informal education and training (Appendix 3-2);

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iii. Survey 3 (S3): A post-investigation survey to elicit intent to champion online privacy and to limit tracking by default on the web. (Appendix 3-3)

To monitor ethical research in the CSI-COP project, the Coordinator and partners will perform regular check-ins to ensure the obligations are being met.

4 CSI-COP methodology

The specific objectives S01 and S02 underpin CSI-COP's approach to investigating website cookies and trackers in apps. For the purpose of this project, citizen scientists will be engaged to investigate trackers in **apps on Android devices** (such as Samsung tablets and mobile phones). The reason for this is that Apple's architecture is a privacy-by-design closed system making it difficult to get beneath Apple's iOS platform used in their iPhones. This approach fuels the methodology to engage citizen scientists throughout the investigation and innovation phase of the project. The aim of the methodology is to achieve the proposed benefits identified in the SwafS-15-2019 EU Horizon2020 call. The **ten steps for engagement** in the CSI-COP **methodology** will realise the benefits of citizen science in the project. These are to:

1. Categorise the potentials and limits of citizen science for society by exploring the number and nature of citizen scientists (who they are);
2. Raise public awareness of the high standard for 'consent' that the GDPR sets: offering individuals real choice and control over their data;
3. Informally educate that genuine consent requires positive opt-in following a very clear and specific statement of consent, so putting individuals in charge during engagement;
4. Support citizen scientists engaged throughout the co-production phase generating new knowledge following the co-investigation of websites and apps;
5. Co-create a taxonomy of trackers in cookies;
6. Co-innovate an online accessible repository of trackers;
7. Counter perceived anti-intellectual attitudes in society by increasing scientific skills and competencies, and especially around the science and technological development of privacy-by-design tools and technologies;
8. Assist policy makers in monitoring the implementation of and compliance to the GDPR;
9. Highlight the relationship citizen science has with informal and formal science education;
10. Raise the scientific literacy of European citizens promoting social inclusion and employability.

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CSI-COP's ten steps drive the project's methodology engaging citizen scientists collaborating as part of the project's team conducting online exploration. This will be done following participating in online, virtual or face-to-face activities gaining informal education and practical training. Citizen scientists will learn how to find and log the different types of cookies they uncover in websites and apps. The citizen scientists will be armed with knowledge of the GDPR and the techniques to uncover trackers in websites and in apps as they go about their daily lives using the Internet. Mobilising citizen scientists necessitated the CSI-COP consortium understanding issues in citizen science engagement (motivation, and drop-off in interest if not supported). To gain this understanding the CSI-COP conducted research and produced documents include the first research deliverable (D2.1) exploring the best practices in citizen science (Ignat et al., 2020). This was followed by research conducted on the challenges in the engagement of an inclusive community recruited from a broad background in the general public to participate in citizen science projects (D2.2): gender, geographical location, socio-economic diversity (Hinsenkamp et al., 2020).

4.1 Access to potential citizen scientists

If people do not have broadband at home, this might limit their chances to become aware of opportunities that could enhance their skills. Additionally, this limitation could prevent individuals from contributing to science projects and slowing the progress in particular science subjects. CSI-COP's solutions aim to actively include *going to where the prospective citizen scientist is*, whether that is in a library or in a shopping centre. Using the extensive capacity of the project through outreach within schools, partner networks of organisations, CSI-COP will work hard to engage citizen scientists from all walks of life. This will be to invite the general public who might access the Internet using public machines and WiFi connections (such as in a library, or in a cafe). Volunteers who respond to CSI-COP's calls for citizen scientists will be engaged regardless of background (age-range, gender, socio-economic or geographical factors), building a community of CSI-COP citizen scientists in preparation for training.

4.2 Motivation

The CSI-COP privacy-by-design, no-tracking website (https://www.csi-cop.eu) will be the focal point for interaction between the project partners and the citizen scientists. By using CSI-COP's online discussion forum accessible from CSI-COP's website, the partners will endeavour to:

a. protect the privacy of citizen scientists' data; and

b. provide support and encouragement to motivate the citizen scientists.

CSI-COP is aware of the 'rewards' in citizen science projects to encourage engagement from volunteer citizen scientists. For example, in Weeser et al. (2018): in one citizen science project volunteer participants were 'rewarded' through text message reimbursement once they responded to a request to read water levels and send the data back to the researchers via text message. On engaging younger people, Mitchell et al. (2017) state that "a **lack of participation by young people in citizen science** programs has led to calls to recruit citizen scientists from the university education sector". Mitchell et al. (2017) found that "Citizen Science offers the potential to increase student engagement through active and inquiry-based learning; consequently, citizen science programs have been implemented into some undergraduate classes and research" (p. 2). Mitchell et al. (2017) study engaged students with peer reviews involving PhD students.

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To further motivate CSI-COP's citizen scientists consortium partners will nudge engagement utilising the project's communication activities, for example, by announcing the top ten contributors in the project newsletters, website, Twitter account and elsewhere.

4.3 Diverse community

As part of CSI-COP's focus on the nature of its engaged citizen scientists, the project researchers will gather non-personal, non-identifiable information about the interested individuals who take part. Among the attributes of the citizen scientists that will be collected are: gender, age range, college education and urban vs non-urban residence. This will assist CSI-COP to create a balanced citizen science community in each of the partner countries. This will be a major challenge, especially in the period recovering from Covid-19, when some participants might be home-schooling young children, so have much less time for extra curricula activities.

The 2019 European platform for women scientists (EPWS, 2019) international workshop on citizen science and gender held in Lasi, Romania found that *"*there are some ideas in public discussion, e.g. "associations observing nature" are male dominated, but neither there are clear data nor the subtle mechanism is addressed. There should be more clarity on: – CS activities organising team (& roles), – participants (& roles), – domain of activity (scientific fields*)"*.

With respect to the use of social media to recruit potential citizen scientists, Brandtzaeg (2017) found that "gender differences are less significant among the younger people known as the millennials" and that "millennials are also found to be early adaptors of social media and are often seen as more familiar with the use of social media for the purpose of civic engagement than older generations*"* (ibid, p.107).

The project's full marketing force will be put in play to raise awareness of the project and the opportunities for participation and gaining informal education on human rights accorded in the GDPR with respect to data protection. CSI-COP partners have identified broad and diverse set of organisations which they will approach directly to invite their members as citizen scientists. These organisations are related to the main and cross-cutting priority in the EU Horizon 2020 science with and for society (SwafS) 15-2019 call: citizen science, gender, geographical location and socio-economic standing. A sample list of inclusive organisations that CSI-COP aim to approach is tabled in Appendix 4. A comprehensive list of organisations will be made open-access as a dataset during the recruitment phase and uploaded to various online accessible platforms.

4.4 Informal education

Sub-contracting was budgeted to recruit an expert to create the content for the informal education, and to deliver the training material. This content will be used in workshops held in six different accessible in-country locations, and in a CSI-COP MOOC. CSI-COP's informal education will train the citizen scientists on how to find trackers embedded in cookies and apps. Together, the citizen scientists and researchers will design a method on how best to record and report findings as we go about our daily business using the Internet to search for news, weather, health management, travel information, play online games, interact on discussion boards, as well as communicate on social media platforms. CSI-COP's online MOOC will also allow citizen scientists from around the world to undertake the training and learn about right to privacy in light of the GDPR. This way we intend to spread the understanding of data protection legislation and extend the reach of understanding of informed consent, data subject rights, purpose limitation, data minimisation and accountability in the

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GDPR. Pre-participation learning pack will include, for example, links to appropriate TED talks, papers from related research (see section 1.3 Related Work). The successful sub-contract will be expected to have:

1. **Detailed knowledge**, understanding and experience in **advising on the GDPR** and applicable ePrivacy rules
2. **Established experience in developing and delivering content to individuals/the general public** as citizens and consumers about online privacy and ways to protect it
3. The **ability to engage citizens through informal education in face-to-face workshops**
4. The material that can also be translatable into online material for an **informal online education course**

In addition, the creator of CSI-COP's informal education content should:

5. **Be prepared to deliver half-day workshops** including interesting practical exercises supported by appropriate and relevant data protection and privacy rights information
6. **Deliver the first workshop in Coventry**
7. **Deliver five further workshops in 2021** with the same material delivered at Coventry University delivered at the following university partner venues:
    a. Patras (Greece);
    b. Tilburg (The Netherlands)
    c. Oulu (Finland)
    d. Bar-Ilan (Israel)
    e. CTU-Prague (Czech Republic)
8. **Deliver** a **seventh workshop at Coventry University** taking on board feedback from the workshops at partner venues and the experience and views of volunteer attendees.

4.5 Workshops

The consequences of Covid-19 affected the planning of delivering accessible informal education. Face-to-face workshops had been planned to deliver the informal GDPR education, and the hands-on training through practical exercises to understand how to find cookies in websites and uncover trackers in apps. Initially the aim was to start face-to-face workshops from late autumn 2020 through to spring 2021. However, it was decided to organise the MOOC first and plan virtual workshops in case Covid-19 restrictions continued well into 2021.

The risks to success of virtual workshops do include loss of human connection, lack of face-to-face conversations constraints to generating new ideas, and possible limits to interactions with project researchers. However, the growth of virtual meeting platforms (Microsoft Teams, Zoom, Hop-In, Google Meet) during lockdown that enabled home-working from spring 2020 onwards demonstrated people's tenacity to evolve their habits to suit changing situations.

4.6 MOOC

There has been a significant advance in MOOCs for both informal and life-long learning. Class Central (2019) reports that the modern MOOC movement has reached over 110 million learners worldwide and MOOC providers launched over 2,500 courses in 2019. For example, there are 45 million learners

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registered with Coursera[14] and 10 million with FutureLearn[15], which are two of the current biggest MOOC providers. We have already established contacts with both platforms and CSI-COP's MOOC will be available in these online dissemination spaces. The CSI-COP researcher in charge of this MOOS is Professor Jordi Vallverdú (UAB) has three current MOOC courses with a sum of 160,000 learners. Vallverdú will use this expertise in engaging learners online to co-design a reliable MOOC. Learners on MOOC platforms appreciate that the educational content is available anytime and anywhere giving complete freedom and true flexibility on when to schedule learning. Learners can proceed at their own pace outside of usual school and office hours. These properties make MOOCs attractive even for citizen science projects. Recently, there have been reports of the first experiments utilising MOOC for citizen scientist training (Hemmet, Woods and Gonzales, 2018; Groblinger et al. 2019) or for engaging the interest of a wide audience (WeObserve MOOC, n.d.). Both these types of MOOCs have proven to be very successful for citizen science.

CSI-COP's MOOC will aim to reach an even greater audience beyond the workshops to providing an inclusive way for attendees to benefit from accessible free informal education on 'human rights in the digital age'. Our field studies on the existing online materials allow us to affirm that this MOOC will become the first and important source of information for citizen scientists, becoming not only a dissemination tool in our project, but a true tool for engaging more people into the field of citizen science. The range of covered topics, as well as the embedded communication techniques, are oriented to any adult citizen regardless of their gender or cultural heritage. Without losing the accuracy, this course will accommodate very important functional aspects of sciences to the main audiences. The MOOC will allow anyone from around the world to join CSI-COP's online workshop to learn more about privacy and data protection and learn how to find trackers in website cookies and in Android apps. Through the MOOC, CSI-COP will be informally educating about GDPR, and training learners to investigate GDPR compliance after they go through a simple course that CSI-COP project will develop. Thus the purpose of CSI-COP's MOOC is not only to inform, but to engage citizens into regulatory participation, or watchdog roles in relation to scientific practices. As a consequence, a new wave of informed citizens will reinforce democracy and interest in science.

4.7 Applying investigatory training

CSI-COP citizen scientists will apply their practical skills gained through the training in the workshops or the MOOC. They will collaborate with the CSI-COP researchers to co-create a searchable system that is a classification (taxonomy) of different types of cookies. This activity will entail citizen scientists recording the number and type of cookies they find in a co-created tool, for example, using a spreadsheet (see Table 2). This will aid simpler reporting to the project researchers. Citizen scientists progressing from the workshops will liaise with their local CSI-COP partner (the organiser of the local CSI-COP workshop), or with Coventry University if they progressed from the MOOC. There will be no minimum or maximum limit set on the number of records (names of websites and / or apps with cookies) that a CSI-COP citizen scientist can submit. On the CSI-COP website a continually updated list will be posted of well-known websites and apps that citizen scientists have already investigated. This is to prevent citizen scientists repeating each other's work. However, where an organisation might have a different country hosting their website due to multi-language accessibility, the records will be separate, for

[14] https://www.coursera.org/
[15] https://www.futurelearn.com/

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example, amazon.co.uk and amazon.com. In this way we aim to optimise citizen scientist investigations with reduced redundancy. The CSI-COP website will be one method for citizen scientists to post a query on the CSI-COP forum to ask if a website had been checked already. Rather than automating this process, and to further motivate and mentor the CSI-COP citizen scientist community, the most engaged and interested will be invited to become privacy champions and given senior roles above other citizen scientists to validate/check 'junior' citizen scientist records for authenticity. There is no standard tool to check cookies embedded in websites. Free and commercial tools are available (such as Blacklight[16], Webbkoll[17]), which the consortium will review for accuracy and efficacy. The free or commercial tools will be explored in the informal education and training phase with the citizen scientists.

Table 2: Example of cookie recording tool

Website (name and URL)	App on Android device (mobile phone/tablet)	Number and type of cookies				
		Session	Persistent	Advertising	Marketing	Third-party
BBC bbc.co.uk						
	Facebook					

Each CSI-COP partner will collect the findings from their local citizen scientists and be responsible for passing their citizen scientists records to Tilburg University. This partner is responsible for a systematic mapping of the types of cookies found by the citizen scientists. Led by Tilburg University and with the CSI-COP partners, the citizen scientists will co-create a classification (taxonomy) of the different types of cookies found in websites and apps.

4.8 Innovation phase

From the investigation phase producing a taxonomy of cookies (categorising types of cookies), the CSI-COP scientists and citizen scientists will innovate a TRL (technology readiness level) 5+, web-based knowledge resource as an online, freely accessible repository. This will be designed around ease-of-search of types of trackers by first-party (website visited; app used) and third-party vendors (digital advertising, etc.) on health websites, children's game apps and other web sources reported by CSI-COP citizen scientists. Led by Coventry University, the citizen scientists will be involved in developing the repository with the project partners. The repository will be a tool available for free for a wide range of stakeholders in citizen science engagement and data protection compliance. Policy makers holding software developers and AI scientists to account, to reduce unnecessary digital tracking of individuals using the web, will be able to use the repository as evidence of the extent of tracking by default. The

[16] Blacklight: https://themarkup.org/
[17] https://webbkoll.dataskydd.net/

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tool will also be freely available to technology journalists searching for the number of times, for example, a specific type of tracker (such as personal profiling or location matrix), is embedded in different types of apps without being made explicit or obvious to the consumer. Citizen science researchers, STEM researchers and educationalists as well as technology developers will also have access to the repository and be able to search through and retrieve information on trackers from the knowledge resource.

4.9 Citizen Scientists' interaction with CSI-COP researchers

To sustain the citizen scientists' motivation through the investigation phase, project scientists will ensure that queries on execution are answered promptly. A forum for the citizen scientists to interact with each other, and with the project partners beyond the workshops, will be set up and be accessible in a project-only area on the CSI-COP website. This will allow the project partners to continually support the citizen scientists and maintain their interest in investigating data protection and privacy compliance.

5 CSI-COP expected outcomes

The expected outcomes from CSI-COP citizen science engagement activities include promoting social inclusion and employability. The experience, knowledge and skills gained from citizen science involvement will increase the employability of the participants.

Raise the scientific literacy of European citizens.

Involvement will act as a tool for informal and formal science education for young people and adults, and support hands-on citizen science activities. Through attendance at one of the training workshops or the MOOC, and with continual support from the project, the recruited community of citizen scientists will gain from informal education on data protection, privacy rights and GDPR compliance. Their hands-on investigations and explorations will act as a tool to understand privacy issues and learn about the extent of digital tracking. The participation will generate pro-privacy champions promoting software development that limits digital tracking.

Explore how citizen science develops scientific skills and competencies.

What are the costs and benefits of citizen science in terms of scientific excellence and the economy? Through the informal education, the execution of GDPR investigatory tasks, and the engagement of citizen scientists with stakeholders in citizen science cafés and parent-teacher roundtables, the effect on the citizen scientists' capabilities (whether or not they are enthusiastic to become pro-privacy champions) will provide data on the costs and benefits of involving citizen scientists in research and innovation

Communication, dissemination and exploitation

Citizen scientists will be involved with the project partners to communicate CSI-COP findings to a broad audience. Taking part in the main project event, in citizen science cafes and parent-teacher roundtables, citizen scientists will fully interact with a variety of stakeholders to disseminate and exploit CSI-COP's findings on GDPR compliance. Pro-privacy champions will emerge from the most

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motivated citizen scientists in the project who will participate in outreach events after the project's conclusion to promote development of ethical data collection technologies.

Measurements of citizen science engagement success

Success of CSI-COP's engagement with citizen scientists will be measured through impact factors. A basket of indicators will be in place to **monitor** the evolution and benefits of **responsible research and innovation** (**MoRRI**) and from the UN's Sustainable Development Goals[18] (**SDG**).

To assess impact, CSI-COP will apply twelve indicators from MoRRI and SDG (including gender equality; science literacy and quality education; ethics; public engagement; open access, and partnerships for goals). These twelve indicators will provide the measures of impact and therefore success of CSI-COP which are presented in Table 3.

Table 3: Dimensions to measure CSI-COP success

Dimension	**MoRRI indicator**	**SDG indicator**	**CSI-COP indicator for impact**
Gender equality	**GE2**	**Goal 5**	Balanced recruitment of male, female and other gender citizen scientists
Science Literacy and education (SLSE)	**SLSE2** **SLSE3** **SLSE4**		SLSE2: Responsible Research and Innovation (RRI) Training SLSE3: Science communication through informal education into the GDPR SLSE4: Citizen science engagement
Ethics (E)	**E1**		Ethics at the level of the University and other CSI-COP partners
Public Engagement (PE)	**PE2** **PE3** **PE4** **PE5**		PE2: Policy-oriented engagement with science (secondary data) PE3: Citizen preferences for active participation in Science &Technology decision making (secondary data) PE4: Active information search about controversial technology (secondary data) PE5: Public engagement performance mechanisms at the level of research institutions
Open Access (OA)	**OA1**		Open access literature and to CSI-COP's innovation
Quality Education		**Goal 4.4**	Contribute to goal "By 2030, substantially increase the number of youth and adults who have relevant

[18] https://www.un.org/sustainabledevelopment/sustainable-development-goals/

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			skills, including technical and vocational skills, for employment, decent jobs and entrepreneurship"
Partnership for Goals		**Goal 17.7**	Encourage and promote effective public, public-private and civil society partnerships, building on the experience and resourcing strategies of partnerships

6 Validation, quality assurance and validation of outcomes

Quality assurance and validation of CSI-COP outcomes involve managing a large number of volunteers to ensure the integrity of methods in investigating websites and apps, and the accuracy of data gathering of cookies.

The creation of the project website's forum for citizen science interaction will afford communication between citizen scientists and CSI-COP partners to resolve issues promptly by email or web meeting as they arise to sustain participation. Hence, the community of citizen scientists will be continually motivated to complete their inclusion in the project. The training will be verified by citizen science investigations in their data collections and citizen science reporting on trackers uncovered in cookies and apps.

CSI-COP has 13 success indicators assessed through six 'expected impacts' and seven 'other impacts'.

6.1 Expected impacts

Expected Impact 1: Development of new knowledge and innovation by citizen scientists

Measurement indicators: SLSE2; PE2; OA1; SDG 4.4

New knowledge created in CS1-COP will be realised in the repository of trackers made accessible on the Internet through a freely available systematic mapping of types of embedded trackers in website cookies and smart device apps through an innovated knowledge resource (WP5). Details on the number and types of trackers will include the following information:

- geo-location
- log in to remember website login (convenience)
- the languages a consumer chooses when shopping on a website
- what items consumers have in their shopping basket
- what consumers click on (behaviour)
- search queries

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- personal profiling (how a consumer browses the web)

Measures: Responsible research and innovation (SLSE2); policy-oriented engagement (PE2); open access (OA1); contribute to goal to increase the number of youth and adults with relevant skills for employment, decent jobs and entrepreneurship (SDG 4.4).

Expected Impact 2: Availability of evaluation data concerning the societal, democratic and economic costs and benefits of citizen science

Measurement indicators: GE2; E1; OA1; PE4-5

CSI-COP evaluation data on the community of citizen scientists and their engagement, and long-term interest in pro-privacy software development will be open access available through the project's assessment on societal impact.

- Evaluation data on citizen science motivation in the training workshops;
- Investigation of cookies and apps;
- Communication, dissemination and exploitation activities including citizen science stakeholder cafés;
- Citizen scientists attending parent-teacher roundtables and contributing to CSI-COP publications.

Measures: Gender equality in recruitment and training of citizen scientists (GE2); ethical practice (E1); open access (OA1); active information search about controversial technology, and Public engagement performance mechanisms (PE4-5).

Expected Impact 3: Impact on the citizen scientists

Measurement indicators: GE2; SLSE2-4; E1; PE3; SDG4.4

CSI-COP's continuous public calls for engagement across a variety of channels will reduce barriers to informal learning about rights to privacy under the GDPR, and to training to uncover trackers embedded in cookies and apps through a free online training course, MOOC, as well as free-to-attend workshops organised in six accessible locations across Europe. The impact of the training on CSI-COP citizen scientists will be realised through the motivated and supported community progressing to investigating trackers in cookies an apps.

Measures: Gender equality in recruitment and training of citizen scientists (GE2); RRI Training, science communication through informal education, and Citizen science engagement (SLSE2-4); ethical practice impacting citizen (E1); citizen preferences for active participation (PE3); contribute to goal to increase the number of youth and adults with relevant skills for employment, decent jobs and entrepreneurship (SDG 4.4).

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Expected Impact 4: Impact on responsible, research and innovation

Measurement indicators: GE2**;** E1; SLSE2; PE1

CSI-COP's framework for citizen science investigations will directly contribute to conducting responsible research and responsible innovation through empowering CSI-COP's community of citizen scientists during training progressing to active learning on how to take back some control over their privacy when navigating the Internet with their various devices during their investigations of embedded trackers in cookies and apps, and boosting interest in becoming pro-privacy champions by affording platforms for CSI-COP's citizen scientists to communicate their experiences to stakeholders in citizen science cafés, and update parents and teachers in roundtables.

Measures: Gender equality in recruitment and training of citizen scientists (GE2)**;** ethical practice (E1); Responsible Research and Innovation (SLSE2); policy-oriented engagement with science (PE2).

Expected Impact 5: Impact on the science: GDPR compliance

Measurement indicators: GE2; E1; PE2-5;

CSI-COP's transdisciplinary approach and communication strategies will contribute to the speedier adoption of pro-privacy software development to comply with the GDPR and transparency in explaining trackers to consumers. Citizen science investigations and findings of website cookies and smart device apps will be systematically mapped into an online repository accessible as a knowledge resource. Creation of pro-privacy champions from the citizen scientist community will be utilised in stakeholder engagements, and beyond the project in outreach events.

Measures: Gender equality in recruitment and training of citizen scientists (GE2); ethical practice (E1); Policy-oriented engagement with science (PE2); Citizen preferences for active participation in S&T decision making (PE3); Active information search about controversial technology (PE4); Public engagement performance mechanisms (PE5).

Expected Impact 6: Impact on society

Measurement indicators: GE2; E1; SLSE3**;** SDG 4.4; SDG 17.7

CSI-COP's proposed approach is to place a community of recruited and trained citizen scientists at the centre of the project. The citizen scientists would be fully supported as they investigate for themselves how much they might be tracked while navigating the web seeking news, checking the weather, organising their travel, shopping, watching videos, managing their health, commenting on issues and sharing information. The effect of learning about trackers is expected to prompt some citizen scientists to become pro-privacy champions and take the opportunity to communicate their findings at public-private stakeholder events to advocate improved compliance of the GDPR. It also has a medium to long-term expected impact to enable faster ways to spread GDPR awareness through society to promote pro-privacy software development and introduce ethical practices in ad tech marketing, and to encourage progress among the citizen scientist community to formally provide education in fields

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related to the ethical development of digital technologies and fill the gap in areas including data science, machine learning, digital humanities and human-computer interaction.

Measures: Gender equality in recruitment and training of citizen scientists (GE2); ethical practice (E1); Science communication through informal education into GDPR (SLSE3)**;** Contribute towards meeting goal: to substantially increase the number of youth and adults who have relevant skills, including technical and vocational by 2030 (SDG 4.4); Encourage and promote effective public, public-private and civil society partnerships, building on the experience and resourcing strategies of partnerships (SDG 17.7).

6.2 Other impacts

Other impacts arising from CSI-COP include finding about the amount of screen-time the community of citizen scientists report that they devote daily and improving safety online.

6.2.1 Short term other impacts

Short-term: raise awareness of privacy rights under the GDPR.

Other impact 1: Screen time

CSI-COP citizen scientists investigating how much they are tracked as they navigate the web using desktop or mobile devices will find out the number of hours they spend daily on the Internet. Learning about the extent of time spent online may lead to changes in behaviour to spend less time online and more time in physical activity.

Other impact 2: Staying safer online

Through pro-active training and cookies and app investigations, citizen scientists will learn more about the privacy implications of accepting cookies without first checking what trackers are embedded. The impact could be that citizen scientists think less about convenience, and saving time by accepting cookies, without knowing the consequences of accepting cookies, such as personal identification realised from the 'address of the device' they use (IP address).

6.2.2 Medium-to-long term other impacts

Medium-long term impacts are on the pro-privacy development of champions invited into universities to communicate their experience investigating GDPR compliance, as well as ethical development of online technologies.

Other impact 3: Upskilling the public and educators

Up-skilling the public and teachers will be through citizen scientists' engagement with stakeholders in citizen science cafés including with policy makers, privacy professionals, citizen science researchers, technologists, software and web developers, parents and teachers (in parent-teacher round tables), and beyond the project in outreach and other events organised by universities. The new CSI-COP innovation could help to train and up-skill the general public and teachers in schools, colleges and universities. The repository created in CSI-COP could inform discussions among citizens and in classrooms with individuals as active players in their own dynamic learning process about privacy and tracking in the age of machine learning, data science and artificial intelligence. Skilled STEM and Humanities

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(STEMAH) teachers can take advantage of CSI-COP's training actions and add *investigate cookies and apps* to in-class activities to foster enthusiasm in STEM, boosting self-motivation through lively classes that inspire and increase employability.

Other impact 4: Curriculum development

Undergraduate and post-graduate curriculum updates and further course development will result from the findings of CSI-COP. The behavioural sciences will be able to use the findings to upgrade courses on web usage and the psychology of human-computer interaction. GDPR compliance issues found in this project will impact business and law courses. Computer science and software development courses could use the findings to teach ethical engineering of digital technologies.

Other impact 5: Project partner's website privacy compliance

A consequence of a project on GDPR compliance, with citizen scientists investigating cookies and apps for trackers, will be partners revisiting their own organisational websites to review transparency on cookie information and disclosing embedded trackers more obviously. This way the project partners will be leading the way to better informing visitors to their websites to build greater loyalty and improved trust.

Other impact 6: Reducing barriers

CSI-COP activities will help reduce barriers to science, by bringing free training activities to local venues with workshops in six countries and a free online MOOC (WP3) to engage citizen scientists across Europe and internationally. This could spark interest in STEM subjects complemented by the arts and the humanities where previously it was not present in citizens, extract hidden talent and show that science and technology are inextricably linked because people discover new scientific techniques, develop new technologies to benefit everyone, boosting local, regional and national economies, reducing skills shortages and so meeting societal needs.

Other impact 7: Gender, socio-economic and geographical factors

CSI-COP will consider the factors that affect gender, groups from different socio-economic backgrounds and geographical locations applying best practices encouraging greater participation in CSI-COP regardless of background, because data protection and right to privacy applies to everyone. The framework for CSI-COP will go some way to mitigating any dissatisfaction felt by these groups from their limited or non-participation in citizen science activities. This will be done by designing more inclusive training activities and inspire further life-long STEM learning by these groups.

7 Supporting CSI-COP citizen scientists

CSI-COP citizen scientists will be encouraged, supported and in this way motivated to sustain their interest in science and technology through opportunities to voice their experiences in the project. This will be achieved by the project partners inviting CSI-COP citizen scientists to outreach events, especially organised by the seven universities in the CSI-COP consortium. The community of citizen scientists will be encouraged to progress their enthusiasm and participation in informal learning to formal education in science, technology, engineering and mathematics (STEM) to help bridge skills gaps. Post-project a working group will be formed from CSI-COP's partners for continuity of the

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activities and promoting GDPR compliance training. Beyond the project the activities that the working group will take on board include:

- Sustain interest in pro-privacy development, each university will maintain contact with their citizen science community for outreach events. Pro-privacy champions emerging from the project will be invited and motivated to talk about their GDPR awareness, digital tracking experience, and privacy protection procedures following participation in CSI-COP;
- Continuous promotion of the repository of trackers created in WP5 as a knowledge resource for use as a tool for a variety of stakeholders in data protection (such as web and app developers, privacy researchers, tech journalists, data protection policy makers, teachers, parents);
- CSI-COP project findings will inform curriculum development at undergraduate and postgraduate levels to continue investigating trackers and apps, updating the taxonomy where necessary and adding to the repository;
- Create or leverage meetups - forming new or using existing meetups of local communities around Europe and beyond to gather with similarly interested and curious individuals and discuss data protection, privacy and ethical technology development locally;
- Learning from UAB's expertise in MOOCs, run CSI-COP's MOOC at least twice a year. In collaboration with privacy professionals in the partners' network of networks CSI-COP material will be updated as privacy research and regulations are changed and revised;
- Run parent-child summer camps making parents better aware of app trackers in child-targeted games on Android mobile phones and tablets so that parents are better aware of what tech companies do with their children's data.

Open science lines of communication have already been established with other relevant citizen science projects, and privacy and data protection projects, as well as EU-funded SwafS projects to share evaluation data and data arising from CSI-COP.

CSI-COP will be promoted across Europe and beyond by all project partners – all of whom are intimately familiar with data protection and privacy concerns and not being able to produce enough skilled engineers and technologists to meet the skills gap felt in science and engineering stakeholders. CSI-COP partners also bring with them a wide-ranging network of stakeholders, many of whom will be interested in working with CSI-COP in the future in order to apply CSI-COP innovations to their science job needs. CSI-COP will exploit the partners' collective expertise and networks to drive stakeholder engagement opportunities.

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9 Appendices

9.1 Appendix 1 **Participant Information Sheet**

Dear Citizen Scientist

We invite you to take part in research investigating online privacy by exploring cookies in websites you visit, and in apps you use on your smart phone. The official title of this project is '**Citizen scientists investigating cookies and app GDPR compliance' (CSI-COP)**. Dr Huma Shah, Director of Science of the CSI-COP project is at Coventry University, the lead partner of this international research and innovation project. Before you decide to take part as a citizen scientist it is important that you understand why the research is being conducted and what it will involve. Please kindly take the time to read the following information carefully.

What is the purpose of the study?

The GDPR is an EU law that requires organisations to safeguard personal data and uphold the privacy rights of everyone in the EU. Citizen scientists can play a valuable role in ensuring privacy and providing a better understanding of what information is tracked online. The CSI-COP project aims at a co-investigation between the professional researchers and citizen scientists interested in human rights in the digital age. CSI-COP is funded under the EU Horizon 2020 programme: https://cordis.europa.eu/project/id/873169

CSI-COP project will mobilise citizen scientists from across Europe and beyond to investigate the different types of trackers in cookies and smart phone apps. The project will offer free training material to informally instruct citizen scientists on 'informed consent' and protections accorded in the GDPR. CSI-COP citizen scientists will engage in producing a taxonomy of trackers with the CSI-COP partners. This will lead to the co-creation of an open access knowledge resource, a repository of digital trackers that can be searched by parents, teachers and others.

Why have I been chosen to take part?

CSI-COP aims to recruit a broad community of citizen scientists through a variety of online platforms, groups and interests. You are invited to participate in this study because you are interested in finding out the purpose of different cookies in websites and in smart phone apps.

What are the benefits of taking part?

Through participation in this project you will become aware of your human rights in the digital age (GDPR). By sharing your findings with us concerning cookies you find in the websites you visit and in the apps you use on your smart phone, you will be helping CSI-COP to better understand the extent of online tracking. You will also be involved in designing a free-to-access online knowledge base of cookies.

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Are there any risks associated with taking part?

This study has been reviewed and approved through the project's formal research ethics procedure. There are no significant risks associated with participation.

Do I have to take part?

No – it is entirely up to you. If you do decide to take part, please keep this Information Sheet and complete the Informed Consent Form to show that you understand your rights in relation to the research, and that you are happy to participate. Please note down your participant number (which is on the Consent Form) and provide this to the lead researcher if you seek to withdraw from the study at a later date.

You are free to withdraw your information from the project data set at any time until the data is destroyed ten years after the conclusion of the project (30 June 2032). Please note, you will have the opportunity to co-author publications, including scientific articles. Hence, please also note that your data may be used in the production of these formal research outputs (e.g. journal articles, conference papers, theses and reports) prior to this date. Please be advised to contact the recruiting university at your earliest convenience should you wish to withdraw from the study. To withdraw, please contact the lead researcher (contact details are provided below). Please also contact the Research Support Office [research.eec@coventry.ac.uk or telephone +44 24 7765 7688] so that your request can be dealt with promptly in the event of the lead researcher's absence. You do not need to give a reason. A decision to withdraw, or not to take part, will not affect you in any way.

What will happen if I decide to take part?

You will be asked a few questions before you take part, these will be regarding your age range, gender, experience level with the Internet. The questions will be asked in a survey you will receive prior to participation in one of CSI-COP's free workshops or online informal education 'human rights in the digital age' courses. The survey can be completed online (information on how and where to access to be advised), or in the clean, health-safe environment CSI-COP will provide before the start of any face-to-face workshop which will be dependent on local Covid-19 restrictions. The survey should take 5-10 minutes to complete.

Data protection and confidentiality

Your data will be processed in accordance with the GDPR. All information collected about you will be kept strictly confidential. No personal or sensitive data will be collected. Unless they are fully anonymised in our records, your data will be referred to by a unique participant number rather than by your name. Your data will only be viewed by the researcher/research team. All electronic data will be stored on a password-protected computer file in Coventry University's servers. Any paper records will be scanned into a digital document then stored securely. The paper files will be destroyed securely after the scanning process. Your consent information will be kept separately from the data you provide about your investigations. This in order to minimise risk in the event of a data breach. The lead researcher will take responsibility for data destruction and all collected data will be destroyed on or before 30 June 2032 [10 years after the conclusion of CSI-COP].

International data transfers

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Your data will only be stored or processed in a CSI-COP partner location.

Data protection rights

Coventry University is a data controller for the information you provide. You have the right to access information held about you. Your right of access can be exercised in accordance with the GDPR. You also have other rights including rights of correction, erasure, objection, and data portability. For more details, including the right to lodge a complaint with the Information Commissioner's Office (ICO), please visit www.ico.org.uk. Questions, comments and requests about your personal data can also be sent to the Coventry University Data Protection Officer: dpo@coventry.ac.uk

What will happen with the results of this study?

The results of this study may be summarised in published articles, reports and presentations. Quotes or key findings will always be made anonymous in any formal outputs unless we have your prior and explicit written permission to attribute them to you by name.

Making a complaint

If you are unhappy with any aspect of this research, please first contact CSI-COP's Director of Science, [Dr Huma Shah, ab7778@coventry.ac.uk]. If you still have concerns and wish to make a formal complaint, please write to Dr Paul Griffiths, ac7972@coventry.ac.uk

CSI-COP hopes the investigation of 'how online tracking might impinge on our human rights' will interest you to participate in this timely project.

Dr. Huma Shah
Assistant Professor, School of Computing, Electronics and Mathematics
Associate Member, Centre for Data Science research
Coventry University
Coventry CV1 5FB
United Kingdom
Email: ab7778@coventry.ac.uk

In your letter please provide information about the research project, specify the name of the researcher and detail the nature of your complaint.

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9.2 Appendix 2 Informed Consent Form

Participant No. To include recruiting partner acronym e.g. CU1, CTU3, BIU9, TIL20, etc.

INFORMED CONSENT FORM:

Citizen Scientists Investigating Cookies and App GDPR compliance (CSI-COP)

You are invited to take part in this research study for the purpose of investigating cookies in websites and apps.

Before you decide to take part, you must **read the accompanying Participant Information Sheet.**

Please do not hesitate to ask questions if anything is unclear or if you would like more information about any aspect of this research. It is important that you feel able to take the necessary time to decide whether or not you wish to take part.

If you are happy to participate, please confirm your consent by circling YES against each of the statements below and then signing and dating the form as a CSI-COP project participant.

1	**I confirm that I have read and understood the Participant Information Sheet for the above study and have had the opportunity to ask questions**	**YES**	**NO**
2	**I understand my participation is voluntary and that I am free to withdraw my data, without giving a reason, by contacting the lead researcher and the Research Support Office at any time until the date specified in the Participant Information Sheet**	**YES**	**NO**
3	**I have noted down my participant number (top left of this Consent Form) which may be required by the lead researcher if I wish to withdraw from the study**	**YES**	**NO**
4	**I understand that all the information I provide will be held securely and treated confidentially**	**YES**	**NO**
5	**I am happy for the information I provide to be used (anonymously) in academic papers and other formal research outputs**	**YES**	**NO**
6	**I agree to take part in the above study**	**YES**	**NO**

Thank you for your participation in this study. Your help is very much appreciated.

Participant's Name	**Date**	**Signature**
Researcher	**Date**	**Signature**

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9.3 Appendix 3 Participant surveys

9.3.1 Appendix 3-1 **Survey 1**

Participant No.
To include recruiting partner acronym e.g. CU1, CTU3, BIU9, TIL20, etc.

Survey 1: Before Participation in Workshops/MOOC

Dear Citizen Scientist,

Please kindly provide some information about yourself for the purpose of registering you as a CSI-COP citizen scientist.

Age range, please underline or circle: 18-25; 26-35; 36-45; 46-55; 56-65; 66-75; 6-85, 86+

Prefer not to say

Gender please underline or circle: Male; Female; Intersex; Trans Umbrella; Other

Prefer not to say

Location:

Country of residence:

Urban please circle or underline: Town; City; Metropolis

Rural – e.g. villages

Languages

What is your mother tongue, or most dominant language?

Do you read/check websites in other languages, if so please say which:

Accessibility

Do you regard yourself as having some accessibility issues, for example, motor (wheelchair user), or use text-to-speech and /or speech-to-text software due to some visual impairment?

Yes / No / Prefer not to say

Highest Education level:

Middle/ Elementary/ Basic school (up to age 16)

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High School (up to age 18)

Vocational (up to age 19)

Undergraduate degree (e.g. BA/BSc)

Postgraduate degree (Masters)

Doctoral (PhD)
Subject/degree name

Prefer not to say

Social Involvement:

Full time guardian (e.g. mother; grandparent; carer)

Seasonal worker

Freelancer

Employed (P/T; F/T)

Refugee seeking asylum

Prefer not to say

Internet Usage

Do you have access to your own Internet connection (home or work broadband/mobile), or do you use public access when using the Internet?

How often do you use the Internet? Please select

Daily

2-3 times a week

Once a week

Less than once a week

Purpose of Internet use:

Use the Internet daily as part of work

Use the Internet for leisure, not part of work

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Use the Internet for work and leisure

Use the Internet in a limited way, for example using a computer in a public library

Prefer not to say

Use apps for:

Use apps regularly, for example, transport apps to inform on timing of next train, bus, etc., if so, please provide names of some apps you use and their purpose, such as

Playing Games

Educational apps

Lifestyle (sport, fitness, health)

News

Entertainment (for example streaming apps, such as Netflix)

Other uses

Prefer not to say

How did you hear about CSI-COP project?

Word of mouth (from friends)

From the Internet (Twitter; Facebook post; University marketing)

From a citizen science platform (e.g. SciStarter; Zooniverse; EU.Citizen-science)

Direct approach (email from CSI-COP team, email from a membership organisation)

When entering a website, do you:

a) Tend to check and read any cookie information before exploring the website?
b) Tend to accept and enter the website without checking cookie information?

When downloading an app, do you

a) Read any privacy notice before downloading an app?
b) Read any privacy notice after downloading an app?
c) Do not read app privacy notices?

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d) Not aware of app privacy notices? For example, the app does not make it transparent that there is one.

9.3.2 Appendix 3-2 **Survey 2**

Survey 2: Quality of informal education in workshop/MOOC

Participant No.
To include recruiting partner acronym e.g. CU1, CTU3, BIU9, TIL20, etc.

1. Did you join a CSI-COP workshop or take CSI-COP's MOOC?
2. In which venue/organisation/city did you attend the workshop? _____
3. Date attended a CSI-COP workshop or completed CSI-COP MOOC:
4. What did you expect from this workshop /MOOC?
    a. Meeting new people
    b. Learning about human rights for online activity
    c. Learn what cookies are and their purpose
    d. What is the GDPR?
    e. Learn about online privacy?
    f. Other
5. How well did the free online education achieve your goals?
6. Did your intention to participate in CSI-COP change after attending the workshop/MOOC?
7. In the practical training: how easy or hard did you find uncovering cookies?

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8. Do you intend to join the CSI-COP team and progress to explore cookies in websites and apps?

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9.3.1 Appendix 3-3 **Survey 3**

Survey 3: After investigation phase (validation)

a. What was the maximum number of cookies you found in a website or in an app?

b. Did you feel that your privacy online was invaded?

c. How do you feel about this? Please select from the options below:

   i. Not surprised at all
   ii. A little surprised
   iii. No opinion
   iv. Surprised
   v. Shocked

d. Do you intend to continue checking for cookies after the end of the CSI-COP project?

e. How did you feel about being a citizen scientist? Please select from below:

   i. I felt part of a team
   ii. I would participate in other citizen science projects in future
   iii. I learnt useful information, knowledge and skills
   iv. Did not feel part of a team

f. Did your perception of science and *doing science* change after collaborating in CSI-COP?

   i. Better perception of what scientific work involves
   ii. Brings the general public closer to science
   iii. Inspired to progress to further education
   iv. Did not bring me closer to science

g. What would you do to improve interaction in the CSI-COP team?

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9.4 Appendix 4: Sample list of organisations for citizen science engagement (A full dataset with links will be uploaded to csi-cop.eu)

Citizen Science (CS)	Gender	Age & socio-economic	Libraries and Museums	Privacy / Governmental & NGO
International & European platforms	***International & European platforms***	***People-related organisations***	***International & European platforms***	***Privacy***
SciStarter	ACM Women in Europe	AEGEE – European interdisciplinary student organisations	American Library Organisation	Access Now (Right to privacy)
Zooniverse	European Platform of Women Scientists (EPWS)	Age Platform Europe (voice of older persons at EU level)	Association of European Libraries (LIBER)	Big Brother Watch
Citizen Science Association (CSA)	Women in Security and Privacy (WISP)	Eurochild (network of organisations and individuals promoting rights and well-being of children and young people)	International Council of Museums (ICOM)	Electronic Frontier Foundation (EFF)
The European CS Association (ECSA)	Women in Advertising & Communication	European Council on Refugees and Exiles (ECRE	Network of European Museum Organisations (NEMO)	Parent Coalition for Student Privacy (Parents4Privacy)
EU-CITIZEN.SCIENCE	Working mothers' network	Silver Surfers (Over 50s forum)	UNESCO Library Portal	Privacy International
National links	***National links***	***National and Regional***	***National links***	***Governmental/NGOs***
Belgium CS platform (BE, NL)	Association of Hungarian Women in Science: NaTE (HU)	Act4Change (Youth Participation, international cooperation, Belgium)	Association of Library and Information Professionals of Czech Republic (CZ)	European Digital Rights (EDRI)
Citizen Science in CZ (CZ)	Asociación de Mujeres Investigadoras y Tecnólogas (AMIT Spain)	ANKAA project MKO (inclusion, education, Athens, Greece)	Chartered Institute of Library and Information Professionals (CILIP, UK)	Future of Privacy Forum

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Danish CS platform (DK)	Centre for Gender & Science (CZ)	Ackermann-Gemeinde e.V. (Romas and/or other minorities; youth participation, Munich, Germany)	Finnish Museums Association	Greek Ministry of Digital Governance
German CS platform (DE)	Center of Excellence Women and Science (CEWS: DE)	Acknowledging Youths CIC (Early School Leaving / combating failure in education, access for disadvantaged, London, UK)	German Museums Association	Israel Democracy Institute (IL)
IDEAS Science (HU)	Israeli Council for the Advancement of Women in Science and Technology	AFEV Barcelona (Access for Disadvantaged)	Israeli center for libraries	Minsitry of Human Capacities (EMMI, Hungary)
Österreich forscht	SHE CODES (IL)	Antikomplex (Youth Participation, Prague)	Musées et Société en Wallonie ASBL (Belgium)	Open Rights Group
Participatory Sci.Academy (CH)	The Daphne Jackson Trust (UK)	Association for Arab Youth and Adolescents (R.A., skills development; Equality and non-discrimination, Haifa, Israel)	National Museum of Contemporary Arts, Athens (EMST)	Safer Internet Program
Swedish CS platform (SE)	Womens' Association of Patras	Breakthrough Foundation (Disabilities, intercultural, intergenerational education and lifelong learning, Dordrecht, Netherlands)	Netherlands Museums Association	The Privacy Collective EU
Switzerland CS platform (CH)	Women in Journalism	Centre of Open Protection of the Elderly (Patras)	Spanish Association of Cultural Heritage Managers	UN Human Rights
Taking CS to School (IL)	Women in Tech (FI)	Kehitysvammaliitto. (Finnish Association on Intellectual and Developmental disabilities FI)	The Puszky Society – Hungarian Museums Association	World Privacy Organisation

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