



Transforming Research through Innovative Practices for Linked Interdisciplinary Exploration

[30.09.21]

Advancing Open Scholarship

D3.2

REPORT ON CO-DESIGN OF THE INNOVATIVE AND NEW SERVICES

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Acronyms

EOSC	European Open Science Cloud
RI	Research Infrastructure
SSH	Social Sciences and Humanities

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Publishable Summary

TRIPLE will help Social Sciences and Humanities (SSH) research in Europe to gain visibility, to be more efficient and effective, to improve its reuse within the SSH and beyond, and to dramatically increase its societal impact. It will be a dedicated service of the OPERAS research infrastructure and will become a strong service in the [EOSC marketplace](#). The European Commission finances the project under the Horizon 2020 framework with approx. 5.6 million Euros for a duration of 42 months.

GoTriple, the European discovery platform, addresses these issues: it enables researchers to discover SSH publications and data, but also other researchers and projects across disciplinary and language boundaries. It provides all the necessary means to build interdisciplinary projects and to develop large-scale scientific missions. It will thus increase the economic and societal impacts of SSH resources.

Deliverable 3.2 reports on the co-design work on the innovative and new services of the GoTriple platform, conducted as part of Task 3.2. The consortium has engaged in a number of co-design activities aimed at furthering the investigation of the end-user needs around the platform's: recommender system, annotation tool, crowdfunding solution and the visualisation tools. Additionally, a set of co-design activities have been conducted to study with more depth the discovery user journeys of SSH researchers, with a focus on mapping the ecology of tools and practices currently used in the discovery processes. Lastly, to complement the co-design knowledge on the crowdfunding solution, an end-user questionnaire was conducted to investigate the interests of people toward funding research via crowdfunding and in particular the funding of SSH projects.

The work reported in this deliverable has contributed to the overall design of the platform by bringing to the attention of developers a set of key recommendations to be taken into account in the production of the innovative services, prior to their integration in GoTriple and their release to the users.

1 INTRODUCTION

This deliverable describes the work conducted for Task 3.2 of the TRIPLE project. Generally speaking, for Work Package 3 “User research & Co-design” there were 3 tasks running concurrently all focused on co-design with GoTriple end-users:

- Co-design with end-users the core innovative functionalities and novel services of the platform and their interfaces and conduct an analysis of the existing discovery user journeys. The innovative and new services include: the textual/visual search, the recommender system, the annotation tool and the crowdfunding solution **T3.2 - this deliverable D3.2 (Leader Abertay)**
- Design of an innovative trust building system **T3.3 - reported in D3.3 (Leader MEOH)**
- Design of novel user profiles and dashboards, supporting discoverability in GoTriple **T3.4 - reported in D3.4 (Leader Net7)**

Thus, this deliverable reports on the co-design work carried out with potential end-users of the GoTriple platform to ensure that a set of planned innovative services fully meet their needs. We will discuss here the evolution of the co-design / co-creation process and the practical use of the methodology undertaken to inform the design and development process before turning to reporting the results of our research. Designers have become increasingly aware of the need to understand their end-users, and this is apparent in the shift towards a User-centred design approach (Norman, 2013). In fact, Co-design is now seen as critical to the success of most projects and a large range of benefits can be attributed to this (Steen et al, 2011). There are several terms used to describe the participatory approach to designing both systems and services; these include Co-Production, Co-Creation, Co-Design and Co-Delivery. Throughout this deliverable, the term co-design is favoured when describing the work we carried out with our stakeholders. When discussing the previous literature, the term used by the original researcher has been used.

As this research has taken place at the time of a Global Pandemic, where social distancing measures have been in place throughout the period of this study, it has been necessary to adapt our methodology to continue to carry out this important work. Thus, from an initial plan to conduct face to face co-design we shifted entirely to an online, remote, approach. How we have moved to online working using digital tools has been described in section 1.2).

The Innovative services of GoTriple are those services that do not comprise the Core of the platform but offer advanced and novel functionalities to make the platform more usable and increase the possibilities to make further discoveries, these include a recommender and a trust-building system, dedicated discovery visualisations, a crowdfunding service and an open annotation tool. The trust building system is intended to be the "social engine" of the platform and therefore requires dedicated co-design work for its development, this is why there is a dedicated task (T3.3) and a dedicated deliverable (D3.3). The aim of this research phase was to increase the appropriation capacity of SSH researchers toward the GoTriple platform by gathering knowledge for making the GoTriple innovative services better and more usable. Therefore, the consortium conducted a number of co-design-creation workshops and design research activities on the user journey within GoTriple. The goal was to involve SSH researchers in taking decisions about the shape and the future evolution of the platform, in particular of the end-user interface.

In addition to hands-on co-design workshops on each of the innovative services previously mentioned, we have also conducted a questionnaire for researching the crowdfunding services. This work related in particular to the crowdfunding solution where it emerged that additional knowledge coming from the people who may be funding a project (rather than the researchers conducting a project i.e., the regular GoTriple users) would have been relevant for the set-up of the GoTriple crowdfunding solution. The results of the questionnaire are reported in section 8.

1.1 A brief perspective on Co-Design

End-users are considered a rich source of innovation for the design of products and also services (Prahalad & Ramaswamy, 2000). In the literature, the participation of end-users is often labelled 'co-creation' (Von Hippel, 2009) and the terms Co-creation / Co-Design are the more recent terms used for what the Scandinavian researchers called originally Participatory Design (PD) which has been around for approximately 40 years. In the mid-1970s, computer-based technologies were introduced into the workplace in Europe, and workers began to feel that they were losing control of their work environment. The early Scandinavian Co-operative Design movement involved very little actual design per se but emphasized the importance of providing workers and union officials the knowledge and skills about the potential of computational systems so that their views would be better articulated when bargaining with management. They were to an extent participating actively in making decisions about technology and work. This idea has then been generalised toward the design of all solutions. Thus, in brief, PD strives to bring together designers and users to produce technologies that better meet the needs of the user and ideally support their empowerment toward technology and work and sometimes even their emancipation from specific forms of exploitation or alienation. Co-design research is also particularly attentive to the differences among end-users and strives to promote a perspective of equality and diversity during the conduction of design activities (Horne and Shirely, 2009). At a very general level, the main motivation for user participation is the proposition 'that the people whose activity and experiences will ultimately be affected most directly by a design outcome ought to have a substantive say in what that outcome is' (Carroll & Rosson, 2007).

Co-creation / Co-design assumes that user involvement is essential during any design creative process. This is because users can tell designers more clearly how specific ideas, tools or solutions meet their needs and offer the designers insights on how to produce better technologies. (User) empowerment occurs when users are involved in the decision-making process for new technology from the beginning. Moreover, involving users from the early stages of technology development reduces the risk that technology is not accepted, i.e., it reduces the risk of failure at later stages of the development. Practically, co-design is very often conducted through participative workshop activities in which users and designers work together using hands-on methodologies and techniques in order to approach a problem and envision specific solutions for that problem.

It is apparent though that the traditional user-centred design approach (mainly used to develop products) cannot address the complexity of the challenges we face today (Sanders & Stappers, 2008). There has recently been a shift away from simply designing new products towards designing for the future experiences of people, communities, and cultures. The ideas of 'service design' and 'interaction design' have become more widely adopted in recent times. Emerging

design practices, such as ‘design for sustainability’ or ‘design for transforming;’ are trying to address personal or societal needs. Sanders & Stappers, (2008) argue that these emerging design disciplines require larger scopes of inquiry and a longer-term viewpoint to be taken.

Adopting co-design for GoTriple is fundamental as in this way the consortium will be capable of considering several possibilities for the design of the platform and serving the needs of different users, taking into account gender differences, career stage differences, disciplinary differences, country-specific differences and so on. Co-design for GoTriple can support the wider acceptability of the solution and generally empower SSH researchers in taking key decisions about a platform they will use later. For example, a workshop can focus both on visualisations modes and on highlighting the links between SSH data and societal challenges.

The following section of the deliverable describes in detail the different methodologies used to carry out Co-design with the future end-users of the GoTriple platform, for the work planned for Task 3.2 “Co-Design of Innovative and New Services” in order to get a more in-depth understanding of their needs for the innovative services of the GoTriple platform.

1.2 Co-Design in a Global Pandemic

Prior to 2020 we had envisaged that our co-design activities would take place via group workshops in a physical environment (i.e., face-to-face). With the onset of the Covid-19 pandemic early in 2020, it soon became apparent that this would not be possible and that to successfully conduct our co-design process, we would need to adapt our methodology and move to virtual workshops, working with participants remotely (either in groups or as an individual activity).

We had already become familiar with online meetings, enabling video conferencing as a group, such as Zoom and Teams. To facilitate the co-design activities, we also needed whiteboard tool that would enable us to interact with workshop participants in a virtual design space. The whiteboard tool would allow us to replicate hands-on workshop activities offering participants the opportunity to interact together. We spent some time researching the available platforms that could support this kind of work and assessed features as well as costs to identify a platform that would best fit our specific needs. From our analysis, it emerged that there were two strong contenders, Miro and Mural (<https://www.miro.com> ; <https://www.mural.co/>), the WP3 leaders were able to download trial versions of both of the tools and try them out. An internal workshop also took place with the partners of WP3 in order to present these platforms and discuss together their merits and limits. In addition, both of the companies providing these two services were running ‘Taster sessions’ (during the time we were in the process of making a decision) where prospective users could participate in an online webinar that highlighted the functionalities of the software. The sessions were very useful in allowing us to ensure that the software would allow us to do everything that we required. In the end, both tools could have been used, but it came down to a personal preference for the slightly cleaner interface of Miro.

Test Miro boards were created and shared to see if the software allowed for easy access by participants (avoiding making them sign up/sign in to access the boards). Indeed, this was considered by us an important feature as we wanted a solution with the least number of obstacles for access for our participants. We then had to work out the best way to incorporate the Miro session into an online video group call. For the work related to this deliverable, we

decided that the best way was to use Microsoft Teams as it had automatic caption generation, which allowed us to make quick transcriptions of any discussions made during the session. For other Tasks (e.g., for example during some workshops for T3.4), Zoom was used as an alternative to Teams). The link to the Miro board could be dropped into the chat allowing participants to access (if the Access Settings had been amended in advance to reflect this) and the session then recorded using the Teams recording software (with prior informed consent already collected from participants a few days before the workshop). A few test sessions were made with local colleagues to check the methodology and the correct working of the technology, and after one or two minor adjustments we were ready to start. All this work took place in the early period of the task.

To better explain what the GoTriple platform would offer during our online co-design workshops we developed an infographic visualisation, which was included in the Miro whiteboard, to highlight what would be included in the services (see figures 1 & 2 below). The infographic did indeed facilitate the participants' understanding of what GoTriple would be, why the platform would support SSH researchers and why these users were part of the workshop (i.e., as SSH researchers having a say on how the GoTriple innovative services could look like).

Figure 1 shows a visualisation of the different components (including the Innovative Services) of the GoTriple platform made by Paula Forbes (Abertay).

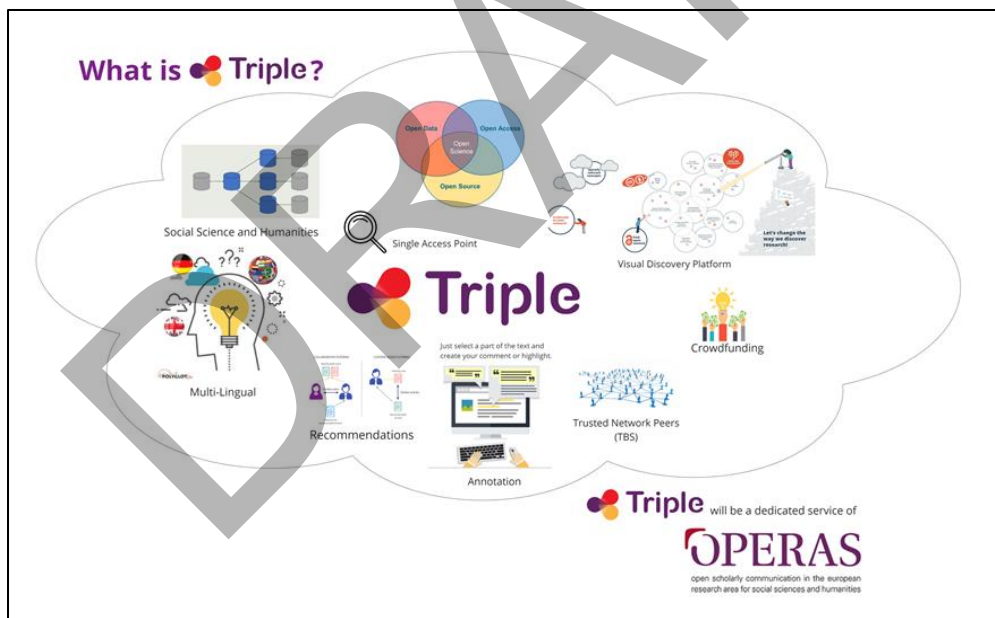


Figure 1. Initial Infographic to explain the GoTriple platform to participants

This was then improved upon by Giulio Andreini (NET7) to produce the infographic shown in Figure 2.

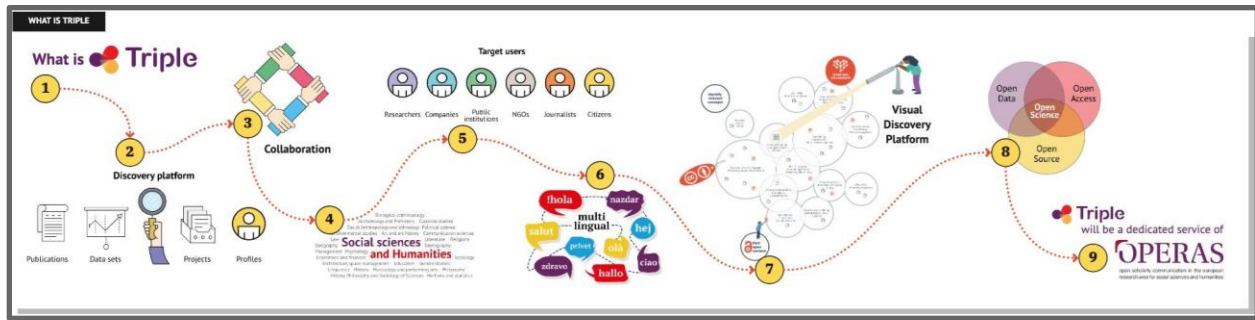


Figure 2. Final GoTriple Platform Infographic

Additionally, during the conduction of the online workshop we also have introduced the idea of conducting both group (online) workshops as well as one-to-one sessions. There are a couple of reasons for introducing the “one-to-one”. First, in part of the work we wanted to work with individual users (e.g. in mapping their own discovery journeys). Second, very often we operated recruitment of participants for group workshops at a specific date-time, however occasionally some participants could not attend in the specified time or for an unforeseen last-minute reason they did not show up. The “one-to-one” sessions allowed us to keep these participants in the process while organising a session at a time suitable for them. Overall, the mix of group workshops and “one-to-one” sessions have provided interesting results, and often we witnessed that it was possible to go more in-depth in some issues during the “one-to-one” over the group workshop. To note that the methodology for the “one-to-one” and the group workshop was always the same, thus allowing to collect similar and comparable material.

1. Set up Miro Board (N.B. set edit access!)
2. Send participant link to Teams meeting (+ Informed Consent forms)
3. Join Teams meeting & share link to Miro board
4. Start Recording via Teams
5. Share Screen to enable recording of actions on Miro board
6. At the end of the session generate captions via Stream for transcription

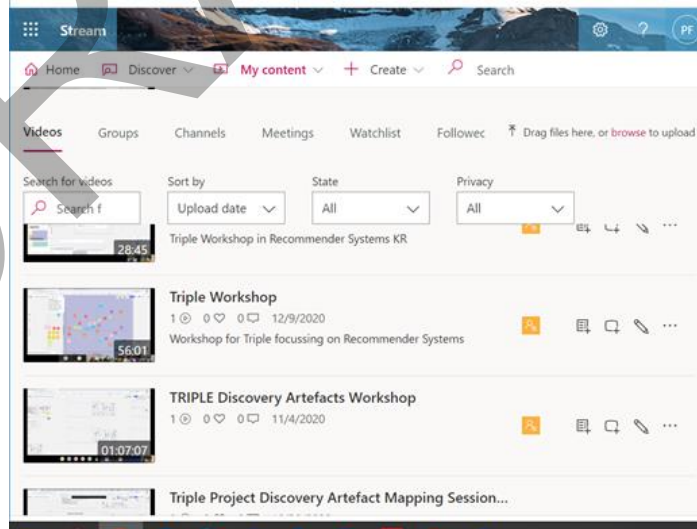


Figure 3. Methodology used for Remote Online workshops in Miro and Teams and image showing recorded sessions on MS Stream.

Guidelines were developed to enable consistency in the methods used and to allow replication by other project partners where this was necessary. Anyway, during the conduction of all the three co-design tasks there has been a constant sharing of best practices and ideas among the

involved partners for how to better conduct this work in the new context. Informed consent was obtained from participants in advance of any activity, along with an information sheet, making them aware that sessions would be recorded and ensuring that they were happy to proceed.

1.3 Summary of Co-Design Activities

Activity 1: User Discovery Journey Mapping (Cognitive Walkthrough): Screen Recorded Walkthrough of Researchers' Discovery Processes and Saving Relevant Articles (Conducted by DARIAH)

Number of Participants: Individual (“one-to-one”) activity (x7)

Technology used: Online conferencing software (eg. Teams/Skype/Zoom). Screen Recording software

Aim: To better understand the current discovery processes of potential end-users (e.g., what tools they are using currently, what practices they use, aspects of tacit knowledge in the discovery etc.) and to pinpoint specific ‘pain points’ to see how the GoTriple platform could provide a better User Experience for discovery. We wanted to understand the interaction of different technologies and artefacts currently used (e.g., search engine, annotation tools etc.) along the process of discovery and to see how individuals differ in their approach, what are commonalities and where can GoTriple help streamline and support the process.

Preparation required: A script for talking the user through an activity (e.g., searching for specific publications)– **but** they should follow their usual process, we are not prompting them to use a specific tool, just to carry out a search and save in their usual way. Pre-test screen recording software in advance of any session.

Time taken: 30-40 minutes per session.

Activity 2: User Discovery Journey Mapping - Artifact Ecology Activity

Workshop using the techniques adapted from Bødker et al. (2017), which uses stickers in order to facilitate the users in mapping the ecology of the artifacts they use (e.g., the researcher’s tools used in discovery journey).

Aim: To better understand the discovery process and to pinpoint specific ‘pain points’ to see how the GoTriple platform could provide a better User Experience. We want to understand the interaction of different technologies and artefacts used along the process of discovery and to see how individuals differ in their approach, what are commonalities and where can GoTriple help streamline and support the process.

Technology used: Miro + Online conferencing software (eg. Teams/Skype/Zoom). Screen Recording software (we used Teams and the Recording feature within it, but ensured that the screen was shared to enable the recording of the activities happening on the Miro Board).

Preparation required: A Miro Board per participant with the sticker board and an example Map.

**Group workshop = 1 (n=8 but only 2/3 usable journey maps); Individual (“one-to-one”) = 10
Total = 13 maps (18 participants) (This activity worked best with individuals)**

Dates workshops held: From the start of October through to the end of November 2020 (various dates)

Time taken: About 60 minutes per session.

Activity 3: Difficulties in Discovery ‘That Camp’ Session

Aim: To better understand the difficulties commonly encountered by researchers during the process of searching for, obtaining and making sense of relevant research materials. The format of the focus group discussion was very much led by the participants in this session.

Number of Participants: Group Session = 1 (n= 11) **Total =11**

Technology Used: Miro workshop (conducted via Zoom meeting)

Preparation required: A Miro board with ‘Brainstorming’ layout including Post-it notes

Date workshop held: 11th May 2021

Time taken: About 60 minutes per session.

Activity 4: Insights into Recommender Systems (Innovative Services)

Aim: To better understand the requirements of researchers in having good quality recommendations that will be useful to them in their research activities. The session investigated what kinds of recommendations researchers currently receive (in both academia and non-academic life), the frequency that they receive them and how useful they are to them.

Difficulties in making and utilising annotations as part of their research practices were discussed and also their wishes for a better annotation service.

Group workshop = 1 (n=6); Individual (“one-to-one”) = 4 ; Total = 10 participants

Technology used: Miro + Teams (transcript generated in MS Teams)

Preparation required: A pre-prepared Miro Board with the activities in different frames

Dates workshops held: 9th, 15th, 16th Dec 2020 & 5th February 2021

Time taken: About 60 minutes per session.

Activity 5: Insights into Crowdfunding (Innovative Services)

Aim: To better understand the requirements of both researchers and the public for a Crowdfunding service within the GoTriple platform, to allow crowdfunding of SSH projects. Separate sessions were conducted with the 2 different end-user groups (researchers who will receive the funding and funders e.g. general public other researchers) to see what their concerns are regarding crowdfunding, what features could support researchers in obtaining crowdfunding and other related issues relevant to the successful implementation of this feature.

Funders: Group workshop = 1 (n=4); Individual (“one-to-one”) (n=5); Total= 9 participants

Researchers: Group workshop = 1 (n=5); Individual (“one-to-one”) (n=5); Total= 10 participants

Technology used: Miro workshop (conducted via Teams meeting)

Preparation required: A pre-prepared Miro board with each activity in a different frame

Dates workshops held: 9th 10th 11th 15th February, 2nd March .

Time taken: About 60 minutes per session.

Activity 6: Insights into Enrichment/Annotation (Innovative Services - Pundit)

Aim: To better understand the requirements of researchers for annotation/enrichment service. The workshops investigated the kinds of enrichment of texts and annotations currently made by researchers, in what formats and using what tools. By better understanding the current practices, we can ensure that the GoTriple annotation tool (‘Pundit’) will meet researcher's needs.

Number of Participants: Group workshop =1 (n=4); Individual (“one-to-one”) 1 (Total 5)

Technology used: Miro workshop (conducted via Teams meeting)

Preparation required: A pre-prepared Miro board with each activity in a different frame

Dates workshops held: 1st & 2nd April

Time taken: About 60 minutes per session.

Activity 7: Insights into Visual Discovery (OKMAPS)

Aim: Overall the aim of the group discussion was to identify how visualisation tools can support SSH researchers in their discovery process and more specifically:

- To identify the most important use cases/benefits for visualisation tools (Knowledge map, Streamgraph, Diagram components)
- To identify additional ideas and use cases for the proposed visualisation tools
- To understand what role multilingualism plays in their research discovery process
- To understand what visualisation tools and what use cases to focus on
- To inform design choices for the visualisation tools and for the whole discovery platform

Technology used: Google Docs, Google Slides and the online conferencing software Zoom. Audio recording software provided by Zoom.

Preparation required: A Google Doc with all questions & example mock-up images per topic and per group (=12 documents in total, 2-3 pages each). Groups could use these documents for note taking during their breakout sessions. A google slide presentation with 42 slides. (incl. Introduction to each topic, questions, images etc.)

Group workshop = 1 (n=7)

Dates workshops held: January 19, 2021

1.4 Summary of the crowdfunding questionnaire

To complement our knowledge on the crowdfunding solution we also conducted an additional end-user questionnaire. A questionnaire is not co-design research per se, however some of the questions we wanted to investigate around the crowdfunding also blended well for such type of data collection. The decision to develop and conduct a questionnaire to harness a wide set of responses was taken jointly by the coordinator and the WP3 leader. The goal of this work was to investigate with some details the perspective of a specific category of end-users “the funders”. These are users who we do not expect necessarily to engage in discovery via GoTriple and may appear as users only when they decide to support a research project with a donation. Investigating this category of user thus required an additional tailored data collection.

Activity 8 : Questionnaire on Crowdfunding

Aim: investigate the perspective of the funders in areas such as which kind of projects people will be more likely to fund and what funders expect should happen after the project has started or finished.

Number of participants: The questionnaire has collected 587 responses, with the following breakdown: 141 from the general public and 446 from researchers. The questionnaire was distributed in 7 languages (English, German, Greek, Italian, Polish, French, Spanish and Portuguese).

Technology used: the questionnaire was distributed online using Limesurvey

Dates: the questionnaire remained open from mid-May till the beginning of August 2021

DRAFT

2. MAPPING THE USER DISCOVERY JOURNEY - ACTIVITIES 1 & 2

It is important for TRIPLE to have a good understanding of how researchers currently make their discoveries. In other words, researchers already enact discovery practices using a variety of tools and practices. Thus, for the design of GoTriple it is relevant to understand what currently works well for the users and what does not and to understand existing discovery practices and tools in order to accommodate them (where possible) within the GoTriple design. The assumption here is that GoTriple will not replace entirely existing discovery practices and that the success of the platform rests instead on accommodating the existing practices whilst offering novel tools. We began to look at the existing discovery practices in phase one of the project by conducting a large number of interviews with relevant stakeholders including researchers (and also non-academics who may also use the platform, such as journalists, NGO's citizen scientists, SME's), as reported in [D3.1. Report on User Needs](#). This process gave us some useful qualitative information about the discovery process which was also backed up by large-scale survey data to provide us with some quantitative information about the type of software used and what was important to researchers (reported in the iteration of D3.1). From the interviews conducted for this report, it is clear that the discovery process rarely happens using just one piece of software, it involves multiple applications and switching between them, perhaps even on different devices. Moreover, there may be different practices that are used by researchers, some of which may also be related with aspects such as experience (in using digital tools), or academic experience, or with the language used for the discovery process (e.g., more material available in English than for other languages).

The initial focus of the Co-Design work was to understand researchers' discovery journeys. In the design jargon, a user journey is the set of steps that a user undertakes in order to achieve a specific goal, e.g., using a platform or a set of tools. As the word journey suggests, this is a process of travelling from point A to point B, however there is not just one path to undertake such a travel and there can be a multiplicity of journeys that can take a person from A to B. Likewise we can imagine a multiplicity of discovery journeys that can take a user to find a useful resource. To study the complexity of the discovery user journey in more detail (compared to the initial exploration done for D3.1, using interviews) we have utilised a two-pronged approach, one to investigate what researchers tell us about the process/journey and how they 'map' it with us and another to record their normal discovery process/journey in a Cognitive Walkthrough task, where the researcher talks the workshop facilitator through the process as they perform it in a recorded online session (Rieman et al. 1995; Lewis et al. 1990). This dual approach was decided upon as although the 'mapping' activity was very informative, we were concerned that sometimes what people say they do does not always reflect what they actually do. Moreover, capturing the live performance of a journey could allow us to see additional aspects, such as the use of tacit skills. By conducting both methods, we can check to see if there are any major differences, and it will be interesting to see the comparison.

The cognitive walkthrough is really a usability evaluation method that allows researchers to assess how easy or difficult it is for end-users to use a particular software. Normally this method is used during an evaluation phase of a technology or platform. For our research we have re-adapted this method to study the current live discovery journey. The discovery journey 'mapping' methodology instead was adapted from the method used by Bødker et al. (2017) who used

interviews and then paper maps with stickers to untangle the different technology artefacts used in a local volunteer-based community. This second approach is normally referred to as artifact ecology and is intended to map the full ecology of artifacts that people use in their everyday life. The concept of artefact ecologies relates to the conceptualisation of the use of multiple artifacts and their relation to concrete practices (Larsen-Ledet et al. 2020), which in our cases, is the use of varying software, hardware and physical objects in order to make discoveries relevant to the SSH field of the researcher. A recent paper (Larsen-Ledet et al. 2020) focuses on how collaborative writing takes place across multiple applications and devices, and states that few have looked into how collaborative writing happens and how co writers negotiate and deal with the use of these multiple applications. Most studies focus on the use of a single tool or document which does not reflect how collaborative writing (and also discovering new material) is currently practiced. The *'artefact ecologies'* concept has evolved from the earlier concept of the *'Information Ecology'* which is defined as *'a system of people, practices, values and technologies in a particular local environment'* (Nardi & O'Day, 1999, p. 49). Information ecology focuses attention on relationships involving tools and people and their practices, and the notion of an ecology as it is used metaphorically, evokes an image of biological ecologies with their complex dynamics and diverse species and opportunistic niches for growth (Nardi & O'Day, 1999). Nardi & O'Day (1999, p. 52) state that *'A diverse information ecology is a lively, human, intensely social place, even if it incorporates very advanced technologies. It has many different resources and materials and allows for individual proclivities and interests'*. We should be aware that these artifact and information ecologies are not static, but change and evolve over time in the same way as biological ecological systems do. We have re-adapted the artifact ecology method for our purpose with the goal of mapping the ecology of the discovery artifacts in use.

2.1 Cognitive Walkthroughs of Discovery Journey - Activity 1

The cognitive walkthrough technique was used to allow us to capture the researcher's journey through the various software tools used by SSH researchers to make discoveries of academic resources. The method was chosen as it is a tried and tested usability evaluation technique and allows the highlighting of pain points or usability issues along the process. We also wanted to make comparisons with the second, newer approach we took, ie the Artifact Ecology Mapping, described in section 2.2.

2.1.1 Methods Cognitive Walkthrough

In total, seven researchers from different SSH disciplines took part in this activity. A script was prepared in advance, for talking the user through the activity (e.g., searching for specific publications)– but they were asked to follow their usual process, we did not prompt them to use any specific tools, just to carry out a search and save resources in their usual way. Screen recording software was tested in advance of any session. Sessions lasted between 35-45 minutes and were straightforward. The facilitators asked questions during the workflow to gain a better understanding of how and why the researcher was using the method being demonstrated.

Different profiles in terms of disciplines, academic status/ career level and country were sought. The seven walkthroughs allow a representation of Linguistics, Philology, Political Philosophy,

Theatre Studies, Information Science and Social Sciences and History, from PhD candidates to Assistant professors coming from Ireland, Belgium, Poland, Croatia, Greece and France.

2.1.2 Results of the Cognitive Walkthrough

Interesting findings were extracted from the seven sessions. Our plan was to couple the results with the ones coming from the Journey Mapping activities described in the next section to gain a more complete overview of the discovery practices of SSH researchers.

Discovery is never the first step in the workflow/ Complexity of research discovery workflow

The first tool or software mentioned as a starting point of the walkthrough was always intertwined with a previous step, be it a trusted colleague's recommendation, a citation coming from a previous article studied (this relates to the section entitled 'cascading discovery' described in section 2.2.2), or the ambition to start a new research project investigating a new concept or period for example. Thanks to the walkthrough, we were able to focus on a portion of the research discovery workflow and to deeper investigate the integration "in action" of different tools (switching from one tab to another in a browser, copy-pasting references from one tool to another etc).

Mix of innovative and more traditional methods

Depending on the research topic or the familiarity with digital methods, the studied practices revealed a mix of more innovative and more traditional methods. Some of the discovery paths end when a physical book is found after consulting the library catalogue for example. And in some cases, even when the workflow showcased was fully digital, it was very interesting to see the complementarity or cohabitation between different formats. A researcher showed how he was using both HTML and PDF formats of the same article: the pdf format is used to read the article and highlight the most interesting parts, while via the html format he was able to copy-paste content from the article to the document where he keeps notes.

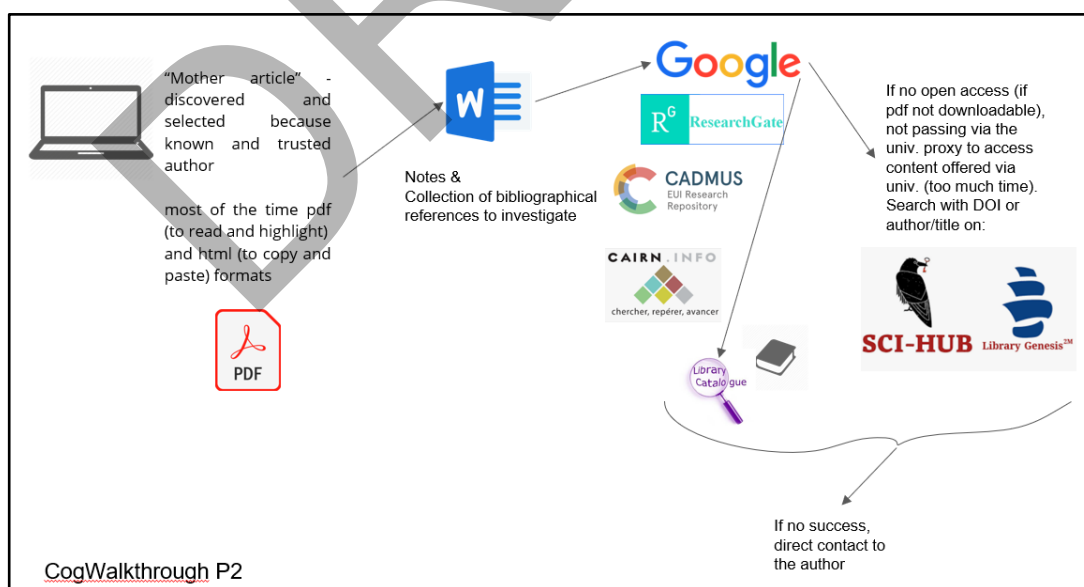


Figure 4. Example of a mapped workflow designed after the cognitive walkthrough

When it came to methods and practices used to enhance networking or to follow the activities of a fellow researcher, most of the walkthroughs revealed quite a critical approach towards automation or networking platforms. The time to invest, the potential stress and noise created by social media (Twitter) or automatic email feeds/ mailing lists (which were even compared to spam) were highlighted several times. Here, we must mention though at least two examples revealing discovery workflows almost entirely based on respectively Twitter and Academia.

Patterns in search and accessibility

Based on the seven walkthroughs, we could try to extract some kind of pattern. Often researchers would indeed start their research consulting Google and/or Google Scholar, before refining their initial search thanks to citation rates or specific tags and filters. More specialised discovery portals or institutional catalogues were then used - usually in a second step - and it seemed that the resource used was highly dependent on both the location of the researcher AND the discipline/field. Furthermore, even though not all researchers using shadow libraries wished to show their practices during the recorded session, the use of these tools was mentioned several times.

We should also highlight here that the discovery workflow encompasses activities such as annotation of resources (Evernote, Google Sheet, Microsoft Word or Zotero are some of the tools showcased), archiving (Dropbox, GDrive or local storage), referencing (Zotero, Mendeley or Papers), citing and editing.

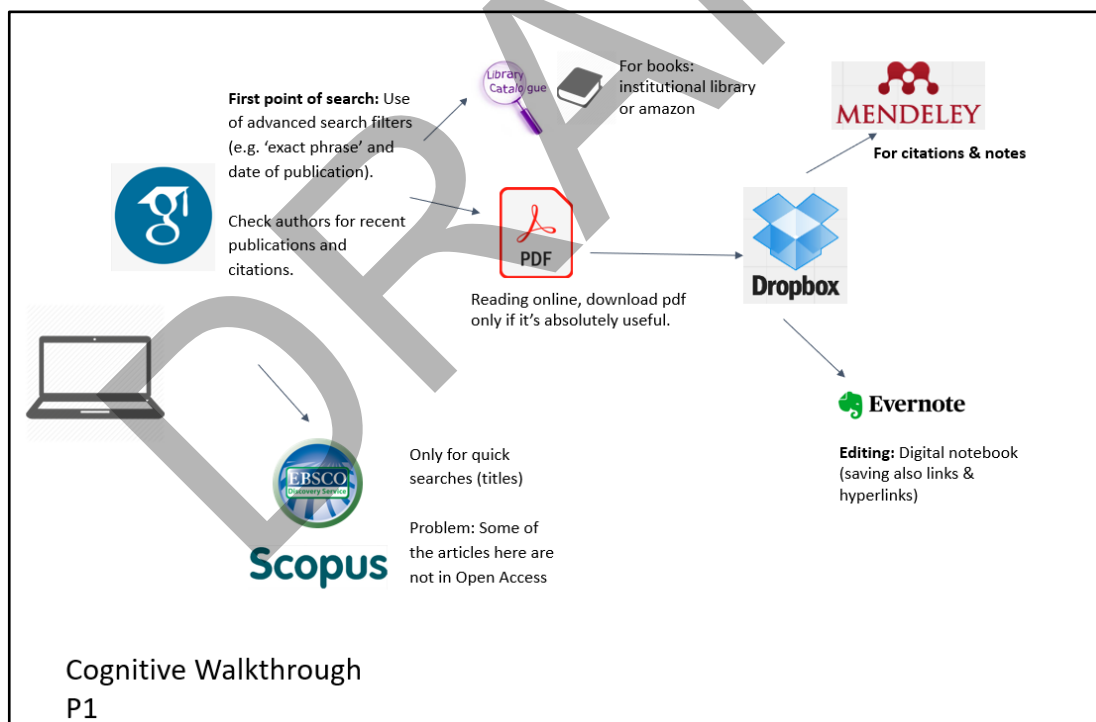


Figure 5. Example of a mapped workflow created after the walkthrough

Publications are central

It is possibly a result of a bias in the sample of researchers, or of the method used, but the results showed that discovery came more from content cited than from an ungrounded network, even though ResearchGate and Academia were mentioned. Publications and their content, more than

their author(s), seemed to be the first driver for discovery. As mentioned above, only a few walkthroughs showed digital networking practices and direct contacts with peers was mentioned at the end of a process of search for accessibility. The question of data discovery was also asked but no real use cases/examples emerged from these seven walkthroughs. One researcher mentioned reusing data from other papers - so data already contextualised and used in for a given research question - but no search or browsing of “raw” data in specialised catalogues was mentioned.

2.2 User Journey Mapping: Discovery Artifacts - Activity 2

As the GoTriple platform we are developing will be part of a diverse information ecology, we thought that it was important to understand the other aspects of this complex ecology and how the platform might fit into it. Jung et al. (2008) define a person’s ecology of artifacts as the artifacts “ that a person owns, has access to, and uses”. In a biological system, a newly emerged species will only survive the test of time if it is fit for purpose, as there is already strong competition within the ecological system. This is very similar to newly developed digital systems who must find their place within the overall system ecology, it’s likely that only those providing the greatest value within the ecology will be sustained (Jung et al. 2008).

Our earlier interviews with SSH researchers and other stakeholders gave us a glimpse of the complexity of the discovery process; this process rarely occurs using a single application in isolation, but entails switching between various applications (and also devices), and perhaps between digital and non-digital resources. A useful review article by Lyle et al. (2020) identifies themes regarding artifact, communicative device and Information Ecologies, they propose four relevant concepts, i) Information Ecologies, ii) Artifact Ecologies, iii) Device Ecologies and iv) Communicative Ecologies. The review also examines the different scales that these ecologies may span; Macro, Meso & Micro and how the different levels should be considered.

To add to the complexity, we should consider collaborative practices, as researchers may be working together to solve a problem, with each working on sub-tasks either individually or perhaps with each other either synchronously or at different times. Digital and physical artifacts within an artifact ecology may be used for a variety of tasks, with each individual carrying out the task differently (Vasilou et al. 2015).

The method we have adapted to investigate our discovery artefacts was initially developed by (Bødker et al, 2017) and investigated how artifact ecologies took shape via the interactions between people in and across volunteer communities and their various social contexts. Their aim was to see if the visual mapping technique combined with other qualitative methods enabled a deeper understanding of the complexities of such artifact ecologies. We used this method as inspiration, but modified it somewhat, to enable it to be used in online workshops with participants joining remotely (due to the Covid-19 pandemic). The sticker board was created digitally, using Miro and also saved as a ‘template’ to enable it to be re-used with multiple participants on separate Miro boards more easily.

2.2.1 Methods of Co-Design workshops Using Online Miro Board

The online whiteboard software 'Miro' was the main tool used to conduct this task (and other TRIPLE co-design tasks). Participants were recruited by asking project partners to help find relevant SSH researchers in the different countries. We also made use of the TRIPLE website, via the Community page, to advertise upcoming co-design workshops that people might be interested in attending. In addition, notices were sent out via the TRIPLE mailing list and posts made on Twitter to try and find participants.

Sessions were conducted via MS Teams and recorded (with the informed consent of the participant - sought in advance). Transcripts of the recordings were then made by using the captioning functionality of the MS streams. For each session a separate Miro board was made and the link to the board was shared with the participant once they joined the Teams meeting. The first 5 minutes of each session was an introduction to the Miro functionality and included a practice board for participants to get to know how to use it. The facilitator then briefly introduced the TRIPLE project and the aims of the platform and what tasks the workshop would consist of. For each task, we aimed to include 10 different participants.

Figure 6 below shows the instructions for onboarding participants to the Miro workshops at the start of the sessions we ran with researchers from across various SSH disciplines and figure 7 the virtual sticker board created to support the activity and replicate the method used by Bødker et al. (2017).



Figure 6. Practice Board for onboarding participants to familiarise them with the actions on Miro



Figure 7. Sticker Board & Instructions created for Discovery Mapping workshop

To help participants understand what we were asking them to do in the artifacts ecology mapping, the facilitator created an example map in the Miro board as seen in Figure 8 below.

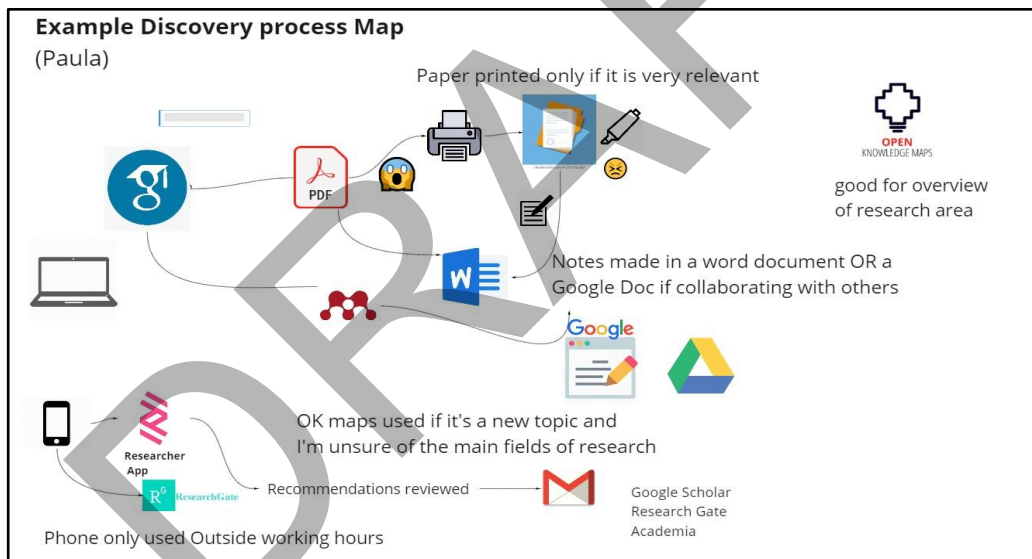


Figure 8. Example map for the Artifacts Ecology Journey Mapping activity

The following instructions were included on the Miro Board to enable the researchers to access them at any point during the session.

IN THE SPACE BELOW PLEASE USE THE ICONS FROM THE 'STICKER BOARD' TO 'MAP' THE TOOLS YOU USE FOR DISCOVERY

YOU CAN ANNOTATE THE MAP WITH TEXT TO EXPLAIN ANYTHING THAT YOU WOULD LIKE TO CLARIFY.

IF THERE IS NO ICON FOR THE TOOL YOU USE, PLEASE ADD A STICKY-NOTE WITH THE NAME OF THE TOOL.

AN EXAMPLE IS SHOWN ON THE RIGHT

PLEASE INCLUDE:

- How you search for research papers and any other items that you would use eg, data, slides, videos, researchers. etc
- How you take notes or annotate your relevant data
- How you would save it
- How you view recommendations (if received)
- Any strategy for retrieving saved items again

Participants were welcomed at the start of the meeting and verbally reminded about the session being recorded (although informed consent had been given). The first 5-10 minutes of the session were dedicated to an introduction of the TRIPLE project and then familiarisation of the Miro platform, with a quick run-through of the practice exercise. Participants were then shown the example map and the instructions given for creating their own map. The screenshot below shows the overview of the Miro board for this activity.

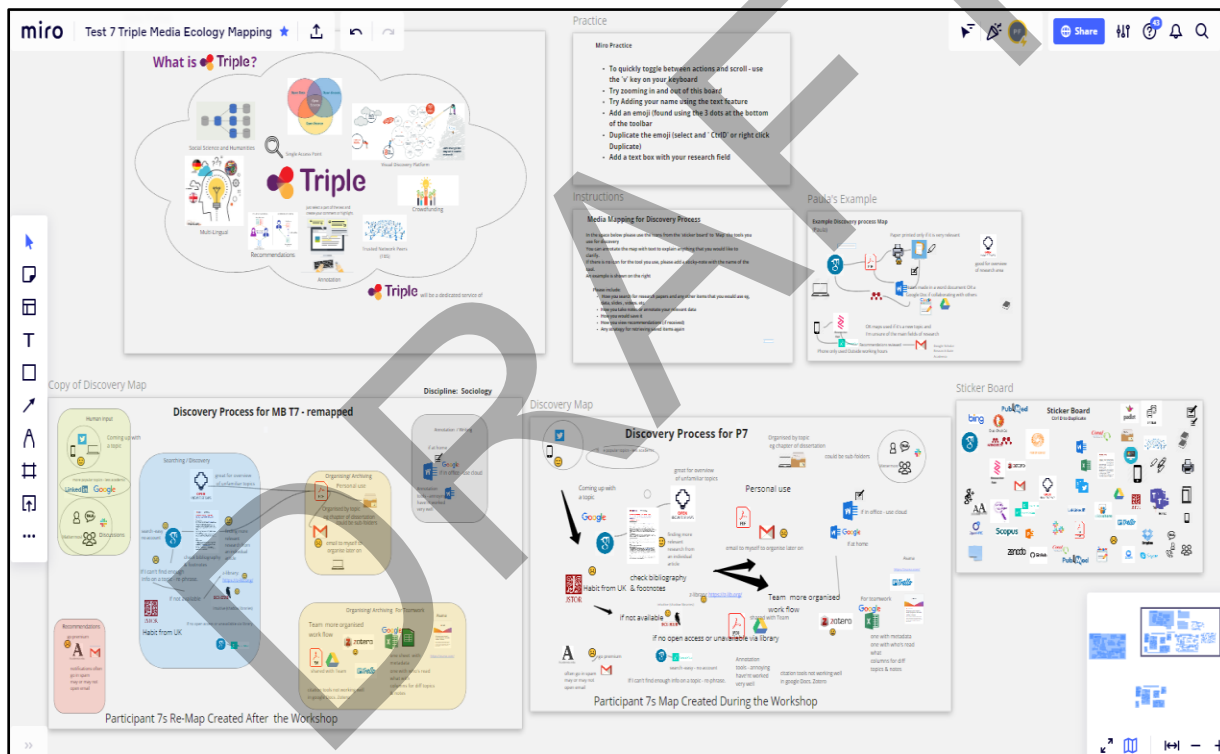


Figure 9. Screenshot of the Miro Board Showing original map created and the Re-map to the left (map with coloured boxes)

At a higher level, these categories could be grouped into an initial 'Search/Discovery' phase which is then followed by a 'Storing' phase of relevant items, and then a 'Sense-Making' phase where annotation/reflection occurs, either individually or sometimes collaboratively. The process is not strictly linear and, more often than not, it is iterative, with follow-up searches being made after periods of reflection and sense-making. After the session, the workshop facilitator went back to the map, made a copy and then re-mapped the artifact ecology, grouping the actions into the above categories.

Contrary to many ‘task evaluations’ which focus on a specific, time-constrained task, this Discovery process takes place over a prolonged time-frame. User-testing methods of any long-term interaction are difficult, and current best practice is often to use interviews to enquire about longer-term interaction (Dix, 2018). Our methods for this work are basically an expansion on an in-depth interview, with participants able to use the digital ‘stickers’ to support the discussion, to aid their recall, and to recreate a graphical representation of this complex process that allows for discussion and comparison and a more in-depth understanding, useful for the GoTriple platform. We feel that this method is able to take into account the longer time-frame over which the process is taking place.

Categorisation of the Activities

After making the categorisations, previous academic work was examined to see if these categories matched any published work. There has already been research into defining ‘basic functions common to scholarly activities across disciplines’ and these have been labelled ‘Scholarly Primitives’ a term first coined by Unsworth (2000) these are: Discovering, annotating, comparing, referring, sampling, illustrating, and representing (Palmer et al, 2009).

A paper by Koolen et al. (2020) discusses a workflow analysis perspective to scholarly research tasks and how this deeper understanding can inform the design of any digital infrastructures. The varied nature of research practices across the SSH escapes the formalized workflows often defined in scientific domains, which are often defined and scripted and can be executed and reused by other scientists (Koolen et al. 2020). The paper by Koolen et al. attempts to define a methodology to characterise these workflows by using two different research projects as case studies. In the context of developing digital research infrastructures, having an in-depth understanding of these workflows that take place in research tasks is important.

2.2.2 Results of the Journey Mapping Activity

The figures (10-14) show a selection of the maps we obtained during the mapping of the different artifacts used in the discovery process. Figures 15 & 16 show examples of the remapped versions whereby the tasks have been grouped by theme. Although some commonalities exist and the themes are universal, the methods and journeys are very different for each individual, with each using a different process and different tools to accomplish this complex task.

Below (in Figures 10-14) we show a selection of the Artifact Ecology Maps created by researchers during our workshops followed by some examples of the re-mapping completed after the workshops (Figures 15-16).

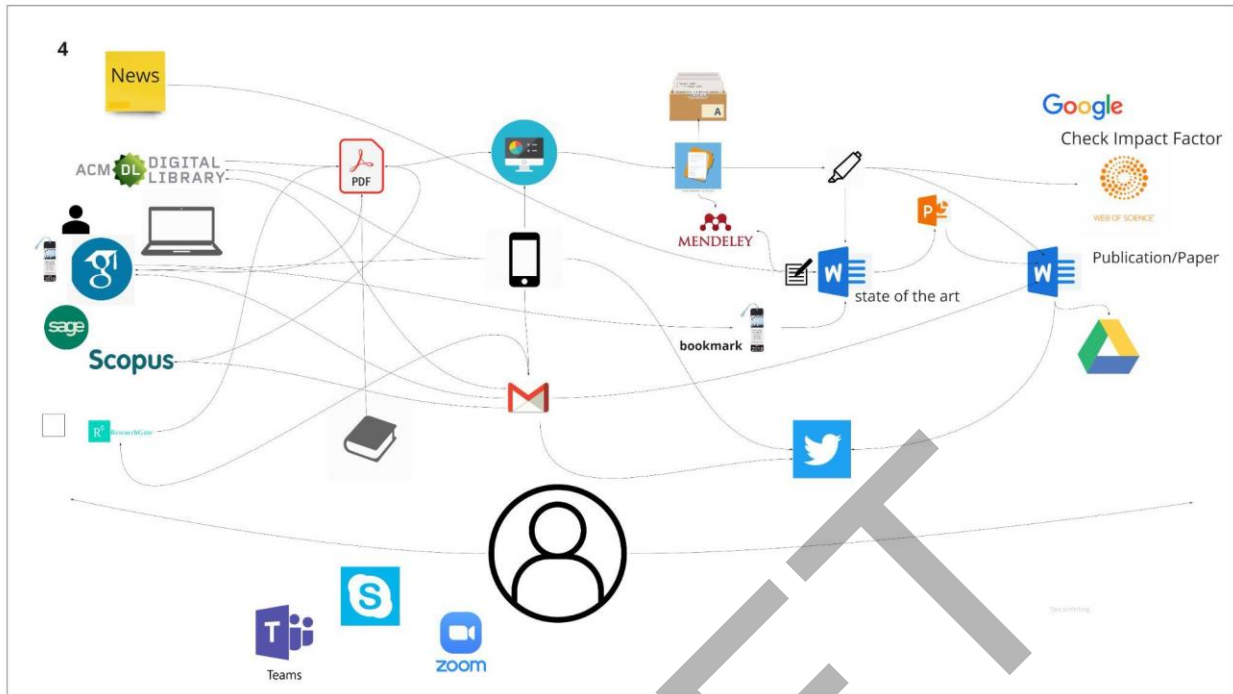


Figure 10. Artifact Ecology Map from Participant 4 (human computer interaction lecturer)

P4 uses Google/Google Scholar to get an overview of a topic, when looking to view all papers on a particular topic, then the Advanced Search of Scopus is used using specific keyword and maybe restricted to a timeframe (eg last 5 years). Search is often a two-step process, (overview and then dig deeper). Also uses Mendeley as a library tool (doesn't read the document here). Opens as a PDF and highlights in PDF reader. Paper is then moved to Mendeley library after annotations are made, also uses 'notes' section in Mendeley to write high level annotations of the paper – good/bad things, things of particular interest). Uses a Word file to keep a 'State of the Art' on particular topics. University library search is seldom used as it is not very usable. Sometimes finds papers that people post on Twitter, but Twitter mostly used as a tool to disseminate my own work. Use ResearchGate, but only on my computer, receives Google Scholar recommendations via email. Don't use phone to make active searching, just to read emails when on the go. Web of Science is used specifically to check Impact Factors for publications. P4 stated that it would be nice to have the rank of journals, to easily see this – it currently takes time and you also need to know which category the journal is listed under. Pain Point is that the article may not always be a good match for the overall category listing of the Journal. Silo Approach of categorisation.

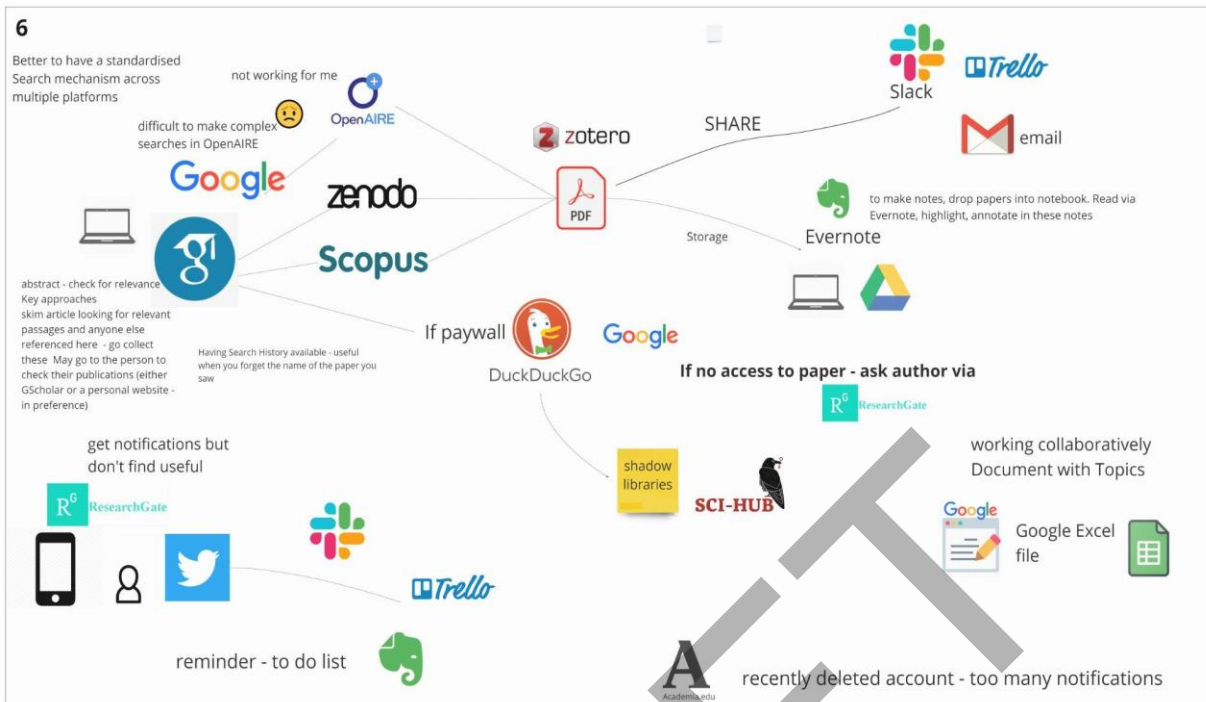


Figure 11. Artifact Ecology Map from Participant 6 (Literature/Digital Humanities lecturer)

For P6, Google and Google Scholar are used initially and tend to act as a Gateway to other services, it might lead to Zenodo/Scopus or OpenAire (via Google). Pain Point of making complex searches in OpenAire which is not working well, P6 ended up having to use code to do this complex search. Abstracts of Articles are read and if relevant, a download of the PDF file (if available). If not available, then quest to find a PDF (Google again or DuckDuckGo). As Google hides shadow libraries, need to select function of 'show everything' in DuckDuckGo. Articles are stored in Zotero library, P6 tends not to annotate in here though. PDF may be stored in Hard Drive or in Evernote (notes made here). Information found on Twitter is saved to a Trello Board or Evernote, as a tendency to forget stuff otherwise, often does this on mobile device, when travelling. Has used Researcher & Academia, but he recently deleted his Academia account as there were far too many notifications. Does still get some notifications, but doesn't really use them. What does work are Google Scholar updates – but these are only visible when you log-in (“perhaps I opted out of push notifications”). Having access to Browsing History is helpful – helps to find things that you came across and forgot about.

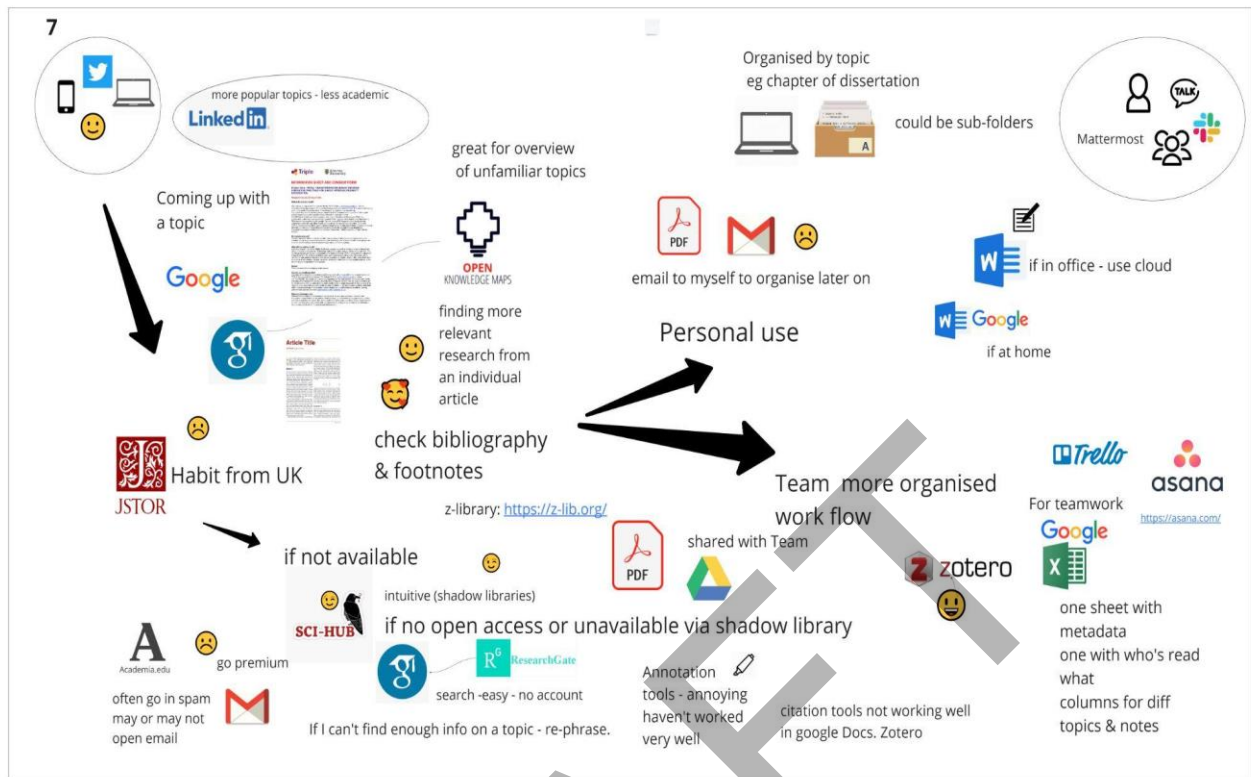


Figure 12. Artifact Ecology Map from Participant 7 (Sociologist post-doc)

The journey map produced by P7 also highlights the initial ‘inspiration for new topic’ and lists the use of mobile phone and social media platform Twitter for new ideas. When conducting a search, Google Scholar is often the first place to look, and then sometimes JSTOR (which was a habit picked up when studying in the UK). Open Knowledge Maps was mentioned as being useful for an overview of an unfamiliar topic. A similar strategy to P6 was mapped for finding ‘unavailable’ research material, in addition to Sci-Hub, Z-library was sometimes used. P6 mentioned that different workflows were used depending on whether she was working individually or as part of a Team (where the workflow was more organized, and cloud tools used e.g, Google Docs and an Excel spreadsheet with relevant material to read, columns for whose read what, links, metadata and notes). Trello and/or Asana is also used for teamwork. Specific pain points in this journey were saving PDFs (may resort to emailing herself), re-naming, saving to hard-drive organized by theme (e.g., topic or a specific chapter of dissertation).

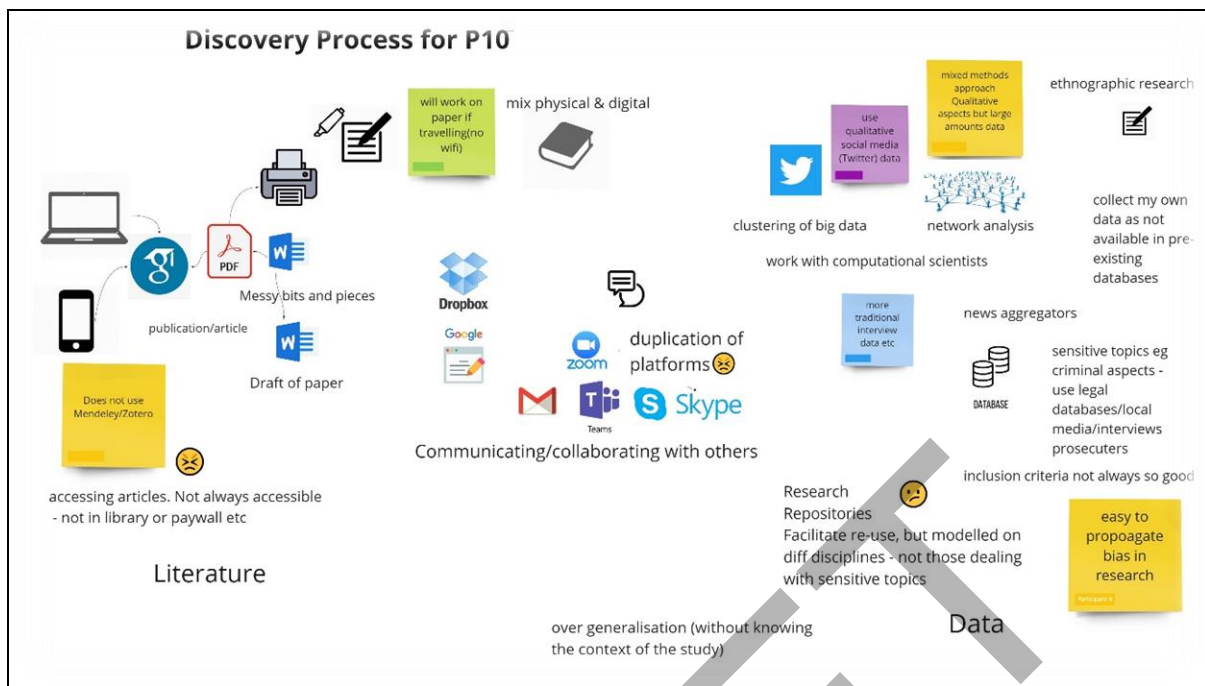


Figure 14. Artifact Ecology Map from Participant 10 Criminologist senior lecturer

The map for P10 a Sociologist/Criminologist who works on sensitive topics (criminal behaviour) and separated her map into searching for Articles/Publications and searching for Data (which she often does). Her initial search for literature starts with Google Scholar, and she encounters the aforementioned issues around not having access to all the articles she wishes to view. As well as conducting her own research via interviews and ethnographic studies, she has been working with computational scientists on the clustering of big data, and also undertakes network analysis as part of her research methods, using sources such as Twitter.

She may print out a relevant PDF download of a paper to work on (especially if travelling and there is no wi-fi). Generally, she uses a mix of digital and physical material. P10 mentions the same use of Cloud Platforms (Dropbox / Google Drive) to work collaboratively. She does not like the duplication of platforms for the same purpose of communicating, it used to be that everyone used Skype, but now there is also Zoom and Teams and people use different platforms.

Another pain point highlighted here was that although Research Repositories can facilitate the re-use of data, they are modelled on different disciplines – not those dealing with sensitive topics. The inclusion criteria is not always a good match for the system and P10 mentioned that it becomes easy to propagate bias in research because of these issues.

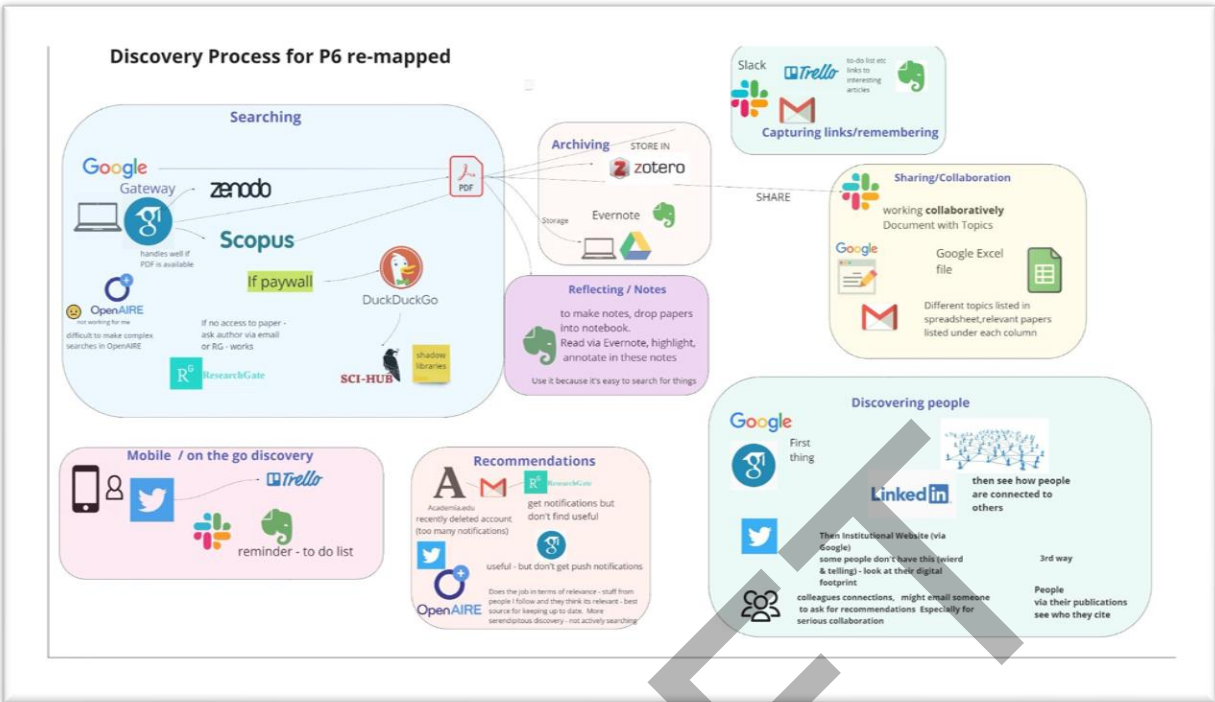


Figure 15. Remapped discovery process for Participant 6 (Literature/Digital Humanities).

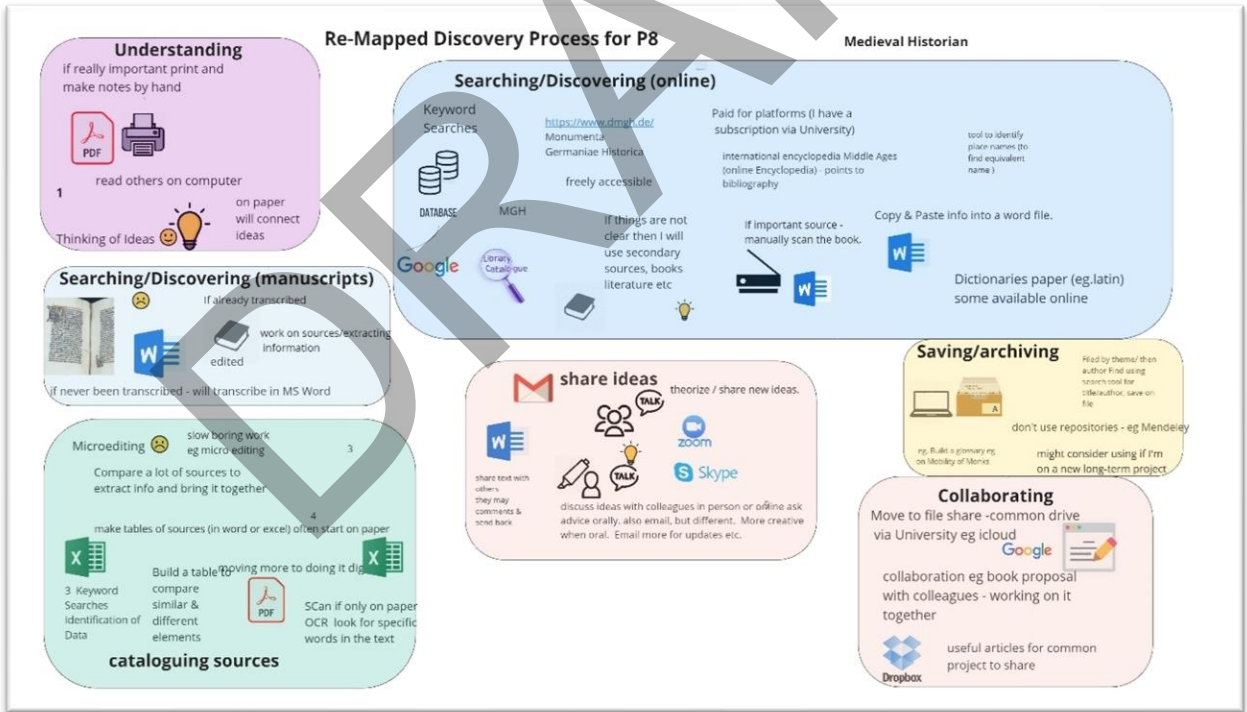


Figure 16. Remapped discovery process for Participant 8 (Medieval historian)

2.2.3 Implications for the GoTriple Platform

The purpose of carrying out the re-mapping process was that each participant tended to put together their discovery map in a different way, it was however possible to see common themes across all the maps, several different types of activities were taking place, common to the majority of researchers (but differing in their finer detail, the tools used etc.)

By clustering the mapped artifacts in a slightly different way (while still maintaining the integrity of the task) it was possible to create more comparable maps, with artifacts clustered by general themes such as: Searching / Saving / Understanding / Reflecting/ Collaborating/ Mobile Discovery/ Writing/ Discovering People /

Others are more specific to disciplines, such as Cataloguing sources (shown in P8 remap – Figure 16). Creating the re-map, helped the researcher involved to gain a deeper understanding of the issues, and it is also a little easier for people to gain an overview of the person's workflow at a glance.

The next section describes some of the common themes discovered from this mapping process in activity 2.

Search Pathways

A common starting point for discovery is Google and Google Scholar, the former being used to do a general search (perhaps when looking for more general material/slides etc) and the latter to discover academic publications. Participants mentioned that Google Scholar is often used as it is so quick, and although not entirely comprehensive, it is a useful gateway to other research portals. After a generalised search in Google Scholar or Google, other portals are often used, such as University library searches or other Academic resources on either general platforms (eg. *Scopus, Elsevier or OpenAIRE*), or more specialised libraries relating to the discipline of the researcher (eg. *ACM Digital Library or Monumenta Germaniae Historica*).

Search Terms can be Problematic – Silo Effect

Some researchers mentioned that there is a silo effect in place and that finding articles (especially when they do not fall into a neat academic category) can be problematic. This 'silo' effect of disciplinary publishing was mentioned as being an issue, especially amongst researchers whose work tends to span disciplines, it leads to extra time having to check multiple repositories or worse, not finding the required resources. Additional complexity arises when different languages use different terms for the same topic. It is often the case that the researcher makes a multitude of different searches to find relevant material. Having a visible 'Search History' on the platform helps the researcher remember which terms have already been used and can be very helpful.

Cascading Discovery

A theme both mentioned and 'mapped' on the Miro board was the concept of cascading discovery, whereby finding one relevant article (article A) leads to finding others via the references that this article cites. It's also now possible (thanks to digitisation and the associated metrics being available) to see in which future publications article A is cited, thus leading to the discovery of more up-to-date articles, whereas in the past, only the reference list of older articles could be discovered from article A. Researchers mentioned that they may also search the profile page of specific authors to find other material that they may have published (in this way, search keywords are seldom used, but the list of the author's publications is browsed for relevance).

Renaming to store articles

Another commonly reported 'bottleneck' and 'pain point' is the storing/archiving of relevant material. Some researchers are using software such as Zotero, EndNote or Mendeley for this purpose (which saves time, but comes with its own usability issues) whereas others prefer to store a 'hard copy' of relevant articles either in the hard drive of their computer or using cloud storage (eg Google Drive/Dropbox) This is often said to be done to enable them to file them as they wish and not be restricted to the filing structures of these tools (which are often reported as unsatisfactory and not matching the researchers own preferred filing structures). Where hard copies of articles are stored, a re-naming process to save the file with a name that makes sense to them is usually entailed (the most commonly used strategy being Author name, abbrev title, year published).

Changing Working Practices to Collaborate

It was a common theme to alter working practices when working collaboratively, but this tended to be based more on the reflecting stage and not the initial discovery process. Researchers tended to move to cloud-based services to ensure compatibility with others and to allow simultaneous access and editing on shared resources. Google Drive was the most commonly used tool, with Drop Box also being used by a few researchers. Researchers often had institutional repositories that could be shared, but usually only with others within their institution, making collaboration with other organisations more difficult and meaning that often cloud-based services such as Google Drive were used instead for this purpose.

Lack of Access

One of the most common 'pain points' mentioned in the sessions was the lack of access to relevant material due to Paywalls. If this happens then researchers have 2 options, a lengthier option which is to contact the author of the publication via one of the academic platforms such as Academia or Research gate (or to find their email address via any institutional website) and then ask for a copy of the publication. The second (not legal but often resorted to) option is the use of shadow libraries such as SciHub. If the latter option is chosen another search engine is chosen as Google Scholar hides shadow libraries, using DuckDuckGo gets around this barrier. It should be noted that not all participants admitted to this practice, but when accessing the information quickly is a priority then it is resorted to in some cases. Participants mentioned that time is often wasted trying to find if they can access a publication or not, and that it would be easier if labelling was clear (although if researchers are affiliated to institutions, they may have access to paid journals as well as Open Access material).

Lack of Clear Labelling Regarding Access

Clearly, the GoTriple Platform will not be able to completely solve the issue of non Open Access resources, however, researchers reported that it was frustrating to not know at a glance if a particular article is Open Access or not. Triple should ensure that the platform they develop clearly shows which resources are Open Access and which are not. Researchers waste a lot of time trying to gain access to material that lacks clear labelling.

Specific Platforms may be used for Specific Tasks

It was mentioned that specific platforms may be used for very specific purposes, for example, P6 uses Web of Science to examine the **Impact Factor** of a Journal, this task is quite laborious -and

requires that the researcher knows the specific category that the Journal is listed under. Having the Impact Factors automatically listed for journals would save a lot of time.

Disciplinary Differences

As we were already aware after the initial user interviews reported in D3.1, researchers across different disciplines have different practices for discovery, but this can, at a very high-level, be categorised by the use of two main sources of material; ie digital or non-digital. The majority of researchers now use mostly digital resources, even the disciplines that were traditionally paper based now have access to digitised or transcribed versions of at least some of their sources, but the main difference found was between using physical and digital material. Digital resources may be 'born digital' i.e., originally created in a digital medium, or they may become digitised from an analogue primary source, with the created digital objects being an association between data and metadata (information about the source). Researchers who work with the latter, often have to spend time on the digital curation of these assets. This 'curation' process involves maintaining, preserving and adding value to digital research data (Fiormonte et al, 2015) and for these objects to be discoverable by others they require the use of formal, standardised and portable formats. One of our Artifact Ecology maps describes the process of having to transcribe material from analogue resources (in this case old manuscripts and books), sometimes it is possible to use OCR (Optical Character Recognition) to automate this laborious task.

Active vs Passive Discovery

Another key difference in the Discovery process is in whether or not the researcher makes a conscious decision to search for material or if this material is 'pushed' toward the researcher by some form of recommender system. This type of discovery is not strictly 'passive' as it still entails that the researcher reads through any list to check for items that may be relevant to them, but as it didn't begin with a conscious action the two are quite different. Researchers mentioned ignoring or even abandoning some platforms after an excess of non-relevant material being pushed at them (e.g., Academia.edu). Notifications that do not provide you with the information but make you access the platform to read it are particularly annoying, as are constant messages about upgrading to premium options.

Serendipitous Discovery

Several non-traditional research sources were mentioned as being useful for more 'serendipitous' discovery, such as finding out something about a topic that you had not thought about before, and certainly would not have made an active search on. Prime among these is Twitter, with posts often being useful in providing relevant material for researchers. It's not strictly a recommender system, but by choosing who is followed on the platform, it often acts in a similar way to one. *'It does the job in terms of relevance; I see stuff from the people I follow and they think it's relevant. It's the best source for keeping up to date' (P6).*

Following people and projects (on platforms such as Google Scholar/Academia/ResearchGate) can also be a source of serendipitous discovery when push notifications (often by email, but also on the platforms' landing page) are sent to researchers. This type of action also acts as a 'Start Prompt', in other words, something bringing the user to the system (Dix, 2020).

2.2.4 Comparisons between Activities 1 and 2

Although no direct comparison can be made as we had different methodologies in the 2 activities (and different participants), it seems to us that the Artifact Ecology method does give a fairly accurate and rich representation of the Discovery process. By comparing the maps produced (maps were made by the facilitators of the cognitive walkthroughs after the session and by going over the recording) it does seem that the maps made by the researchers in the Artifact Ecology sessions were actually richer, and tended to give alternative methods/variations on working practice compared with the more linear (and time-constrained) activity that was demonstrated during the cognitive walkthrough method. Advantages did exist for the cognitive walkthrough though, as the activity itself was very intuitive, does not rely on recall, and is a reliable way to follow user interaction with digital tools.

Clearly there are similarities displayed in the maps, often with similar starting points, but there is divergence that relates to the specific SSH discipline and of course, personal preferences and habits of the individual researchers. We also found that the Artifact Ecology method tended to consider and map much longer-term interaction than it was possible during the Cognitive walkthrough activity.

However, the identified user pain points were similar across both methods, with issues such as:

- Difficulty in accessing articles that were not Open Access
- Too many notifications making them less valuable (tendency not to engage with them)
- Issues with storing/retrieval
- Complexity of using multiple platforms and software tools

What seems apparent is that the 'Discovery Process' is not a short or constrained user interaction, but something that takes place over a longer time frame, perhaps with things happening in-between any given user action (for example, push notifications being sent, other people working on collaborative documents). A recent publication (Dix, 2020) explains the relevance of this type of extended interaction and also proposes a modification of a cognitive walkthrough method to take into account things happening between interactions (see Figure 17 below). This article considers important factors such as what brings the user to the system (Start Prompts), what makes them re-engage (Between phase Prompts) and what makes them stop using the system (End Prompts). Taking this longer-term view is important in our understanding of users' interactions with Discovery artifacts, and of the implications for the GoTriple platform.

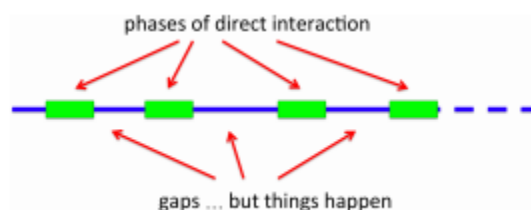


Figure 17. Diagram from Dix showing gaps in-between interactions, from Dix (2020) - CC-BY

In this respect, from our two methods, although the cognitive walkthrough had some advantages, it seems that the artifact ecology mapping is better placed to capture such an extensive and complex process. We have been able to capture not only direct interactions but also some of

these 'prompts' such as receiving links via email to relevant publications which then takes the user back to the system. Interestingly, the same prompt handled badly has also been seen (in both methods) to act as an End Prompt, with an excess of non-relevant push notifications causing the user to terminate their account. Having knowledge about this, and ensuring that users are able to adapt their preference settings to allow for their own individual requirements will ensure that GoTriple prompts promote action rather than terminate it.

2.2.5 Final Comments on the methodology taken

Overall, the methodology used for this part of the work, in particular the Artifact Ecology mapping, did allow us to gain a better understanding of the pathways and tools used by SSH researchers, and this method had advantages over the cognitive walkthrough in being applicable to interactions taking place over the longer-term. The Cognitive walkthrough process was useful for seeing the process taking place, including any problems faced during the process for example digital libraries not working, system downtime etc that might not be captured in the ecology mapping. The walkthrough was also advantageous as it was so intuitive and did not rely on memory. We feel that this method was useful to include in assessing the validity of the Artifact Ecology Mapping method.

The Artifact Ecology Mapping was indeed the first part of the work where we applied in full a co-design, online approach. Given that the Miro tool was new to us and that we had to change our initial workshop plans, it has, overall, been a very positive experience and has allowed us to engage with researchers. Some activities may have benefitted from being able to have a level of physical presence, and we also quickly found out that the artifact ecology mapping activity did not work in group situations. Thankfully it was easy to modify the plans to work one-to-one with researchers (although it took a little longer to achieve the results).

We found that the participants who took part in the Mapping activity were able to quickly learn how to use the whiteboard tool (Miro) and also with the help of the example map, quickly understood what we were asking them to do and were able to create their maps with relative ease (with occasional support from the facilitator in finding relevant software icons). To ensure a level of uniformity, it was necessary to prompt the researchers to map their workflows, for example, during the session they were asked about working on mobile devices as well as at a desk on a computer. Prompts for things like asking how exactly any relevant articles would be stored or bookmarked for re-use was sometimes necessary. The instructions being written on the Miro board also helped the researchers to carry out the activity without too much difficulty.

There were individual differences in how the maps were created, with some being more complex visually, some had more annotations and explanations, and some used more lines and arrows to explain the journey through the different artifacts used. The categorisation and re-mapping was done by creating a copy of the original map and then re-grouping into 'themes' whilst still keeping the overall workflow intact.

Combining both methods allowed us to assess the validity of the mapping technique and we feel that both methods were useful in slightly different and complementary ways, as summarised in Table 1.

TABLE 1. COMPARISON OF THE TWO METHODS USED FOR DISCOVERY JOURNEY MAPPING

Cognitive Walkthrough (Activity 1)	Artifact Ecology Mapping (Activity 2)
Does not rely on memory	Relies on memory
Can be used for novel or seldom used tasks	Only useful for well-known tasks
Focus is usually on a single device	Can take into account multiple devices
Presents an accurate portrayal of the workflow	Seems to present an accurate portrayal of the workflow
Very Intuitive (and tried and tested) method	New approach, users may have to learn to use the whiteboard tool, less intuitive than walkthrough
Results in a more linear (less divergent workflow)	Results in more divergent and complex workflows
Useful in seeing any usability issues (in-situ)	Useful for capturing in-between interactions (eg. push notifications/ collaborative work by others)
Focus is on a time-constrained interaction	Takes into account longer-term interactions

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3 DIFFICULTIES IN DISCOVERY (THATCAMP) ACTIVITY 3

This session ran as part of the TRIPLE ThatCamp organised by WP7/8 on the 11th May 2021, it aligned very well with the work being carried out in WP3, in understanding the difficulties that researchers and other relevant stakeholders have in accessing and making use of research material, hence the inclusion of a brief report on the session here.

The format of this ThatCamp 'unconference' was very open, over 50 participants (consisting of people affiliated with libraries, universities, research institutions, government agencies, publishing companies, and private firms across Europe) were invited to propose topics for discussion and then asked to vote on which of these sessions they would like to proceed during the day. Eight sessions were then selected from the 11 or 12 put forward, four of which would run in the morning, and the other four in the afternoon. The proposal on 'Difficulties in Discovery', which was led by WP3 co-leader Paula Forbes, received the second-highest number of votes and was therefore chosen to run in the morning. The format of the session was very open, and participants were invited to begin a discussion about whatever it was that they found difficult in the discovery process. Post-its were added to the Miro board (by participants and the session facilitator) during the discussion to keep a record of the issues raised (the session was not recorded). A brief summing up of important points was made at the end of the session with the participants and then these were reported back to the whole group (including those people who had attended the other sessions). After the ThatCamp day ended, the notes were again considered and then grouped and another, longer summary made of the important issues put forward by the group.

3.1 Important Issues

Important Issues raised were:

- Differences in terminology across SSH disciplines and also languages.
- Conflict between focussed searching and serendipitous discovery.
- Unknown 'ranking' of articles by the algorithms operating in the 'black box' of the recommender system.
- Difficulty in finding Projects (especially after they are completed).
- Difficulty in finding articles based on keywords - due to a lack of linkages.
- Time delay between articles being published and them being listed in Discovery systems
- Lack of access due to paywalls.
- Not being able to distinguish between Open Access and articles unavailable due to paywalls (lack of clear labelling).

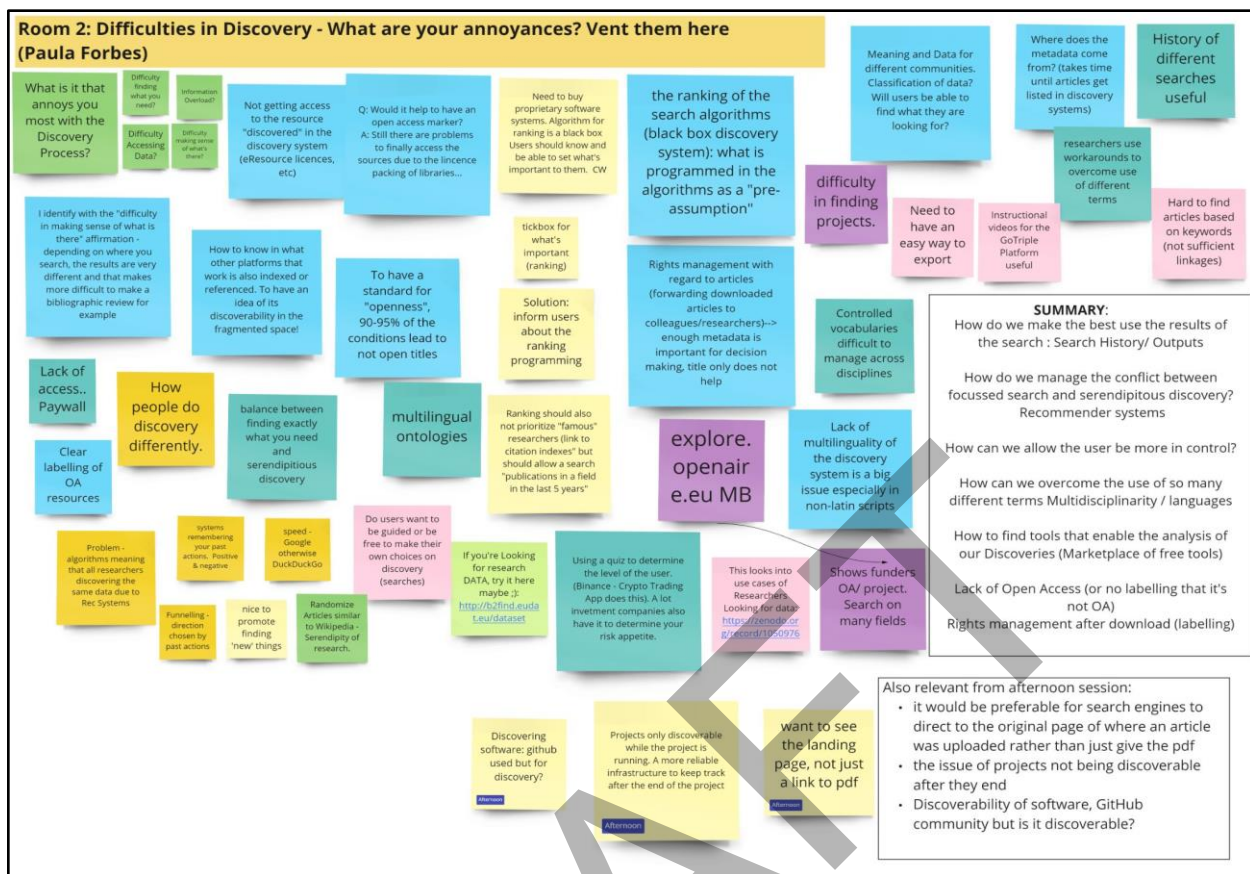


Figure 18. Screenshot from the miro board completed DURING THE 'Difficulties in Discovery' session

Participants also mentioned that they would prefer to have a link to the original landing page where the article was submitted, not just a link to the PDF file (this is especially useful for viewing supplementary material and is also important for tracking the number of downloads of articles which the author needs to know for impact metrics). Participants were keen to have more control over what's important to them (for recommender systems and search algorithms). There was debate over the extent to which users should be guided or left free to make their own choices on discovery. The Discoverability of relevant tools to analyse data and also other software was mentioned as being problematic, GitHub is often used as a community resource for software reuse, but this does not mean that the software is particularly discoverable. Often tools may exist to solve a particular problem, but researchers do not know about them. The full results of this and the other workshops run at this event will be reported on and included in the PEDR report (2023).

4 INSIGHTS FOR RECOMMENDER SYSTEMS -ACTIVITY 4

Among the innovative services of the platform, GoTriple will have a recommender system. In simple terms, these kinds of systems provide recommendations to the users, based on an analysis of their (and other similar users) preferences. These systems are known to digital users as they are pervasive and available in most commercial services like Netflix and Amazon (where users can receive recommendations on e.g. movies to watch based on the previous movies they have watched or e.g. products to buy based on what other people also have purchased). These systems are normally also available on research-like platforms, for example Google Scholar recommends recent papers based on the kind of paper that the user has previously consulted. The recommender system of GoTriple is designed to facilitate discovery and to give the user relevant recommendations based on their preferences. The GoTriple recommender system is fully described in Deliverable 5.2 and readers can refer to that document for details.

4.1 Methods

We had a number of meetings with the developers (partner Know-Center) of the GoTriple recommender system to get directions on the kind of problems, issues or needs for the design that required investigation from a user/co-design perspective. In these meetings, a set of **objectives** for user investigation were defined and agreed on. These are as follows:

- How much Control does the user want over type/frequency of data?
- How much explanation should be given regarding why the recommendations have been chosen - ie transparency of the system workings?
- What factors are important for recommendations of other researchers?
- Would the user like to receive 'serendipitous' recommendations bringing more surprising items to their attention?
- How important are potential biases from recommender systems (eg gender/career level)?

The work for investigating these objectives was done via online workshops (using Teams/Miro). A pre-populated board with activities was prepared ahead of each session and participants then guided through each of them during the hour-long workshop.

4.2 Results

During the session we asked researchers to tell us what recommendations they currently receive and to put these on a board that indicated both frequency and usefulness (see Figure 19). Both non-academic and academic recommendations were included. Concerning the Academic recommendations, Google Scholar was rated as being the most useful (ranked High) with the frequency of recommendations being mostly rated to be neither too low or high, but somewhere in-between. LinkedIn, Academia and ResearchGate were all rated in the mid-range of usefulness, with more participants rating the recommendations from ResearchGate to be more frequent

than Google Scholar, the frequency of LinkedIn notifications was about the same level as Google Scholar.

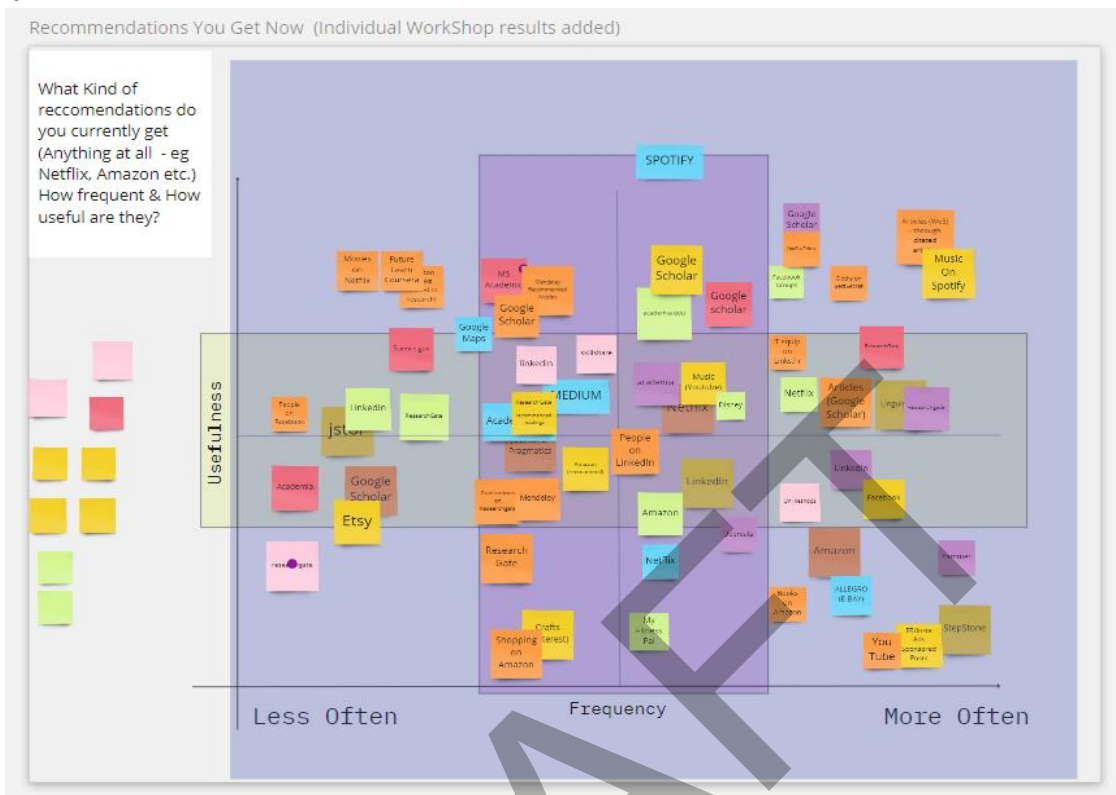


Figure 19. Screenshot of Recommendations received and perceived usefulness

We asked participants to rank how important they perceived the following items using the Likert scale slider option on the Miro board.

We will group these in three groups, those rated highly important (scoring an average of between 7-10 on the scale) , those rated of mid-importance (scoring between 5-7) and those scoring less than 5 being designated low-importance.

Highly Important:

The highest rated factor was the option of **being able to choose what kind of information** is recommended to the researcher. Other features, such as **being surprised with new peers/articles/projects** and being **recommended experts** and **highly rated researchers** in the field were chosen as being highly important. Having **recommendations of partner organisations** was also appreciated and the capacity to get to know new people along with seeing others with similar research interests. Receiving personalised recommendations, choosing how often they should be sent and being able to give feedback on the relevance of any recommendations were also in the highly important category.

Mid-Importance:

Researchers being informed about why they receive certain recommendations fell into this category, as did seeing a balance of gender.

Low importance:

The career level of the researcher was designated as being of low importance, scoring an average of just under 5/10.



Figure 20. Screenshot showing preferences for push notifications and recommendations

4.3 Key takeaways

Workshop participants mentioned that it was quite hard to give specific answers for things like preferred frequency for recommendations as it is quite dependent on the context, and the stage of their research process. The importance of different items that could be recommended is not static but changes over time, for example projects may be more important at the start of research, then academic papers later when you want to write up the work. The relevance of this for the design of the platform is that **GoTriple should allow the user to modify their preference settings for recommendations easily, to allow for this flexibility.**

Push notifications (sent via email) are useful if they do not become too excessive, researchers expressed that this should be able to be controlled by themselves. **Relevant publications were more important and required more frequent recommendations than other types of information**, although weekly was the preferred option for everything other than people (where monthly recommendations were preferred).

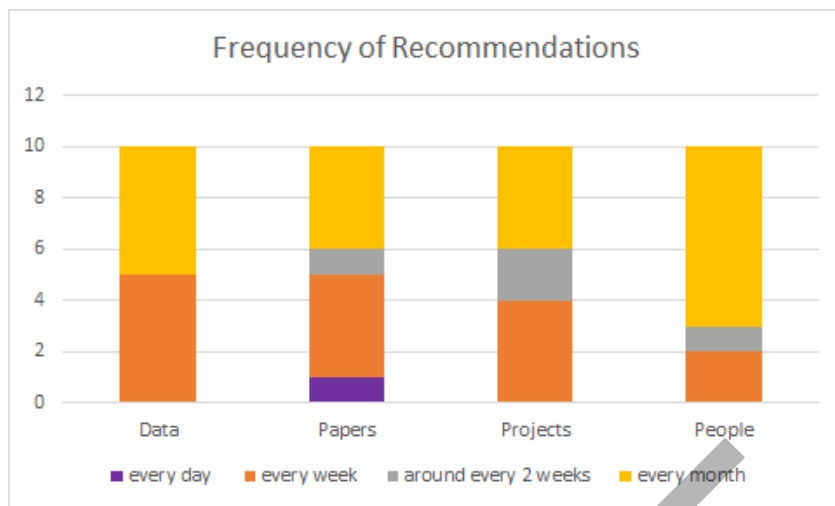


Figure 21. Graph showing the frequency that researchers would like to receive recommendations for data, publications, projects and people

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5 INSIGHTS FOR CROWDFUNDING - ACTIVITY 5

Crowdfunding is an innovative practice where a large number of people fund projects by giving small sums, using internet platforms. These sums can be in the form of donations but can also take other forms such as discounts on future products realised by the crowdfunded campaign or even take the form of investments. Crowdfunding has also been used for research, where normally it takes the form of donations. The crowdfunding of science can take place either in generalist platforms such as Kickstarter, but we have also seen the emergence of dedicated platforms such as experiment.com. In section 8 of this deliverable, where we report the results of the questionnaire conducted on the GoTriple crowdfunding, we report a brief literature review and readers are invited to refer to that section for additional references on the subject. Additionally, Section 3 of the Triple Deliverable D5.1 reports on how the requirements of the service were defined by these activities with citizens and researchers, and how this relates to the more technical development of the platform.

5.1 Methods

For gaining insights into what the important features of a crowdfunding solution for GoTriple are, two separate end-user groups were considered, funders (i.e. members of the public) and also researchers who would benefit from the crowdfunding. Preliminary discussions were held with relevant people from other work packages involved in implementing the Innovative Services to discuss the **main questions** they would like to address in the workshops. For funders (citizens) this would be to find out:

- if they would be willing to fund projects via crowdfunding?
- what concerns would they have about this type of funding?
- what factors would motivate them to fund projects?
- how would they like to be kept informed about any projects that they contributed to?

For researchers the main **questions** were:

- to find out if they would be keen on using this type of funding platform?
- how the relevance and quality of any project proposal could be ensured?
- and also, to investigate how they would like any funds to be managed?

In addition, knowing what would be required in terms of offering support for researchers planning to create a Crowdfunding appeal, such as:

- Knowledge about how to obtain funding via the platform
- Promoting a research project to get funding
- Presenting the research proposal (possible video creation support)

It should be noted that the results of both activities were reported back to other project partners involved in the development of the Crowdfunding platform (in particular WP1 & 5) as soon as they became available.

5.2 Results: Citizens' Preferences for a Crowdfunding platform

Firstly, we will report on the results of potential funders, i.e. citizens.

5.2.1 Citizens' Awareness of existing Crowdfunding platforms

The workshops indicated that the most well-known platforms amongst citizens were (in order of most-least well known):

- Kickstarter
- JustGiving
- GoFundMe
- IndieGoGo
- Patreon
- Facebook Fundraiser
- CrowdFunder

As a group, participants in the workshops we ran were familiar with the majority of the crowdfunding platforms that we showed them as examples, most had used at least one of them to make a donation (but mostly to charitable causes, not for funding research, other than Cancer research or other medical issues). The examples that were liked the most, based on past user experience, were Kickstarter and Patreon.

5.2.2 Motivations for Crowdfunding

Factors motivating citizens to fund projects were (in order of decreasing importance):

- Interest in the topic (High)
- Common Good (High)
- Empathy (High)
- Trusted Crowdfunding Platform (Medium)
- Recommendation (Medium)
- Local interest (Medium)
- Well-presented research project (Medium)
- Friendship (of the people proposing the research) (Low)
- Good video presentation of the project (Low)

Additional motivating factors added by participants on post-it notes were:

- Reusable results (Open Science)
- Contributor acknowledgement
- Feeling of Reward

Advertising/Targeted promotion

Participants told us that the reasons they had made donations in the past were based on having empathy with the crowdfunding cause, or that they felt donating would have a positive effect on the common good. For financing research projects, these same principles apply, with a feeling of contributing to a common good and an interest in the topic both ranked extremely highly. Having the proposal well-presented and advertised well (including perhaps a short video) was also important (especially in gaining people's attention in the first instance).

5.2.3 Information that should be provided about Proposals on the platform

Participants were asked to rank how important they considered the following features to know about the research proposal/researchers involved. The results were (in order of decreasing importance):

- Research would be Peer reviewed (High importance)
- Affiliation of researchers involved (High)
- Proposal is Quality Assured (High)
- Previous experience of the researchers involved (Medium)
- Qualifications of the researchers involved (Medium)
- Metrics (of the researchers eg previous publications) (Medium)
- Career level of the researchers involved (Low)

Citizens were asked about their preferences for a Crowdfunding platform by placing a dot along a sliding scale on the Miro board, the responses were then averaged to give a numeric figure (with 1 being don't agree at all and 10 being the highest agreement rating)

The following figures were obtained ranked in order of importance (average rating from 1-10 where 1 = not important at all, 10 = very important)

- Anonymity option 6.4
- Multilingual platform 5.8
- Log-in requirement of the platform would be a barrier to donation 5.8
- Qualifications of the researchers are important 4.8
- Receiving recognition for the donation is important 4.6
- Happy for a small percentage of the donation to support the maintenance of the Crowdfunding site (suggested value 2-5%) 6.6

- Lack of transparency of funding/spending
- High overhead costs/admin charges (not just platform but Universities)
- Concerns that Universities use this method (to the detriment of other funding channels)
- Credibility of the researcher
- Siloed research (i.e., not reusable)
- Good projects being ignored
- Having enough updates on progress
- Research outcomes
- Duration of the research
- Trust on the research
- Having ability to ask questions about the research / interact with researcher
- Too little community engagement
- Funding poor projects (due to media attention)

Other comments made at the end of the session were:

That the platform should allow:

- sorting of projects by theme/type/donation/participation
- sharing via social media links (including sharing when you donate)
- secure online payments
- different payment types - bank transfer, card payments WePay etc. and different options
e.g., one off payment/monthly payments
- different kinds of rewards
- dedicated hashtags
- Memorial funds

Comments were also made on the time taken for the money to be paid to the recipients and what would happen to the money if the target was not reached. There were concerns expressed that this type of funding should not prevent/replace the more structural/traditional funding of research. The encouragement of industry contributions was also mentioned.

5.3 Researchers Preferences for a Crowdfunding platform

The second group of Workshops was run with researchers to examine any concerns that they had over the use of this type of funding and their requirements for a platform to support crowdfunding of SSH research projects. Initially we asked them which crowdfunding platforms they were aware of and had used, and then asked which they had enjoyed using (if any).

5.3.1 Awareness of researchers of existing Crowdfunding platforms:

The workshops indicated that the most well-known platforms amongst researchers were (in order of most-least well known):

- Kickstarter
- Patreon
- IndieGoGo
- GoFundMe
- Facebook Funder
- AngelList
- JustGiving

It should be noted that some Crowdfunding platforms are more or less known across the different European countries, with some being much more prevalent in some countries than others. The majority of participants had actually used Kickstarter and Patreon, one had used Facebook fundraisers and another AngelList. Kickstarter was the most liked platform of all amongst researchers with Patreon coming second, reflecting the choices made by potential funders in the previous section.

5.3.2 Motivations for Crowdfunding:

We asked researchers to rate how important the following factors might be in motivating people to fund research projects. Post-its were placed on a Target Board with the centre representing High importance and the outer circle less importance (the same as the one shown in Figure 22). In order of importance:

- Common Good (High)
- Empathy (High)
- Interest in the topic (High)
- Well presented research proposal (Medium)
- Local interest (Medium)
- Recommendation (by known others) (Medium)
- Good Visual presentation (Medium)
- Friendship (knowing the people involved) (Low)
- Video explanation (Low)

The next activity asked researchers the following questions (numbers given are an average score of 1-10 with 10 being in the highest agreement):

- If they would be happy for a small % of funds to support the platform - 7.5
- Should funding be handled by an affiliated organisation - 6.5
- Should the researcher be required to be affiliated - 6
- Would they be comfortable seeking crowdfunding - 6

5.3.3 Support features:

Researchers were asked to rank the following platform support features as to their level of usefulness (on a target board with the centre being highly useful, middle ring = useful outer ring = slightly useful). The board was then analysed with a number being assigned to each of the rings.

Centre =9; Middle =6; Outer =3

Overall Scores were then obtained by multiplying the number of votes with the score and then dividing by the total number to give a figure between 1 & 9 with 1 being the lowest importance and 9 being the highest.

<input type="checkbox"/> Putting together a proposal	Score =7.5 (High)
<input type="checkbox"/> Promoting a proposal	Score =7.1 (High)
<input type="checkbox"/> Online instructions (text)	Score = 6.4 (High)
<input type="checkbox"/> Finding collaborators	Score = 6.4 (High)
<input type="checkbox"/> Instructional video	Score = 5.7 (Medium)
<input type="checkbox"/> Past examples	Score = 5.6 (Medium)
<input type="checkbox"/> PDF instructions	Score = 5.1 (Medium)
<input type="checkbox"/> Creating a video	Score = 5.1 (Medium)

Additional features added by participants were to have support with Marketing Strategies and to have Legal Advice.

5.3.4 Quality Assurance:

Researchers were asked during the workshop how the quality of research proposals could be ensured, the following answers were given:

- Collaboration with public institutions (Universities etc.)
- Peer review
- Ensuring that the researchers have sufficient expertise in the area
- The affiliated institutions being highly regarded/trusted
- Sufficient background preparation
- Showing the profile of the person responsible for the proposal
- Giving a good description of the proposed methodology and expected outcomes
- Using accessible language
- Transparency about what the funding will be used for/how exactly money will be spent
- Having recommendations from projects already concluded
- Disclosing any conflicts of interest
- Having a calendar for the follow up (disseminating results)
- Having a guide for how to put together a good proposal

- Giving a clear description of who the target audience is

Researchers were asked what could be done to ensure that high quality research is delivered if it is funded. They gave the following responses:

- Peer review/Open Peer review
- Defining Milestones in any Proposal
- Media Strategy for dissemination
- Stating where results would be published, eg Zenodo Open Edition
- Having an information email/newsletter
- Being transparent about the research process and results
- Having clear Data Management protocols
- Would depend on the audience; may need different output streams for academic and non-academic audiences
- Having a 'stamp of approval' from a recognised institution or internationally recognised scholar

5.3.5 Achieving Targets:

Researchers were asked what could help to give the best chance of reaching any crowdfunding target, answers given were:

- Targeting via particular networks/posting via research infrastructures
- Good advertising
- Using social media
- Using tags (#) identifying the main topics
- Setting a realistic timeframe/schedule
- Giving contact details of person responsible for the proposal (ability to be contacted)
- Promotion via Research institutes

5.3.6 Financial Management:

Researchers were asked how finances should be provided if a project was funded. They gave the following responses:

- By the institution (University/ Research centre)
- Having the third party provide funding is better for taxation purposes (some guidance should be given regarding taxation)
- Via a Research bank account
- Via an associated bank account where movements can be traced by funders
- By a virtual 'wallet' created via the platform
- Should provide a quarterly report in how any money is spent

We asked the researchers what should happen if the target of the funding is not quite reached, they gave the following responses:

- Having an extension of the funding period (once only)
- Asking funders about accepting a 'lite' version of the project proposal
- Dividing the funding into stages (attached to a percentage of the funding target) / setting percentage goals
- Option of 'completion grants' from the infrastructure in order to launch the project
- Most crowdfunding platforms already have specific rules about this issue
- Donating to a charity if the total is not met
- Researchers were asked how any money should be provided;
- Managed via a relevant institution (such as a University/research centre)
- Having a third party (University) is better for taxation purposes
- Associated to a specific bank account which can be traced by the crowdfunding platform
- Depends on the country (and affiliation of the researchers)
- Some guidance on taxation should be provided

5.3.7 Communication with Funders:

Researchers were asked how progress on any project should be communicated to funders. They gave the following responses:

- Social Media/ Video blogs
- Via information on the funding platform
- Funding platform could offer a way to communicate with the project partners
- Via a project page/website with regular updates (Wordpress etc.)
- Updates made as important milestones are achieved
- Working papers
- Conference presentations
- Webinars
- Guest lectures
- PR articles in association with media outlets

Among other issues of interest to the researchers was whether funders would be able to collaborate (more a crowdsourcing model) in a similar way to the Zooniverse platform (<https://www.zooniverse.org/>). Another area of interest was how the platform would manage any data produced by the crowdfunded research, and if communication would be possible between funders and researchers (via the platform or by any other means).

6: INSIGHTS FOR ANNOTATION/ENRICHMENT - ACTIVITY 6

This group of workshops investigated the researchers' usage of annotation tools and considered their current and future needs for an effective tool to provide the enrichment of their documents and also web pages. Annotation tools allow researchers to take notes and annotate a variety of digital contents such as papers, images, books and so on. They are used in a variety of disciplines and advanced tools also allow more complex activities such as semantic annotations, organisation of the notes in notebooks, the sharing of notes and notebooks with other researchers and so on. One of the innovative tools of GoTriple will be the annotation tool [Pundit](#) developed by partner Net7. More detailed information on the GoTriple annotation tool can be sought in Deliverable 5.5. For the work of this Task, Pundit is a tool which is already widely used but it was important to understand how it would fit in the GoTriple design as well to understand whether some changes were required to the existing version.

6.1 Methods

We had several meetings with the developers (partner Net7) of the **Pundit** annotation system to get directions on the kind of problems, issues or needs for the design that required investigation from a user/co-design perspective. In these meetings, a set of **objectives** for user investigation were defined and agreed. These are as follows:

- Why do they make annotations?
- What types of annotations do researchers make?
- What problems do they have when making annotations?
- What features are the most important to researchers?
- Do researchers use semantic annotation?
- What tools do they use and what is the user journey?

We followed the same type of format as previous workshops, using Miro as a tool for remote participation and to gather their needs/requirements for an annotation tool.

We also carried out a 'mapping' process, using the digital sticker board, in the same way we did for the discovery process to give us an idea of the tools used and the journey taken by researchers carrying out annotations in various ways.

6.2 Results

During the session we asked participants **why they made annotations**; responses included:

- To underline or highlight information that is important
- For organising schedule/workflow
- For brainstorming purposes
- To help keep track of excerpts and thoughts that I cannot forget
- To help process ideas
- To help me get back to important ideas
- To communicate with someone else who is sharing the document

- To give feedback on others' work
- To pose a question
- As a means of improving work in progress
- To prepare further work
- To fix ideas
- To provide additional information or further clarity on a specific element of a document or imagery
- As reminders on information to add to a document or amendments that need to be made
- To make links to other work/ideas



Figure 23. Screenshot from the Annotation Group workshop

What is an Annotation?

We asked participants to clarify what they meant by **the term 'annotation'**, responses included:

- Highlighting the key parts of documentation
- A reminder for future review
- A pointer to an idea or related to a source
- A short commentary on a source
- Insights made by texts to help build a subject matter
- A summary of ideas from texts that we want to reuse
- A comment back to an author

- Comments made for my own use
- Text inserted into another text
- Addition of information to an existing text
- Expansion of details on a note or document
- Suggestions to fix something
- Notes to edit work
- Additional detail note
- Making notes on or beside a text
- Creating links between ideas

Annotation Tools Used

We asked researchers what tools were used (participants could select from a pre-populated board containing icons of relevant tools or add any not included by using a post-it note). The most often used tools were:

- Adobe Acrobat
- Expert PDF
- Photoshop (for image annotation)
- Zotero
- Mendeley
- OneNote
- Google Docs
- Iphone notepad
- MS Word
- eReader
- SimpleNote
- Evernote
- Manuskript (Linux)
- NVivo

Annotation Mapping

For the Media Ecology mapping of Annotation, we have included the maps from 5 participants below (in Figures 24-29) to show the complexity and diversity of the methods adopted. The researchers were from different SSH disciplines and used a variety of hardware and software to make annotations. Hardware included computers, tablet devices (especially when working with images) and to a lesser extent mobile phones.

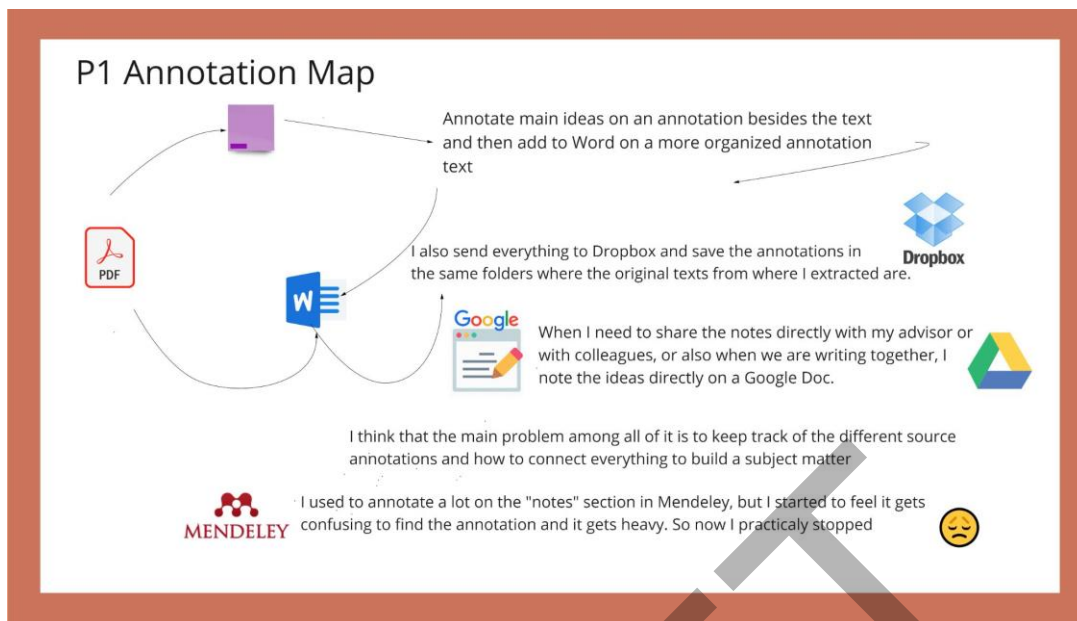


Figure 24. Annotation Map created by participant 1

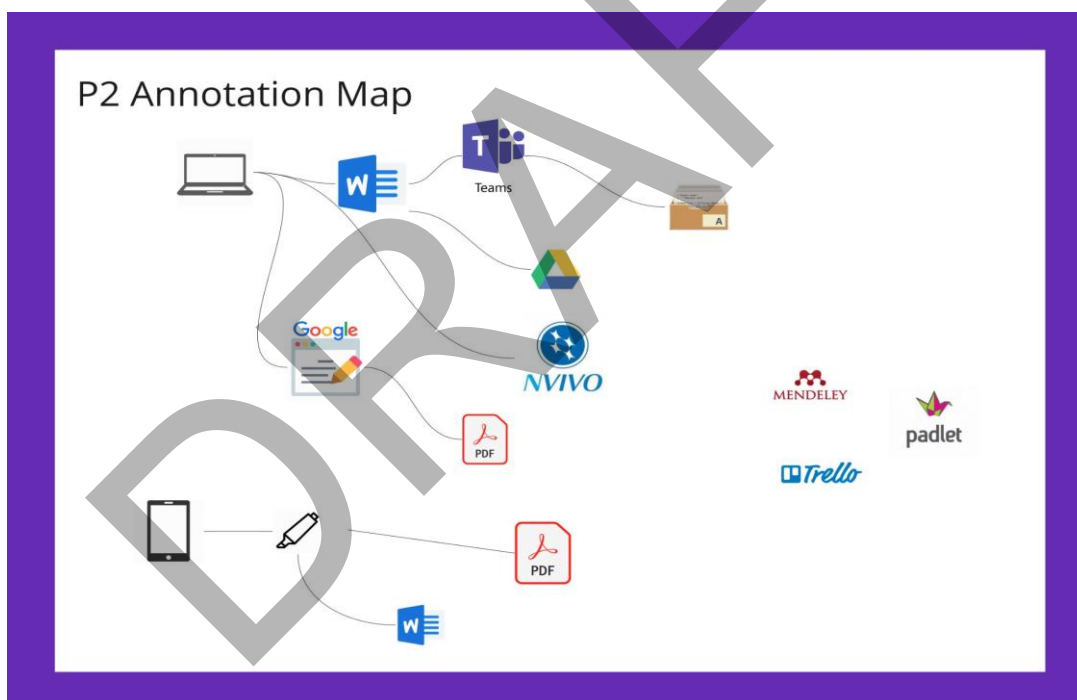


Figure 25. Annotation Map created by participant 2

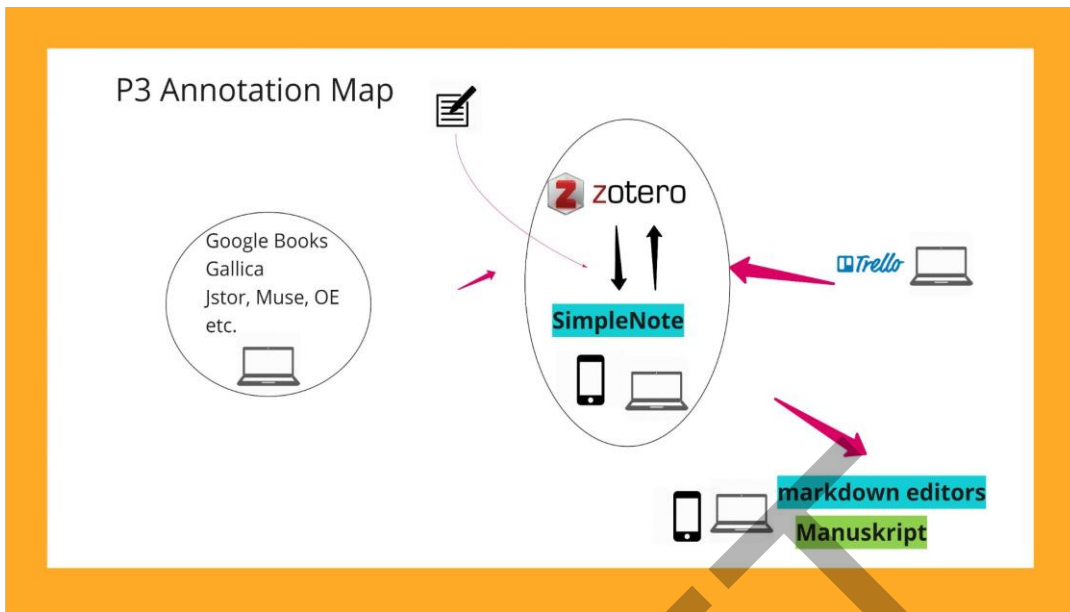


Figure 26. Annotation Map created by participant 3

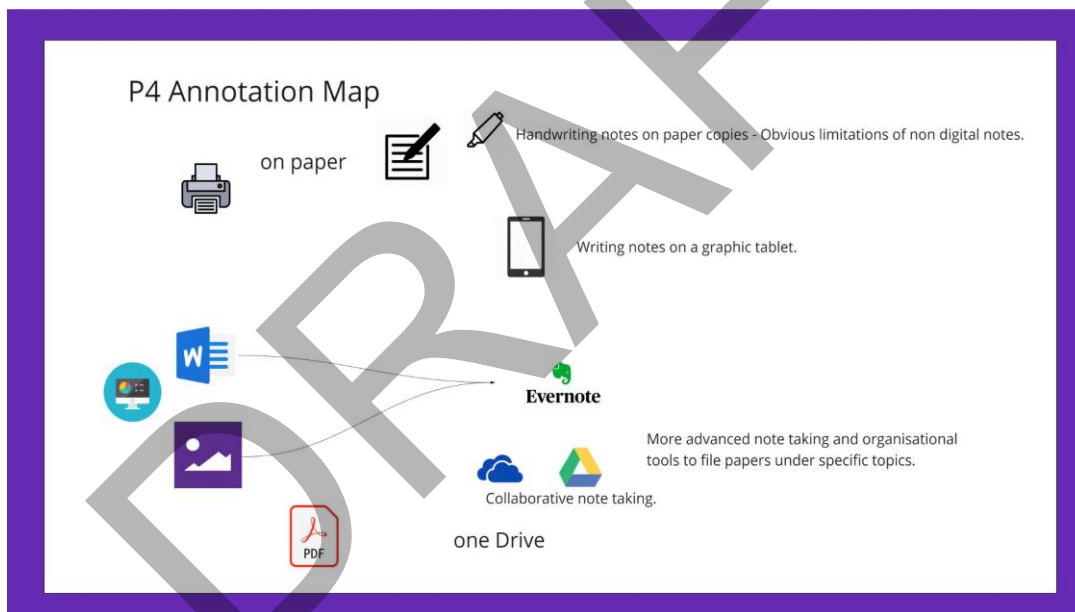


Figure 27. Annotation Map created by participant 4

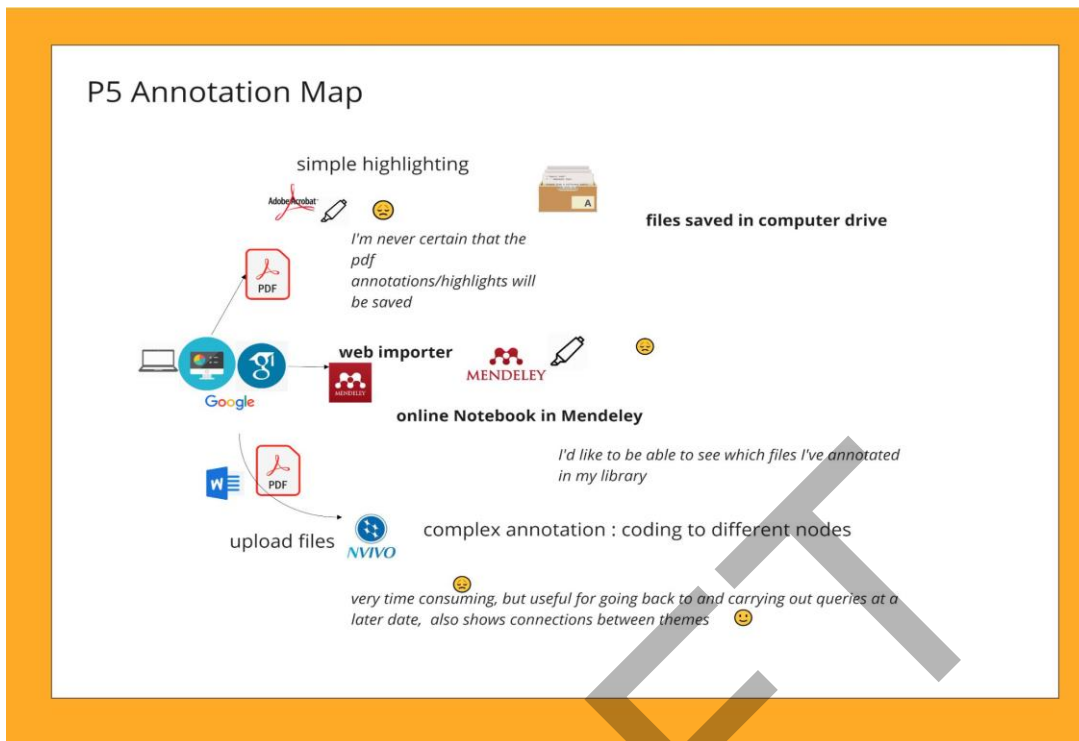


Figure 28. Annotation Map created by participant 5

Problems with Annotation

Participants were asked about the current problems they encountered when annotating; the following responses were given:

- You could add your Appendix to the document.
- Too many tools - makes sharing harder and less agile
- Different OS have different functions
- Some not easy to use
- Incompatibility
- If the volume is big, it is hard to manage
- Difficult to export if you want to use in another platform
- Dispersion
- Cannot share (even with myself)
- Acrobat requires paid version
- Cost
- Evernote - Syncing multiple devices is a premium service. Up to two devices are free but any more costs money.
- No or scarce flow through tools
- Photoshop requires manual backup (and crashes)
- Tedious to import imagery and requires tablet support

- Photoshop converts everything to an image file

Desirable Features for a new Annotation Tool

Participants were asked about the features that they would really like to have for annotation; the following responses were given:

- Ability to automatically track in the notes where the text came from
- Ability to export the annotation/citation to Zotero/Mendeley
- Copy text (from a publication) and an automatic citation is generated
- E-tag reference (for generating a citation)
- Allow for multiple participant input simultaneously
- Synchronous back-up on all devices (or cloud storage)
- Adding in multiple papers and organisational tools for notes on specific topics

6.3 Key Takeaways for the Annotation tool

From the results collected we can see that researchers' use of Annotation tools is quite heterogeneous, with many different tools being used and for several different purposes. Annotations may be made to keep track of ideas or insights; to add detail to or expand text; to summarise text; to create a pointer or reminder for future review.

A commonality is that, for most people (involved in our workshops at least) note-taking and the subsequent 'sense-making' of the notes is seen as a multi-step task, usually done in the following order:

- a quick skim read of the material
- followed by more detailed read when annotations/highlighting of important sections will be created
- compilation (often into a new document) of the combined new notes/annotations and linkages to existing ideas/material.

The abundance of different tools has led to one of the main problems i.e., the lack of compatibility across different platforms, and when working with other people who may use different methods and tools.

Collaborative annotation is commonplace, often annotations will be made to comment on or correct other people's work (especially common when teaching or working on joint research articles). Problems are exacerbated when collaborative work needs to be done (due to the aforementioned abundant number of tools being used and lack of compatibility), researchers often report moving to a cloud-based service such as Google Docs/Drive to be able to use collaborative annotation.

Another problem is summed up nicely by participant 1 who states that '*The main problem among all of it, is to keep track of the different source annotations and how to connect everything to build a subject matter*'

6.4 Implications for the design of the GoTriple platform

Clearly the GoTriple platform will not be able to solve all these problems, however, some or all of the following may be able to be addressed:

- Ensuring cross-compatibility with other annotations services
- Ensure ease of use/ good UX
- Ensure that already annotated documents are distinguishable from non-annotated documents
- Allowing keyword searches to be made of annotations created
- Allow simultaneous multi-user annotation
- Ability to export any annotations made to bookmarking services (eg. Mendeley/Zotero) that the researcher may use
- Ensure annotations are synchronised across all devices (or in cloud storage)
- A '*killer feature*' that was asked for was that an automatic citation be created when inserting text from a publication into a new source, to automatically track in the notes where the text came from (But this is likely to be technically unfeasible).

DRAFT

7. INSIGHTS FOR VISUAL DISCOVERY TOOL - ACTIVITY 7

7.1. Introduction

One of the key components of the TRIPLE will be its visual discovery tools provided by Open Knowledge Maps. These tools are technically described in D5.4 and D5.6 and readers can refer to this deliverable for more details. These visualisation tools should help users to get an overview of a research topic and thus enable them to identify relevant information more easily. visualisations will also provide more context and an insight into the relationships between search results in comparison to a traditional list-based search.

In this workshop we wanted to better understand how visualisation tools can support SSH researchers in their research discovery process. We collected input for the visualisations in a group discussion with experts from various SSH disciplines.

We focused on evaluating the most important benefits for each visualisation type from the SSH researchers' perspective. We gained a deeper insight into their main challenges when it comes to discovering research online and how the proposed tools could be potentially used to cover their specific information needs.

Furthermore, we collected new ideas for the visualisations and also discussed the role multilingualism plays in their research and the challenges related to it. Most participants were not familiar with the TRIPLE project or Open Knowledge Maps beforehand.

Objectives

Overall, the aim was to identify how visualisation tools can support SSH researchers in their discovery process. The specific objectives were:

- To identify the most important use cases/benefits for the following visualisation tools: knowledge map, streamgraph, and diagram components (e.g. bar chart, geo map etc.)
- To identify additional ideas and use cases for the proposed visualisation tools
- To understand what role multilingualism plays in their research discovery process
- To understand what visualisation tools and what use cases to focus on
- To inform design choices for the visualisation tools and for the whole discovery platform

7.2 Methodology

We organized a two-hour online group discussion with seven participants. Participants discussed four topics (Knowledge Map, Streamgraph, Multilingualism, Diagram components) with up to three questions each. We decided to conduct a group discussion in order to better understand the specific needs and challenges when it comes to digital discovery methods of SSH researchers. Furthermore, a group discussion gives participants the opportunity to exchange ideas with each other without too much influence from a moderator.

Due to the pandemic the group discussion was conducted online. As more time is needed to explain and carry out group activities in an online format, we decided to ask participants to focus on the most important questions of each topic. We still left all the questions we originally intended to discuss in the document, should a group have extra time left. This ensured that the

most important issues were discussed while at the same time allowing for additional insights from the extra questions.

We showed representative example images of the visualisations under discussion to the participants (for an example see Figure 29). Participants were not given the opportunity to try out the tools. The reason being some of the tools did not exist yet and others were in an early prototype stage (e.g., based on sample data). We wanted the participants to focus on collecting and evaluating ideas rather than on the tool's functionalities at this stage of the project.

The images we chose did not represent real data. We wanted to avoid that participants would discuss the specific examples themselves or try to compare examples. Instead, we asked them to focus on evaluating the visualisation type in general.

The group discussion was conducted by three people: a moderator, a person responsible for overseeing the group discussions and a note-taker. Following the event, we did a qualitative analysis of the audio recordings and of the notes taken by the participants during the workshop. We first created an extensive record for each part of the group discussion (28 pages long in total) and then iteratively summarized and clustered the results.

7.3 Flow of group discussion

The participants were asked to submit a consent form via email prior to the event. They were also asked to prepare answers to the following questions:

1. What are your main challenges / issues when it comes to discovery of literature and other resources (such as data, projects, authors etc.)?
2. What role does multilingualism play in your discovery process? e.g. Do you use sources in more than one language? Do you publish in more than one language?
3. What types of visualisations do you use in your research work (e.g. bar charts, geo maps etc.)?

The answers were presented by each participant at the beginning of the event in an introductory round. This was followed by an introduction to Open Knowledge Maps and the TRIPLE project by the moderator. In the next step the workshop structure and instructions for the Zoom breakout rooms were explained. Afterwards the participants were divided into 3 groups with 2 and 3 participants each. They were sent to breakout rooms to discuss and give input on 4 topics with 2-3 questions each. After each topic the participants presented the outcomes of their discussions to the entire group. The following topics were discussed:

- 1. Knowledge Map**
- 2. Streamgraph**
- 3. Multilingualism**
- 4. Diagram components**

Each topic included example images of the visualisations. The moderator introduced each topic including general instructions followed by 5-10 minutes of in-depth discussions. Each group was given their own Google document (incl. instructions, questions and example images) for each topic to write down their main outcomes. We used the online video conference tool Zoom. The main room of the Zoom conference was recorded. Breakout rooms were not recorded to encourage informal discussions among participants.

7.4 Context & participants

Seven participants, four of them female, three of them male took part in the group discussion. All participants were current or former SSH researchers. The participants had diverse backgrounds within SSH with a wide range of job descriptions: digital archivist, freelance researcher, head of department, science manager, senior lecturer, senior project manager. Their disciplinary background was equally varied, with anthropology, applied linguistics, applied mathematics to social science, audio description, art history, digital humanities, educational technology, history, philology, philosophy, science History, social and cultural anthropology, and translation all being mentioned on the participant forms. The participants came primarily from Europe (Belgium, France, Greece, Portugal, Switzerland), with one currently residing in Egypt.

7.4.1 Main challenges discovering research literature

Participants agreed that it is very challenging to find resources that are really relevant for their topic of interest. They also find it difficult to keep up to date on relevant information for their projects. It was also mentioned that finding open access articles is an issue in general and getting access to (closed) sources is a problem in particular for freelance researchers who do not have access to university subscriptions.

Several participants also mentioned that contents are not well described on search platforms. The provided keywords often do not seem to match the content. The variety of data sources and platforms to access these sources were also seen as problematic for they complicate cross referencing.

One participant mentioned that they were missing the possibility on digital platforms to find ideas or get inspired when they don't know yet what they are looking for. One person mentioned their concern on the quality of OCR on the web and the difficulty to extract texts from image-based documents.

7.4.2 Role of multilingualism in research process

All participants speak and understand more than one language. The following languages were mentioned: Arabic, Catalan, Dutch, English, French, German, Greek, Italian, Portuguese, Spanish. Multilingualism played an important role for all participants. The majority of participants search and publish in multiple languages. One person said they mainly use English:

“Although I speak other languages too, it is a bit easier and less time consuming.”

Another participant added:

“When I am in a hurry, English as it gives us bigger scope.”

One participant mentioned how difficult it is to translate keywords and because of that most collections only offer keywords in one language. Another participant mentioned that in their experience keywords are often not properly translated.

7.4.3 Experience with visualization tools

All participants were familiar with basic visualisation tools. (e.g. geo map, bar chart). Four participants used simple visualisation tools (e.g. bar chart, geo map).

Two participants had never used any visualisation tools in their research (but are aware of tools that exist) and one person mentioned it is very rare to use these tools in their discipline but also mentioned:

“I think it would be interesting to have this kind of access to data (...) or maybe even only for me to map a little bit my own data set.”

The following existing tools were mentioned: Node-Link Diagrams (1), Word Clouds (2), Corpus tools (1), Charts / Bar charts (2), Statistical tools (e.g. R) (1), Geo maps (2), Google ngram (1), Google Bookworm (1).

7.5 Results

7.5.1 Main Outcomes & implications for TRIPLE

The visualisations were received well in general. Especially the knowledge map and the streamgraph seemed to have the most potential in giving additional insights and context to the research results. Overall, participants agreed that visual discovery tools can solve many challenges related to finding relevant information on the TRIPLE platform.

There was a high consensus on overview-related use cases and the usefulness of the knowledge map. Participants mentioned that the knowledge map could also be of interest to other stakeholders e.g., students, citizen scientists. In addition, it was seen as a great source of inspiration, for example in an exploratory search. The outcomes imply that we should focus on the development of the knowledge map and use it throughout the platform where an overview of relevant search results is needed.

There were many potential use cases and usage scenarios for the streamgraph, but less consensus on the importance of each use case as they seem to be discipline dependent. The best way to proceed therefore seems to be to start with a generic use case such as topics over time and evaluate further use cases as we go along in the project.

The overview of topics was considered more important than the overview of authors; overviews of projects were considered the least important. The order of implementation should focus on topics first, then on authors and last on projects.

For the diagrams, use cases related to getting a better understanding of a set of resources were viewed as the most important. Otherwise, they were seen as more useful for management/meta research. Standard diagrams such as bar charts had the highest consensus. We therefore recommend developing the following three diagram types: line chart, bar chart, and geo map.

We recommend including the diagrams on following pages within the TRIPLE platform:

- Landing pages including user profiles and dashboards
- The TRIPLE search page to e.g. highlight stats of the collections
- As filter options on the search results pages for narrowing down the results

We recommend focussing on following use cases for diagrams:

- To identify institutions / countries / authors doing research on a topic
- To explore trends (e.g. in countries)
- To understand the share of open access publications for a topic
- To identify language distribution across topics

Participants want to initially see search results in all languages that they understand; they welcome translations but are wary of their pitfalls, especially translations of keywords. Ultimately, we depend on the quality of metadata to be able to provide multi language visualisation tools. If it is technically feasible, we recommend focussing on the following:

- Implement a language filter; the default option if the user does not choose a language should be all languages. Allow for easy filtering of languages including additional filtering of search results
- Display original metadata alongside translations
- Streamgraph labels can be in multiple languages but streams should not be separated into languages

The following metadata was seen as most important to display in a list of resources: title, author, year. Other important items were keywords, link to document (PDF), parts of the abstract. If possible, display these metadata fields in a list of resources. Additional metadata could be displayed for example on the TRIPLE page of the document or after clicking on the title of the document in a knowledge map.

In addition, transparency on the way innovative tools work was seen as very important by one group. We also noticed that some participants had misinterpreted the placement of bubbles within the knowledge map. We recommend clearly describing how visualisations work in order to avoid misinterpretations of the results. Furthermore, we recommend to focus on the quality of the user journey by including helpful feedback and improved error detection processes and messages. We also recommend using tooltips and guides within innovative tools to enhance user experience.

7.6 Outcomes for each topic & Implications for TRIPLE

7.6.1 Knowledge Map

A knowledge map (see Figure 29 for an example) is a visualisation tool that clusters relevant documents into topics. The topical overview is based on the users search query and the 100 most relevant papers matching that query (Kraker et al. 2019).

The algorithm groups together the papers that have many words in common (text similarity). Area titles are created from the subject keywords of documents that have been assigned to the same area. We select those keywords and phrases that appear frequently in one area, and seldom in other areas. Knowledge maps provide an instant overview of a topic by showing the main areas at a glance, and documents related to each area. This makes it possible to easily identify useful, pertinent information.

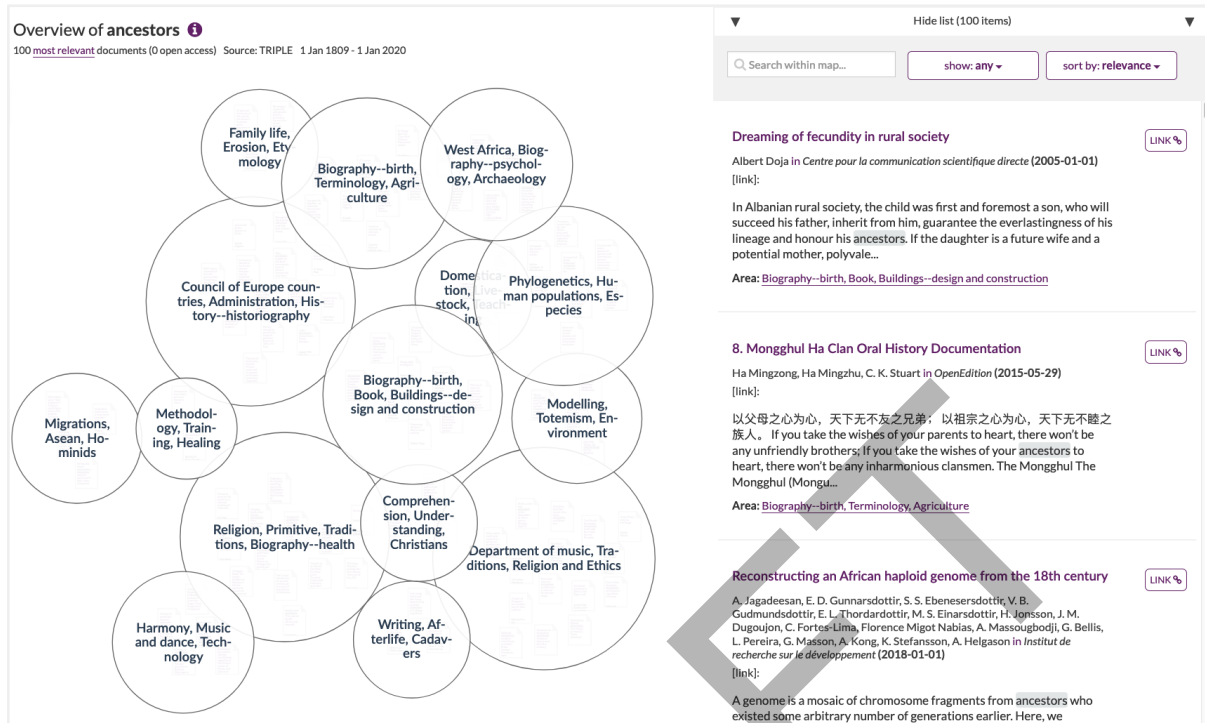


Figure 29. Knowledge Map for the search term “ancestors” Overall findings

Groups agreed that this type of visualisation is very helpful when you start out on a new research topic. They also identified different potentials of the knowledge map. One group remarked that this visualisation is not only helpful for researchers but also students and other users that are interested in research. One group mentioned that this tool can also be used to spark new ideas, especially when you don't know yet what it is you are looking for. They compared it to the library experience of browsing books. And one group remarked that depending on the research stage you are at, the knowledge map could serve different purposes.

“We found extremely important the way it could map a new research area of research and that it could give an idea of which kind of research areas were covered by one author or to find out about key researchers and key teams in each research area...”

“It is important to get an overview of an unknown research topic because that can give us the perspective of something that we don't know. It's that experience of the library that we used to have... that we arrive at a library without knowing what we want to find but just knowing that maybe there is something to find and this kind of map can give us this experience.”

Use cases and benefits

There was a lot of consensus amongst the groups on the following benefits being the most important:

- To get an overview of an unknown research topic

- To find academics / key researchers within an area of expertise
- To identify disciplines that do research on my topic of interest

There was less interest in getting an overview of research projects.

When asked for additional ideas most groups did not have enough time to finish the question, however they came up with following ideas:

- To show relationships between resources
- It could be used to foster issues related to the “noise” due to the polysemy of words

Other findings

When asked about the most important metadata to display for a publication in a visualisation, the consensus amongst groups on following items being the most important for each document when presented with a list of results was:

- Title
- Author
- Year

Groups also agreed that other important items are:

- Keywords
- Link to document (PDF)
- Abstract (or parts of the abstract)

There were no least important items, as participants felt all information and functionality was important. One group suggested adding the historic period under study.

When asked for additional ideas as to what entities to cluster besides publications, the consensus seemed that clusters of authors would be interesting. It should be noted, however, that groups did not have enough time to discuss the question in more detail.

Finally, one group remarked that it's very important to explain how the tools and algorithms behind said tools work.

“It's important that when you do research that the processes the automated processes of the knowledge map are transparent so on the one side it helps to remove the noise on the other side when the process is not transparent you can lose valuable information”

7.6.2 Streamgraph

A streamgraph (see Figure 30 for an example) shows the evolution of the main keywords in a set of documents related to the user's search query over time. The main keywords are represented as coloured streams. Up to 1000 documents are assigned to one or more streams according to their keywords. The height of a stream represents the number of documents with this keyword at a specific time. It is important to note that the number of documents matches the relative height, not the absolute height of the stream.

Streamgraphs are particularly useful for investigating the evolution of keywords over time and to analyse trends.



Figure 30. Streamgraph for the search term “ancestors”.

Overall findings

Groups agreed that this type of visualisation is very helpful when you are working on a topic with a historical focus. Some participants were interested in a streamgraph without the time dimension. One group imagined that the streamgraph could also be used to analyse individual sources (e.g., chapters of a book). Participants discussed many different ideas and also had a lot of input for other potential use cases.

Use cases and benefits

There was a consensus amongst the groups on following benefits being the most important:

- To find out how terminology is currently used across disciplines
- To identify emerging topics over time
- To understand hot topics of the moment

There was less interest in analysing projects.

When asked for additional ideas all groups provided different inputs depending on their research discipline:

- Citations/references
- Content
- Persons
- Analyse the use of a specific concept over time

“Such a tool would be interesting in specific discipline like linguistic or cultural history where you have to analyse the usage of a specific word in the time”

“We thought it could be useful for citations, so references”

“To do content analysis.. it’s not a general overview but on more specific sources that you can see the different words and the importance and them evolving through time. Also this is usable for personal data.... it’s good for analysis of sources of articles when you have very much data.”

Other findings

All groups came up with many additional ideas for what the streams could otherwise represent. Some participants were curious whether the streamgraph could be used without the time dimension.

“We wondered if historical evolution is the only possibility to represent the data, perhaps that’s the choice, if this is the choice we think it is mainly interesting for projects with a historical focus.”

Streams could represent:

- Authors
- Keywords
- Artists
- Sources (based on content analysis)
- maybe adding each disciplines’ participation on the topic evolution

“The progress of adding new disciplines to specific topics, so I have a topic where maybe the discipline of linguistics studied it but later acoustics joined in and later anthropology..”

Two participants mentioned that they had concerns regarding the overall readability of the streamgraph.

7.6.3 Multilingualism

We chose to include multilingualism as a topic in the group discussion because it poses many challenges when it comes to developing discovery tools in general. In many data sources the metadata is lacking in this regard, e.g. the language of the document is not tagged and in many

cases it is not clear whether there are translations of the document available or not. Clustering documents into topics that are written in different languages is also particularly challenging if there is no base language (i.e. a translation of all documents into the same language) available. The lack of translations has an impact on e.g. the quality of the clusters in a knowledge map. There are also many different possibilities on how streams can be labelled e.g. in one language or more than one language.

Multilingualism, as it became evident in the introduction round, was also an important topic to all participants. They are all doing research and are publishing in multiple languages. All groups were aware of the problems associated with the lack of availability and accuracy of keyword translations. All groups agreed that search results in multiple languages were preferred if translations were available.

The consensus seems to be that it would be useful to have translations of texts available including translations of keywords. However, the original language of keywords should also be displayed as it is very important for additional context.

“We would expect to have at least the results in the languages that we have mastered. For example, roman languages if you speak French maybe you can understand some Italian...”

“We also thought it would be useful to have the translated keywords because so many languages are not even readable... translation into roman alphabet.”

“Some words can have a different meaning; some similar words can have a different meaning in different languages which could affect the way we work with this kind of tool.”

When asked for input on default options, all participants agreed that the default option for language search options should be all languages.

When asked about the streamgraph labels, all groups agreed that they prefer labels in multiple languages. Two groups were sceptical about translations of important concepts and thus would prefer if labels would appear in the original language.

“We think it’s important because the same concept can have many different translations in other languages so it could be interesting to have both.”

One group mentioned the labels should be in the language(s) the user has chosen.

“It should present the keywords of the languages that the user has selected.”

7.6.4 Diagrams

The diagram components in TRIPLE are simple and widely known diagram types (e.g. bar chart such as the one in Figure 31, line chart or geo map) that can be used to visualize different aspects of a search query.

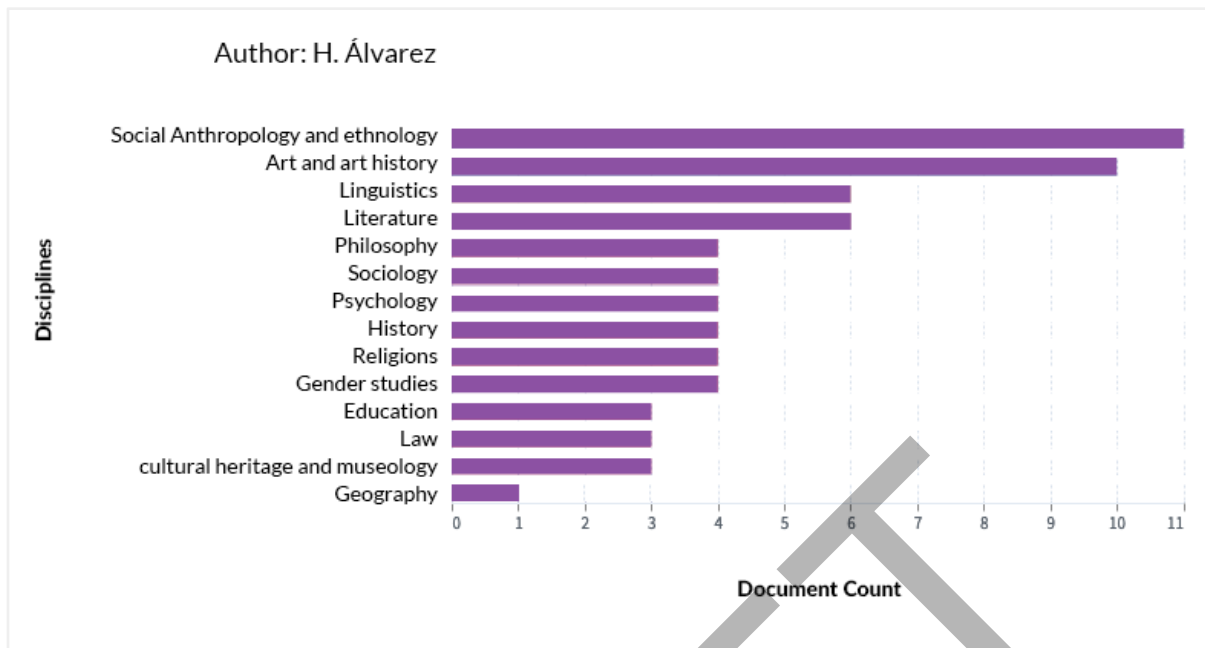


Figure 31. Bar chart of the disciplines assigned to the documents written by an author.

Overall findings

While participants did find benefits and use cases for the diagrams, most participants expressed that the diagrams were not as relevant for a researcher's discovery process as knowledge maps and streamgraphs. They believe that the diagrams might be more relevant for research management (for example to assess the impact of a project), sociologists of knowledge, and for managers of a collection of resources. For discovery purposes, the participants are more interested in gaining a better understanding of relationships between topics or documents.

"Our idea is that this kind of use is not so really in research or just in a very limited area of research: sociology of knowledge or kind of meta research about the research process."

"in general for research not so directly relevant"

Diagram types

There was most consensus amongst the groups on following diagram components being very suitable and easy to interpret:

- line chart
- bar chart
- geo map

All participants were already familiar with these visualisation types.

One group mentioned that bar charts and line charts are particularly useful for data comparison.

"The bar chart of course it was also helpful for data comparison."

The heatmap was not well received by 3 participants, they had no previous experience with heat maps and found them hard to interpret.

“None of us has ever used it and we didn't find it very easy to represent knowledge and we didn't quite understand it”

Groups did not have enough time to finish the question on whether they could think of any other diagram types that they would find useful in this context.

One group suggested a diagram that shows relationships between keywords.

Use cases and benefits

There was a lot of consensus amongst the groups on the following benefits being the most important:

- To identify institutions / countries / authors doing research on a topic
- To understand the share of open access publications for a topic
- To identify language distribution across topics

Participants had less interest in following suggestions:

- To find out what topics funders/funding agencies invest in
- To discover related authors
- To understand what community the researcher belongs to
- To understand publication types of a topic

When asked for additional ideas for use cases, most groups were not able to finish the question. Some participants provided following ideas during the final discussions:

- To assess the impact of a project
- To explore trends in specific countries and in their disciplines

“You can also see trends in specific countries and in their disciplines”

- To show relationships between keywords

“But maybe a diagram which would link its between topics can be useful with lines that you see how many lines are there between two keywords for example”

- To show which resources are cited by other resources

“Maybe you can think about semantic relationships. You can think about some kind of genetics that shows which resources are cited by other resources.”

8 GOTRIPLE CROWDFUNDING QUESTIONNAIRE - ACTIVITY 8

As anticipated earlier the GoTriple platform will complement its offering of innovative services with a crowdfunding solution. The setting up of the GoTriple crowdfunding follows the approach used for the entire platform, requiring broad understanding of user needs. While we conducted co-design workshops with both researchers as well as with the general public in relation to the GoTriple crowdfunding, we decided to obtain a broader view of the potential end-users of this specific service and to complement the co-design material with other data. Indeed, unlike the key services of GoTriple, which are to a large extent aimed at SSH researchers and concentrate on the core concept of discovery, anybody could be a user of the GoTriple crowdfunding, making donations toward the funding of standalone project ideas, with no need to make specific discoveries. The crowdfunding per se is not directly a discovery tool and therefore warrants some additional investigation of its potential end-users. As such, setting up successfully a crowdfunding solution would require additional knowledge for supporting the consortium decision making and an effective delivery. Thus, gathering some additional actionable knowledge was considered important. Some of the questions we have been exploring during the co-design workshop (see section 5) were also suitable to be explored more widely with a questionnaire. For this reason, WP3 undertook the development of a crowdfunding questionnaire for the project, seeking to answer the following key **objectives**:

- What kind of projects would interest the potential users of the crowdfunding service?
- Do crowdfunders want feedback after the funding?
- Would participants like to get involved in other ways, beyond just the funding/donation?
(e.g. giving time or technical support)
- What aspect would contribute toward trusting the researchers and the projects' relevance?
- For the same quality of projects, could the career stage of the researcher (junior or senior) have an impact toward funding decisions?

The remainder of this section of the Deliverable is organised as follows: a) we will present a short literature review on crowdfunding, especially from a user research perspective; b) we will then discuss briefly the methodology used for the questionnaire; c) we will then turn to present a set of core findings, followed by d) final recommendations for the set-up of the crowdfunding platform of GoTriple.

8.1 Literature review on Crowdfunding from a user perspective

To complement the data collection, we also conducted a short and targeted literature review on crowdfunding. While there is ample literature on crowdfunding, especially on the motivations of funders, we chose to concentrate on literature looking specifically at user research on crowdfunding and at scientific crowdfunding.

Scientific crowdfunding, as an emergent area of crowdfunding, is currently under-researched. Most of the scientific crowdfunding research focuses on factors that influence crowdfunding contributions, with a limited number of studies attempting to understand user needs and

preferences for general, rather than scientific crowdfunding platforms. Therefore, this literature review will focus on previous findings regarding scientific crowdfunding which are relevant to inform the design of a scientific crowdfunding platform (detailed in Table 2), followed by a review of the limited findings on general crowdfunding from a user perspective.

TABLE 2. SCIENTIFIC CROWDFUNDING FINDINGS

Area of scientific crowdfunding literature		Findings
Crowdfunding recommendations (no empirical studies)		Conducting outreach, to enhance the amounts raised (Wheat et al., 2013); clear, accessible and engaging (e.g., through video) communication, to keep users engaged in the highly distracting online environment (Vachelard et al., 2016); clear information about how the funding will be used, regular updates, smaller goals, and meaningful rewards such as lab notes, visits to the laboratory etc. (Vachelard et al., 2016).
Researcher motivations to use crowdfunding for funds		Researchers are motivated to crowdfund as it allows them to engage the public with research, communicate about their research in a more accessible way, network with other researchers, achieve funding more quickly and with less reliance on traditional research funding (Hui & Gerber, 2015).
Preferences of funders		In the context of drug development crowdfunding, funders are influenced by the reputation of the university the project is affiliated with, they prefer receiving funding appeals from family or friends, or from researchers known to them, and supporting projects with higher likelihood to cure the disease (Dragojlovic & Lynd, 2016).
Findings based on observed data from crowdfunding platforms	Success factors	Key findings
	Project goals	Lower goals were associated with project success (Aleksina et al., 2019; Sauermann et al., 2019; Schäfer et al., 2018).
	Researcher credentials	PhD qualifications (Aleksina et al., 2019), awards or honours received by the researcher(s) (Schäfer et al., 2018) were not related to project success. The academic rank of a researcher was found to be negatively linked with likelihood of success (Davidson & Tsfati, 2019). Junior researchers and students were found to be more likely to succeed, and scientists' prior

		publications were not related to success (Sauermann et al., 2019).
	Institution's reputation	Researchers from more prestigious universities do not have higher chances of success than those from other universities (Davidson & Tsfati, 2019).
	Communication methods	The use of video was associated with higher likelihood of success (Davidson & Tsfati, 2019; Sauermann et al., 2019), with campaigns that use humour and visualisation also being more likely to succeed (Schäfer et al., 2018). Offering updates was linked to project success (Sauermann et al., 2019).
	Social media activity and interaction	Interaction or feedback between funders and researchers is linked to project success (Schäfer et al., 2018). The number of tweets or retweets about a campaign significantly predicted campaign success (Aleksina et al., 2019).
	Risk	Projects that are less innovative and less risky tend to achieve more funding success (Aleksina et al., 2019).
	Third party endorsement	Testimonials related to the platform, or the project, appear to not significantly influence project success (Schäfer et al., 2018). However, in another study, endorsements of campaigns were associated with higher likelihood of success (Sauermann et al., 2019).
	Rewards	Offering rewards such as lab visits, photographs, the naming of a shark, were linked to likelihood of success (Sauermann et al., 2019).
	Platform and data security	Offering secure payment options and requiring less personal data from funders are also related to project success (Schäfer et al., 2018).

8.1.1 Crowdfunding: user research

Although there is extensive research on crowdfunding, a limited number of studies have attempted to explore user needs for a crowdfunding platform, and refer to more general crowdfunding, rather than scientific crowdfunding. User research on a crowdfunding website in

Indonesia identified user needs such as user profile customization, receiving information and news through the platform, a variety of payment methods and funding model types, user support for creating campaigns and for campaign marketing (Perdana et al., 2017). In the context of equity crowdfunding, user research found that individuals lacked information about financial terminology and paid most attention to risks presented at the top of a risk warnings page (as opposed to the bottom), suggesting platforms should present major risk warnings first and provide either a list of technical or financial terms to facilitate users' investing (Prom Tep et al., 2017). Lipusch et al., (2020) explored design elements that encourage co-creation (conceptualised as involving feedback and funding) on reward-based crowdfunding platforms. They tested the role of three design principles in influencing co-creation: the provision of multiple sources of information about the project (e.g., external reviews), encouraging funders to express their preferences (e.g., through participatory updates where they can provide feedback) and involving funders in product decisions (e.g., through voting on product features). Results from an experiment show that the implementation of these principles led to more feedback being provided, and higher intentions to fund the project compared to when the platform only included creator-provided information, regular updates and no voting options (Lipusch et al., 2020). These findings are consistent with the literature on success factors in scientific crowdfunding, indicating that external endorsements, interaction, and feedback from users can enhance crowdfunding success.

8.1.2 Conclusions of the literature review

The reviewed findings mostly explore data available from crowdfunding platforms, with less focus on preferences of the potential funders that could use scientific crowdfunding platforms. Hui and Gerber (2015) focus on motivations of researchers for using crowdfunding as a funding source and suggest implications for designing scientific crowdfunding platforms: offering options for data sharing and visualisation, and embedding interactions for feedback and collaboration (Hui & Gerber, 2015). However, this does not provide a perspective on the general public's preferences. Although one study explored funder preferences (Dragojlovic & Lynd, 2016), it is limited to the drug crowdfunding field and shows some discrepancies with research based on observed data in other areas of scientific crowdfunding regarding the influence of the reputation of the university researchers are affiliated with. Observed data suggests that the credentials of the researchers (Aleksina et al., 2019) and reputation of the institution may not be influential in funding decisions (Davidson & Tsfati, 2019), whereas funder preferences appear to suggest reputation of the institution would be (Dragojlovic & Lynd, 2016). As the field remains relatively unexplored, more research is needed into the preferences of scientific crowd-funders.

8.2 Methodology

The questionnaire was developed by the WP3 leader (Abertay) with input from the coordinator and comments from other partners. The methodology for building the questionnaire and analysing the data mirrors almost entirely the one used for the questionnaire prepared for [D3.1](#) which focused on the GoTriple user needs. The questionnaire for the crowdfunding research has

been also organised in blocks of questions, mostly composed of 5 points Likert-scale items. A Likert-scale item is normally a statement accompanied by a scale of answers (e.g., Strongly Agree, Agree, Undecided, Disagree, Strongly Disagree) from which the respondent selects one answer. These items are meant to measure the perception of the respondent toward the statement. The questionnaire was composed of the following blocks:

- Block 1:** A general demographic section (measuring gender, age, work status, relative perception of the household income). This block also included a question asking the respondent if they work in research/academia or not. This in particular was important in order to separate the researchers' responses from that of the general public. While anybody can be seen as a funder of a crowdfunding campaign and we expect that researchers will also support other researchers' projects, we also wanted to get the view of the general public.
- Block 2:** A section measuring the general attitude of people toward science. This section was seen as relevant mostly for the general public, to understand their general attitude toward science and research.
- Block 3:** A section asking about previous experience with crowdfunding. This block included a filter question asking about previous direct use of crowdfunding, with only people having had previous experience filling in the remaining questions of this block. These questions included querying on the kind of platforms previously used, the maximum value of a donation made as well as a set of Likert statements on what drove people to fund a project previously.
- Block 4:** A general section with a set of Likert statements asking about the perception of the relevance of crowdfunding of science. This block resumes the questionnaire for all respondents.
- Block 5:** A general section (divided in two parts) with a set of Likert statements asking about what kind of projects people would be more interested to fund via the GoTriple crowdfunding platform.
- Block 6:** A final section, with a set of Likert statements asking respondents about what should happen after the project conclusion.

The questionnaire (and all the questions) is included in Appendix 2 of this deliverable and will not be discussed here in detail. Some rationale about the Likert statements will be given during the presentation of the findings.

Data were analysed in a manner similar to the previous questionnaire conducted for the project. Readers can refer to [D3.1 Report on User Needs Iteration](#) for full reference to the method of analysis, here we will recall the main points. The data obtained from the questionnaire has been analysed mainly with **descriptive statistics**, with the intent of producing graphs (bar charts) reporting on the main findings. The graphs are accompanied by relevant descriptions and interpretations. Descriptive statistics (Boone & Boone, 2012) were adopted because of the nature of the questions (Likert-items, which are ordinal data). In the interpretation of the descriptive graphs **positive response/perception** will be considered as the sum of the two

positive items of the scale used. For example, the sum of Strongly Agree and Agree responses, or the sum of Very Likely and Likely responses (depending on the labels of the Likert-items used). Likewise, the **negative response/perception** will be considered as the sum of the two negative items such as the sum of Strongly Disagree and Disagree.

As in the D3.1 Report on User Needs Iteration, it was decided in some evident cases to conduct appropriate tests to measure whether there are significant statistical differences among some of the groups in the different demographics in relation to some of the questions, in particular in this case differences between researchers and the general public. Thus, for some questions, we performed **non-parametric statistical tests**. Non-parametric tests were conducted on the data since most of it comes in the form of ordinal variables (i.e. Likert-items). These tests have been performed with custom python scripts written by Abertay. In particular, a non-parametric t-test, the **Mann-Whitney U test** (1947) has been used. This test can be used to detect whether two groups present differences in the distribution of responses that are statistically significant. For all the tests p will be at 0.05. For all the tests the null hypothesis is as follows: *H0: the two groups present the same distribution of responses*.

In this deliverable we will concentrate our analysis on the key demographic researchers/public. The other demographics will be used by the project for taking further decisions, but the analysis is not included here (also since this deliverable core reporting is on the co-design). In the following, **general** response means a response which does not distinguish between **public** and **researchers**.

8.2.1 Sampling communication and distribution

It was decided that the questionnaire should be distributed as widely as possible using a **snowball sampling approach** and utilising regular electronic communication channels. However, differently from the D3.1 questionnaire, we used mostly social media distribution rather than sending the questionnaire to various professional SSH mailing lists. This decision was taken in order to reach an audience beyond research and academia. Thus, project partners were invited to distribute the link with their social media, whilst we used the TRIPLE project communication channels as well (e.g. website, twitter etc.).

Moreover, in order to reach an audience beyond academia, the questionnaire has been translated in 7 European languages (in addition to the master version in English): Italian, German, French, Greek, Polish, Portuguese and Spanish. A number of project partners were involved in supporting the translation, with a first version provided by WP3 leader. The partners also took care of the distribution of the questionnaire in the respective countries.

8.3 Results

8.3.1 Block 1 - Demographics

The questionnaire has collected 587 responses, with the following breakdown: 141 from the general public and 446 from researchers. As we can understand, the sample is biased toward the researchers' response with a ratio of almost 3:1.

We will now present the graphs for the general demographics and comment when relevant on any difference between researchers and the public (some additional demographics are included in Appendix 1). As we can see from Figure 32, the majority of respondents belong to two age brackets 30-39 (which also is the mode, with n=183) and 40-49.

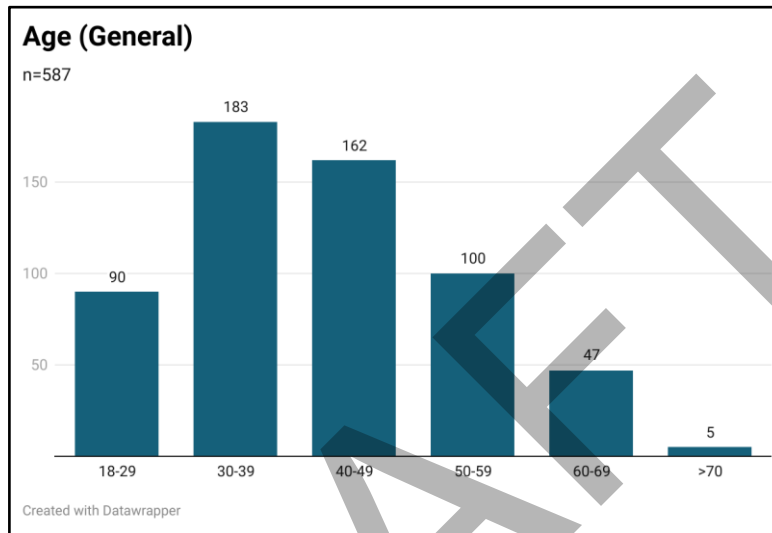


Figure 32. Age demographic (General response)

The large majority of respondents also declared to be employed full time (n=400), as we can see from Figure 33, with only marginal response for the other options, as indeed the next option is employed part-time with almost ten times less responses (n=46).

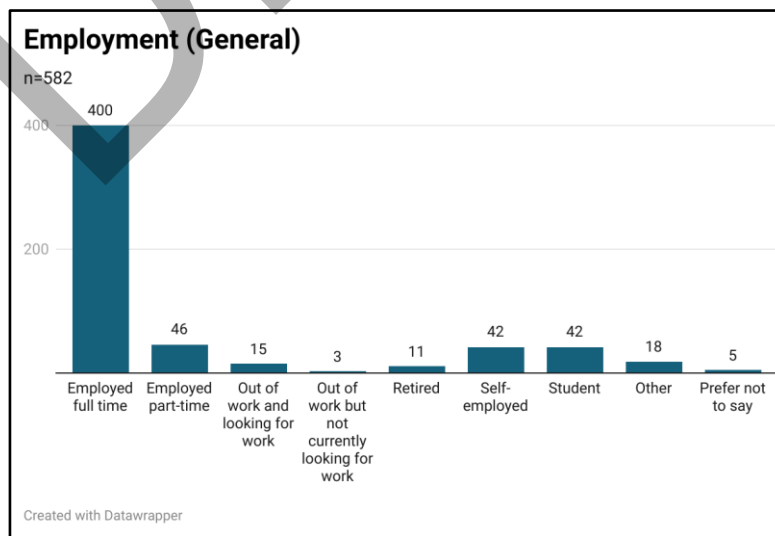


Figure 33. Employment demographic (General response)

In Figure 34 we can see the breakdown of response for gender, with the majority being female (n=337, with n=224 males) and overall an acceptable balance.

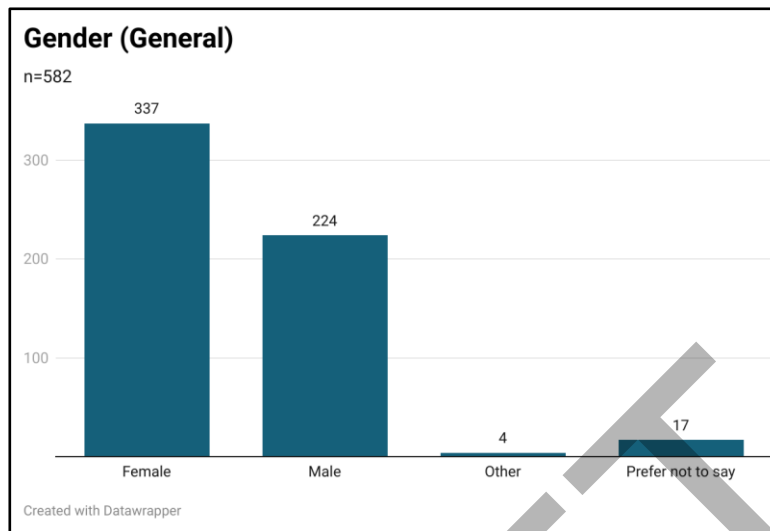


Figure 34. Gender demographic (General response)

In terms of perceived income (Figure 35) the majority of respondents declared their perceived household income to be upper-middle (which also is the mode at m=296), followed by low-middle income (n=193).

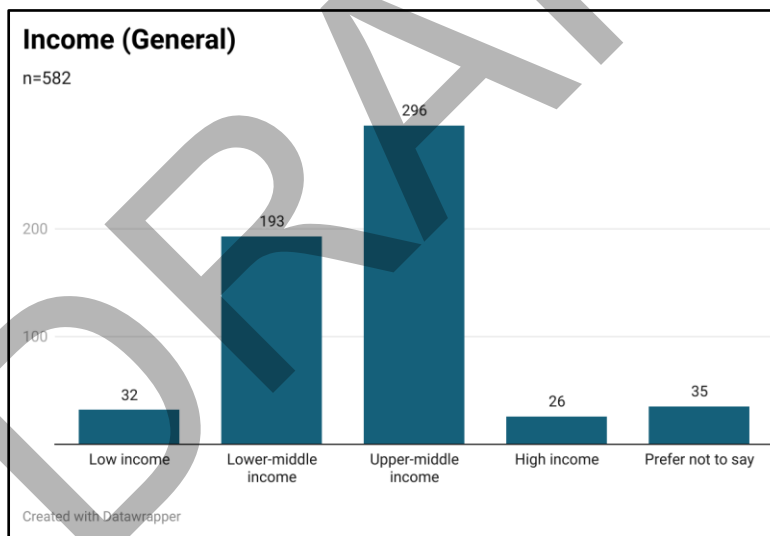


Figure 35. Income demographic (General response)

The final demographic relates with the highest level of education achieved (we call this Studies). In this case we will show two separate graphs for researchers (Figure 37) and the public (Figure 36). While overall (for the General response) the mode is on the category University Degree (Master - n=227), there are significant differences between the two groups. Indeed, the mode for researchers is PhD (n=217), whilst for the public only 2 respondents have a PhD. The mode for the public is University Degree (Master, n=60) with also a relatively higher response in the other categories such as Bachelor or High School if compared to researchers. This is of course not a surprising result as one would expect that most people working in research hold a PhD, whilst

there is more variety in response for the public. However, a large majority of people who answered the questionnaire have achieved university studies.

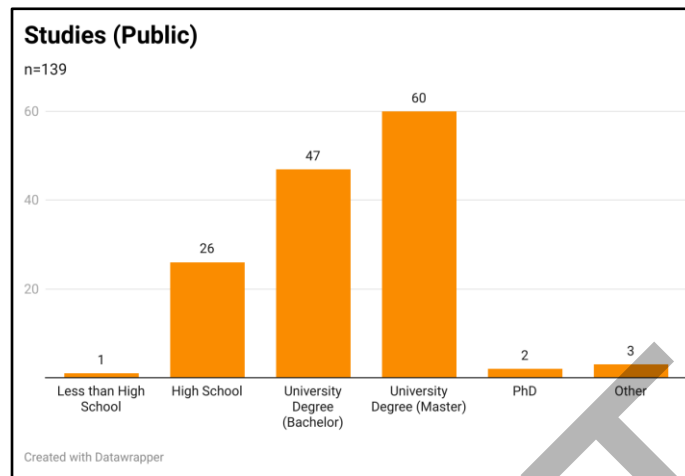


Figure 36. Studies/education for the public

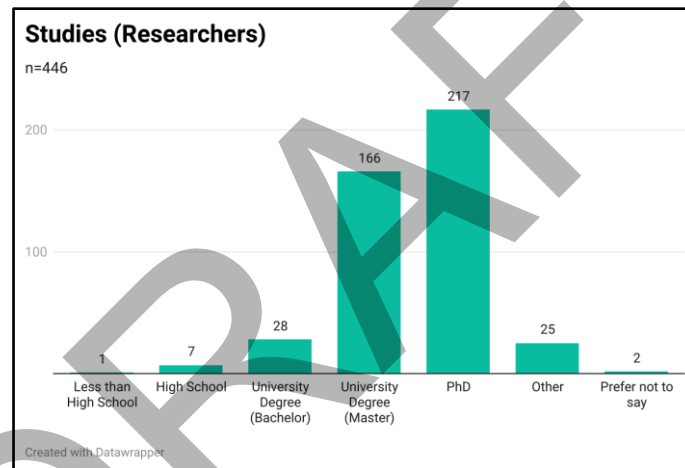


Figure 37. Studies/education for researchers

8.3.2 Block 2 - General attitudes toward science

Block 2 was conceived as a general set of Likert-items to measure some aspects of the attitude of respondents toward science and research. We report here mostly the response received from the **public**, since the other demographic here considered (researchers), clearly gave a majority of positive responses overall to all the statements posed to them. We will comment on a couple of questions for the **researchers** as well.

What stands out from the public response (Figure 38) is that 4 of the statements reached 80% or more of positive response as we can see from the graph. Two statements in particular are relevant: the one on the importance of SSH research being equal to that of technical or medical research with 89.8% of positive response (**G1_SSH_importance**) and the one on whether SSH should receive more research funding (**G1_more_funding_SSH**) at 92.8% of positive response. Moreover we have 80.4% of positive responses to the statements on having trust toward science

(**G1_trust_science**). Most respondents within the public also provided high positive responses to the statement on whether research is generally underfunded (**G1_research_underfunded**) with 80.6% of positive responses. On the statement on whether they would be willing to make a donation toward research (**G1_make_donations**), 52.1% gave a positive response. Overall, this paints a relatively positive picture for crowdfunding. Whether public opinion should be taken into account more in decisions about science is the only statement in which we see a positive score below 50%, specifically at 34%, with a majority of undecided (at 39.1%) (**G1_public_opinion**). The response to the other statements can be seen from the graph and will not be commented further here.

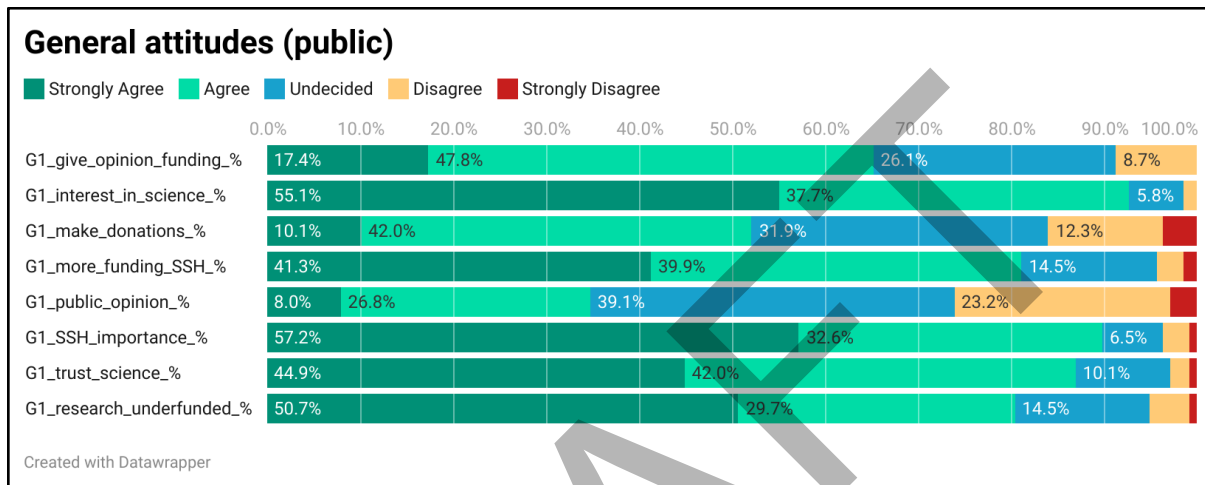


Figure 38. General attitudes toward science for the public group

Looking at the researchers' responses (Figure 39), a couple of statements are worth commenting on. First the statement about public opinion (**G1_public_opinion**), which again appears to be the one with the lowest number of positive responses at 41.7%. This is similar to the response received from the public; however, it is interesting to note that the positive response for researchers is marginally higher. This is followed similarly by the statement on whether participants would be willing to make a donation (**G1_make_donations**) to fund research with 50.7% of positive responses. Overall, just by looking at the two graphs we can see some similarities between the two demographics considered. To detect if there are statistically significant differences in the distribution we conducted a Mann-Whitney Test. Table 3 shows the result of the Tests conducted on all the statements for this block.

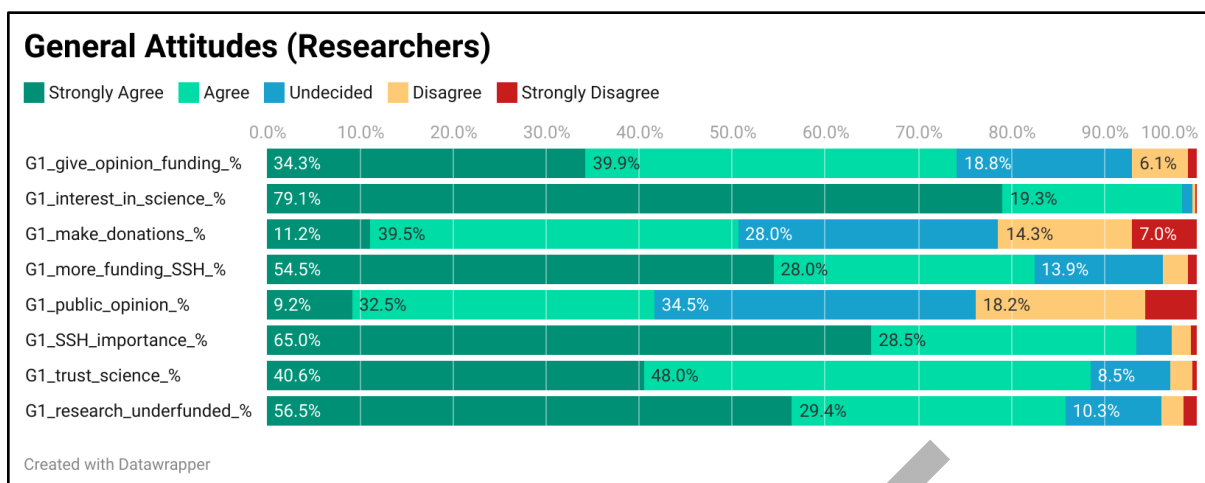


Figure 39. General attitudes toward science for the Researchers group

We can see that in three statements (out of 8) the difference in the distribution of the responses is statistically significant. In particular, we should note the differences in the statements on whether there should be more funding for SSH, with the positive response for researchers being higher than for the public. There also is a difference in the statement on whether participants would like to give their opinion on the funding of science (**G1_give_opinion_funding**), with researchers offering a higher positive response. However, the two groups present the same distribution in the statements on the public opinion on science.

TABLE 3. INDEPENDENCE TEST RESULTS RESEARCHERS/PUBLIC

Question	U	p	H0
G1_give_opinion_funding	35640	0	reject H0
G1_interest_in_science	37755	0	reject H0
G1_make_donations	29146	0.5	accept H0
G1_more_funding_SSH	33520	0.03	reject H0
G1_public_opinion	32076	0.25	accept H0
G1_SSH_importance	32602.5	0.1	accept H0
G1_trust_science	29567.5	0.67	accept H0
G1_research_underfunded	32350	0.16	accept H0

Main Take Away Points

Overall, the main take away points from this block of questions are as follows:

- The general public seems to value the opportunity to give an opinion about science less than expected and for both groups the importance of public opinion in research decisions is

relatively unimportant if compared with the answers provided for most of the other statements.

- Overall, both groups have provided a marginally positive response to the statement on being interested in making donations to science/research (also presenting the same distribution of responses), which is encouraging for the idea of having a crowdfunding platform.
- To note is also the relative importance that the public gives to SSH, having given a large positive response to both the statement on the importance of SSH as well as to the statement on SSH remaining generally underfunded.

8.3.3 Block 3 - Previous experiences with crowdfunding

Of the 587 respondents to the whole survey 313 had previous experience of using crowdfunding platforms. The breakdown between researchers and the public is as follows: 252 and 61 respondents respectively (with thus a relatively low figure for the public). Figure 40 shows which platforms have been used the most by participants (general) with Kickstarter and GoFundMe as the platforms which have been used the most in the past.

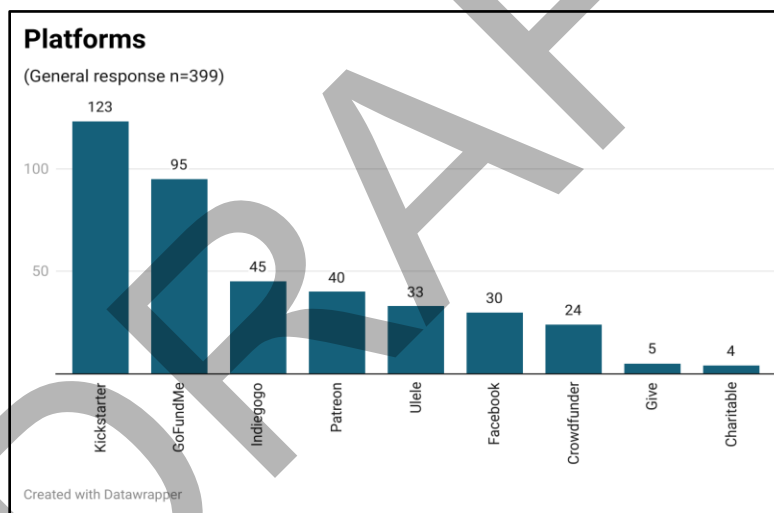


Figure 40. Which crowdsourcing platforms respondents used in the past

In terms of the maximum amount pledged in a crowdfunding campaign (Figure 41), we see the majority of responses ($n=136$) is between 11 to 50 Euros, followed by 1 to 10 Euros ($n=70$) and then 51 to 100 Euros (62). This suggests that participants are generally interested in giving reasonable pledges/donations toward crowdfunding, rather just giving very small sums (between 1 and 10 euros).

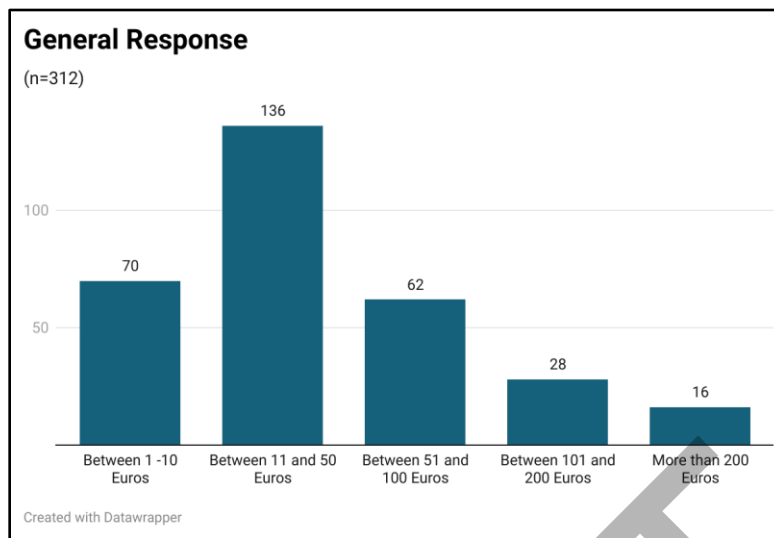


Figure 41. Highest amount donated/pledged to a crowdfunding campaign

Looking at the decisions to fund a project that respondents have taken in the past, Figure 42 shows the response for the entire dataset (general). However, we should note that the general response is impacted by a biased majority of researchers in the sample.

We will comment on some of the statements. Overall positive responses dominate for all the statements with some differences to note. We can see that word-of-mouth (**D1_Word-of-mouth**) was indicated with the lowest positive response at 61.7% and with the largest undecided at 24.3%. This is followed by both the statement on personal knowledge of the proposer (**D1_personal_knowledge_proposer**), expectations on the returns (**D1_expectations_on_return**) and trust in the platform (**D1_trust_platform**) all around 67% of positive responses.

On the other end, having a general interest in the project/idea (**D1_general_interest**) was the option that received the largest positive response (97.4%), followed by the statement on the projects having provided clear information (**D1_clear_information**) (e.g. about its goal, how these will be achieved and the returns) and the statement on sharing the same values of the proposers (**D1_sharing_values**), in both cases just marginally above 90% of positive response.

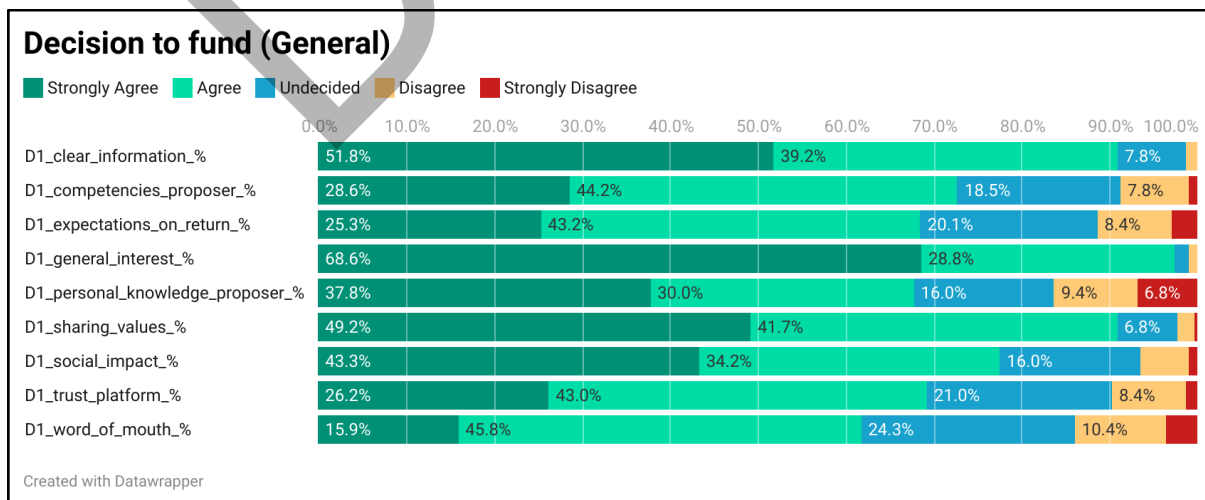


Figure 42. Aspects that drove the decision to participate to a crowdfunding campaign (General response)

Looking now at the same graph for both the researchers (Figure 44) and public (Figure 43) demographics we can detect some minor differences (although, we should still consider that the public accounts only for 61 responses). What stands out the most is the difference in the statements on personal knowledge of the proposer (**D1_personal_knowledge_proposer**), which appears more important for researchers (71.7% of positive responses) than for the public (52.5% of positive response). On the other end, both groups provided good positive responses to the statements on clear information (92% for the public and 88.4% for researchers) and sharing values (95% for the public and 90.2% for researchers).

We conducted a Mann-Whitney test on all the statements but only in one case the hypothesis was rejected. This was for the statement on personal knowledge of the proposer. Table 4 shows the result of the Mann-Whitney Tests conducted on this statement specifically.

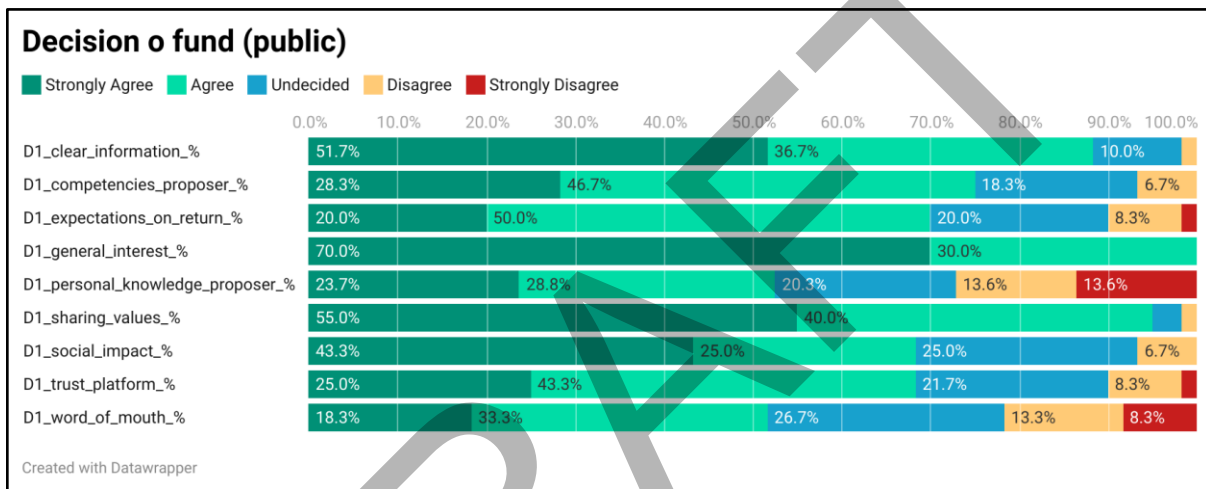


Figure 43. Aspects that drove the decision to donate/participate to a crowdfunding campaign (Public response)

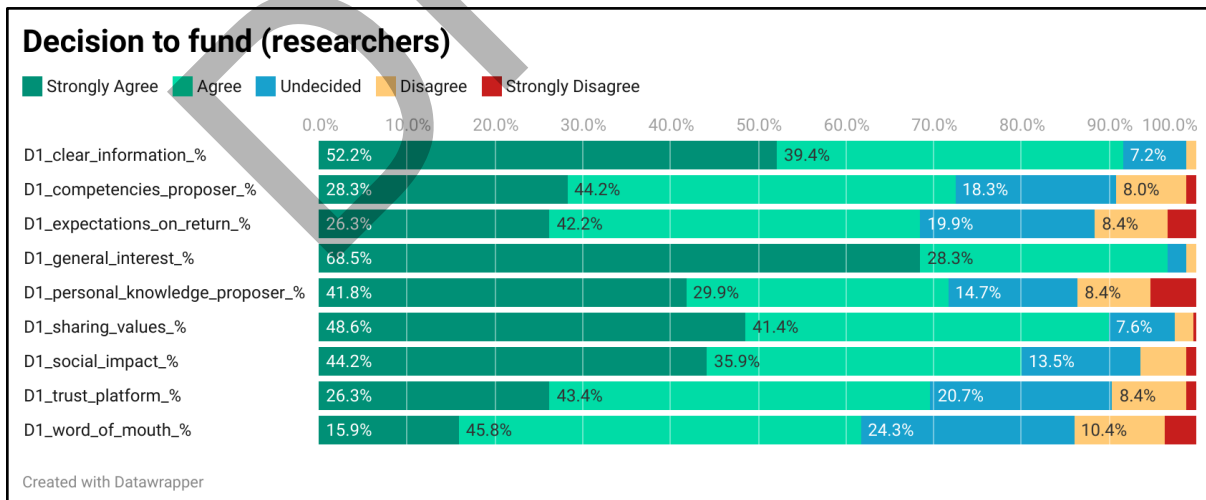


Figure 44. Aspects that drove the decision to donate/participate to a crowdfunding campaign (Researchers response)

TABLE 4. INDEPENDENCE TEST RESULTS RESEARCHERS/PUBLIC ON PERSONAL KNOWLEDGE OF THE PROPOSERS

Question	U	p	H0
D1_personal_knowledge_proposer	9042.5	0.001	reject H0

Main Take Away Points

Overall, the main take away points from this block of questions are as follows:

- There are no differences in distribution for all statements (except one) between the public and researchers, this suggests that past behaviour (i.e., the decision to donate/participate in a crowdfunding campaign) was similar between these two groups.
- Having a general interest in the project, having received clear information about the project and having shared values with the proposers have been indicated as the most important aspects in the decision to fund in the past.
- There is an important difference between the groups in relation to the statement on having funded a project proposed by somebody they know. This appears more relevant for researchers.
- Finally, although both groups present the same distribution of responses, word-of-mouth was seen as the least relevant of these statements in relation to past decisions to fund.
- Generally, respondents have funded projects on the most well-known platforms with Kickstarter and GoFundMe as the most popular ones.

8.3.4 Block 4 - General attitudes toward crowdfunding

The next block of the questionnaire included four Likert statements to measure some general views about crowdfunding. From the general response (Figure 45) we can see that 50.6% of respondents do agree that crowdfunding could be a way to allow the public to have some decision power on the direction of scientific research (**C1_public_decide**). However, this is the only statement with a clear positive response. The majority of respondents do not see crowdfunding as the solution for research underfunding (52.7% of negative response, with only 25.7% of positive response, **C1_solution_underfunding**). Moreover, the two other questions did ask whether the publication of project in a crowdfunding platform would guarantee both the seriousness of the proposers (**C1_platform_seriousness_proposers**) as well as the seriousness of the project (**C1_publication_seriousness**), we can see a relatively low positive response with the majority being negative respectively at 51.7% and 48.7% of negative response, with 33.7% and 30.9% of undecided.

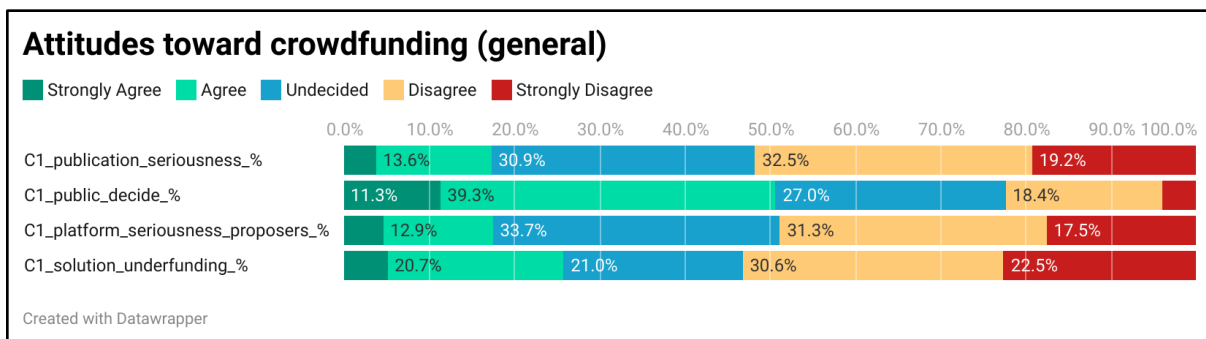


Figure 45. Attitudes toward crowdfunding campaign (General response)

We can now look in more detail at the differences between the two key demographics under investigation here. A first descriptive consideration that can be observed from the graphs is that the public's positive response (Figure 46) is generally higher for all the statements if compared to the researchers' (Figure 47), while for the latter the negative response is instead higher for all the statements. We see again for both groups the generally positive responses to the statement that crowdfunding could allow the public to have some decision power on the direction of scientific research (**C1_public_decide**), however for the public this is at 61.2%, while for researchers this is comparatively lower a 47.7%. Again we conducted an U-test on the data with *H0: the two groups present the same distribution of responses*. Results are reported in Table 2.

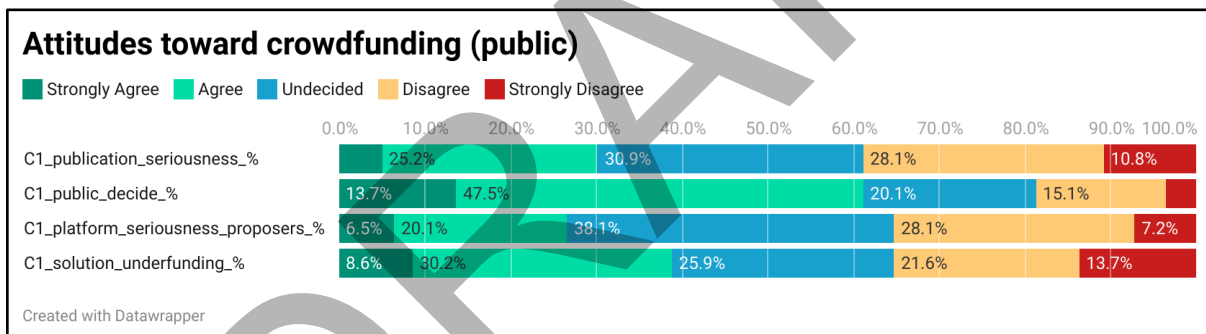


Figure 46. Attitudes toward crowdfunding (public response)

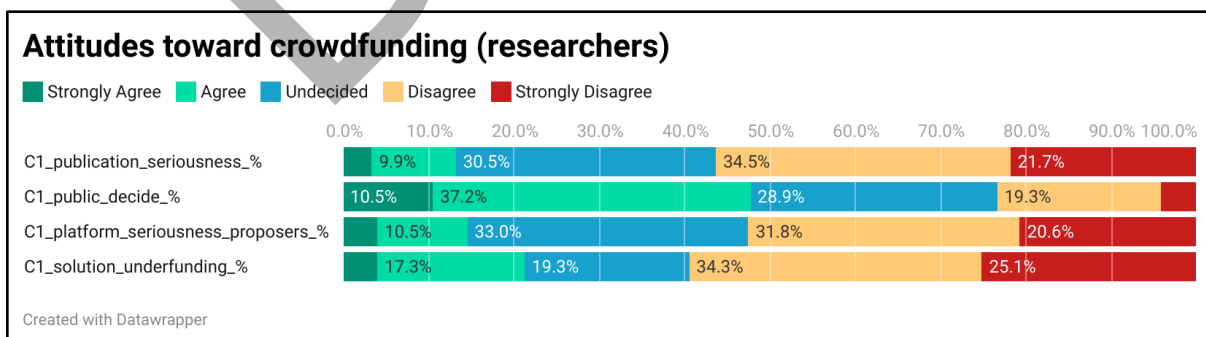


Figure 47. Attitudes toward crowdfunding (Researchers response)

The Mann-Whitney tests (Table 5) show that the two groups present a different distribution of responses in all the statements, thus suggesting that these two groups have different attitudes toward crowdfunding (at least in relation to the proposed statements).

TABLE 5 - INDEPENDENCE TEST RESULTS

Question	U	p	H0
C1_publication_seriousness	23126.5	0	reject H0
C1_public_decide	26589	0	reject H0
C1_platform_seriousness_proposers	23243	0	reject H0
C1_solution_underfunding	22414	0	reject H0

Main Take Away Points

Overall, the main take away points from this block of questions are as follows:

- Both the public and researchers see in the concept of crowdfunding some potential for allowing more public decision making in scientific research. However, these two groups also have a different distribution of responses, with a more positive attitude for the public than for researchers.
- Generally, respondents gave negative responses to the other questions, in particular we should note that the majority do not think that the publication of a project in a crowdfunding platform guarantees its seriousness, nor the seriousness of the proposers. Although this scepticism is fairly more marked for researchers than for the public.

8.3.5 Block 5 - Projects of interest

The subsequent block of the questionnaire aimed at investigating which kind of projects respondents would be **more or less likely** to fund. The rationale underpinning this block of statements was to obtain knowledge for prioritising some decision on the initial projects that could appear on the GoTriple platform. In other words, this block was designed to obtain actionable knowledge for the project. The proposed statements did not focus on research topics but rather on a variety of aspects that could compose a project proposition, including the nature of the proposers, the impact of the project and also aspects of direct interest for potential funders. As anticipated, this block was divided in two parts (Projects of interest 1 and 2). We will not show the general graphs, as we know they are mostly biased because of the higher response from researchers, compared with the public. Instead, we will carry out a direct comparison between these two groups.

The first thing to notice is related to both groups where for the public (Figure 48) and the researchers (Figure 49), projects with clear societal impact (**S1_societal_impact**) have received the highest positive response at 91.5% for the public and 84.6% for researchers. This is followed, again for both groups, by the statements on projects which are of “interest to me” (**S1_interest to me**) at 85.3% and 78.9% of positive responses for the public and researchers respectively. However, we should note that this statement is also highly subjective and it will be difficult to

translate this result into actionable knowledge. Other statements can be further compared. The first are those related with projects that have partnerships with civil society organisations (e.g., NGOs, charities) (**S1_civil_society**) or with business (**S1_business_partners**). It is clear from the response given by both groups that there are more positive responses for civil society, at 73.4% for the public and 59.9% for researchers, compared with the positive response for the business partners (e.g., SMEs) at 40.9% for the public and 27.8% for researchers. Respondents in both groups provided high positive responses to the question related to the likelihood of funding projects related to “my geographical area” (**S1_geographical_area**), with 63.4% and 58% of positive responses for the public and researchers respectively. Moreover, the statement that received the least positive response for both groups is the one related with the funding of projects proposed by a University in my area (**S1_University_my_area**), with 27.1% of positive responses and 41.9% of negative responses for both the public and researchers. Finally, it is worth commenting on the statements related to “risk”, although generally these are statements that received a lower relative response. The public seems generally more positive about funding low risk projects (**S1_no_risk_projects**) than high risk projects (**S1_high_risk_projects**), with positive responses at 53.7% and 36.5% respectively. For researchers the pattern is similar however there is a lower positive response (compared to the public) to the statement on low-risk projects at 37.4%, with 29.1% for high risk projects, suggesting also that the differences for these two questions for researchers is smaller.

It is interesting to note however that for some of these questions, the distribution of responses between the two groups is different, while for some others is the same. Table 6 presents the results of the Mann-Whitney test conducted on the statements for this first part of the block. We can see that there is a different distribution in relation to projects with business partners, suggesting that the public are marginally keener to see business partners in projects than researchers. However, the distribution for the statements on civil society partners is the same. There also is a statistical difference in relation to the statements on projects from my geographical area, where it appears that the public is keener on funding projects related to the places where they live. Finally, there is a difference in the distribution of responses to the question on low-risk projects, which suggests that the public is more likely to prefer projects which carry little or no risk compared to researchers.

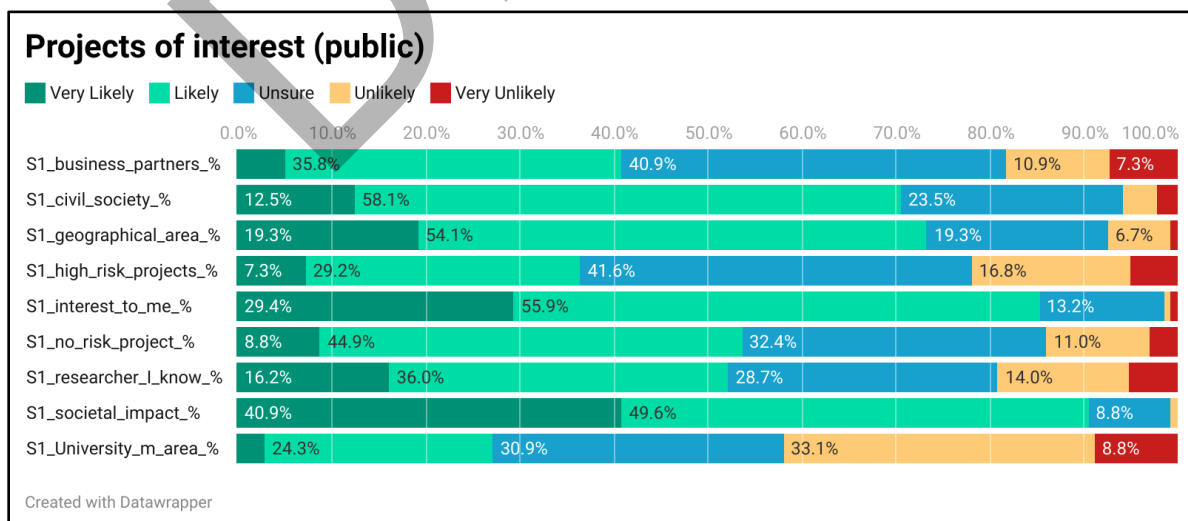


Figure 48. Projects of interest, that participants would be more likely to fund (Public response)

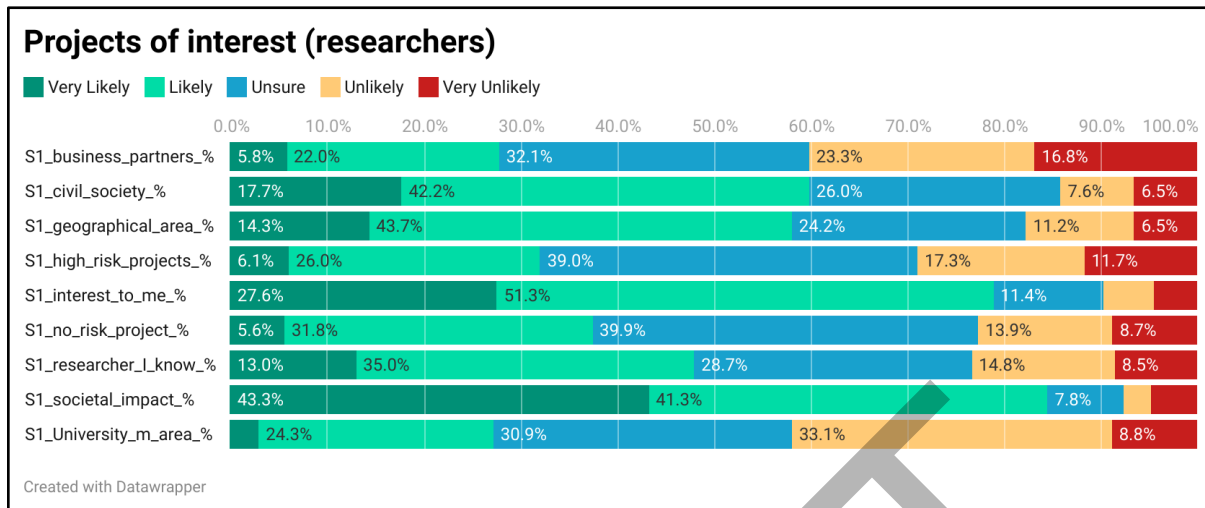


Figure 49. Projects of interest, that participants would be more likely to fund (Researchers response)

TABLE 6 - INDEPENDENCE TEST RESULTS

Question	U	p	H0
S1_business_partners	22476.5	0	reject H0
S1_civil_society	26670	0.18	accept H0
S1_geographical_area	23427	0	reject H0
S1_high_risk_projects	26179.5	0.10	accept H0
S1_interest_to_me	26868	0.21	accept H0
S1_no_risk_project	23514	0	reject H0
S1_researcher_I_know	26647.5	0.19	accept H0
S1_societal_impact	27945.5	0.6	accept H0
S1_University_my_area	26966	0.27	accept H0

We can now look at the second set of statements for this block, again focusing on the projects of interest. We will show, again, the graphs for the public (Figure 50) and the researchers (Figure 51) and compare where possible. The public gave positive responses above 50% to all the statements, with, however, some clear differences. The researchers gave positive responses above 50% to all the statements except one.

The statement that received the highest positive response for both groups is the one related to the funding of projects where it is clear that the proposers will fulfill their obligations (**S2_fulfill_obligations**), with 86.4% for the public and 80.1% for researchers. The statement on likely funding projects where there is the possibility to ask questions to the proposers also received high positive responses for both groups (**S2_ask_questions**), at 75.6% for the public and 74% for researchers. High importance, for both groups, is given to the publications in the area of

the project that the proposers have (**S2_proposer_published**), with 77% of positive responses for the public and 72.9% for researchers. It is also relevant to note a similar response to the statement on whether people would be more likely to fund a project proposed by a researcher at the beginning of their career over an established scholar (**S2_beginning_of_career**). This is one of the questions which has received the lowest positive response, at 54% for the public and 53.8% for researchers. Although it is still positive, there seems to be indecision on this specific statement at 41.9% for the public and 35% for researchers.

We can further look at Table 7 where the results of a Mann-Whitney test are presented for all statements to detect where the two groups present differences in the distribution of responses that are statistically significant. The differences for three statements should be noted.

The first to comment on is in relation to the funding of projects that are endorsed by other people (e.g. by other researchers) (**S2_endorsed_projects**), where the two groups present a different distribution. In this case the researchers present a marginally lower positive response if compared to the public (69.5% Vs 75.8%) and a marginally higher negative response (7.4% Vs 2.2%). This suggests that the public would be keener to see endorsement on projects in the decision to fund, compared to researchers. A difference in the distribution of responses is present also in relation to whether people would be more likely to fund projects presented with an engaging pitch (**S2_engaging_pitch**), we can see for the graphs that this aspect is clearly more important for the public, with positive response at 69.1% compared to 52.7% for researchers, which also present a higher negative response. The last statement in which there is a difference is related to the likelihood of funding projects with a low funding rather than a high funding target (**S2_low_funding_target**). Although this is the statement that has the lowest positive responses for both groups it also is clear that the public are more favourable toward this option than researchers with positive responses for the first group at 51.4% and 39.7% for the second group.

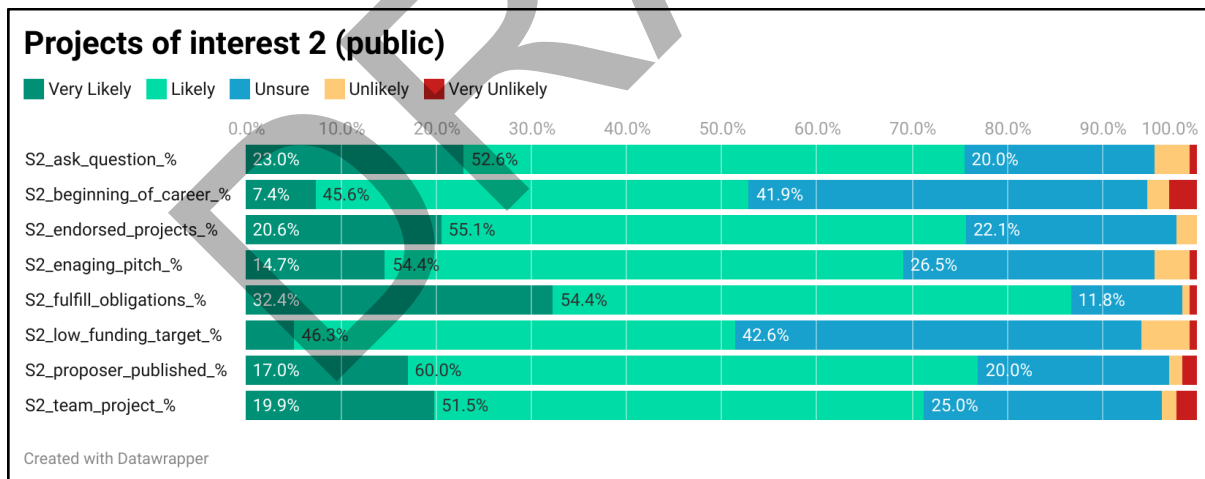


Figure 50 - Projects of interest, that participants would more likely fund (Public response), second part

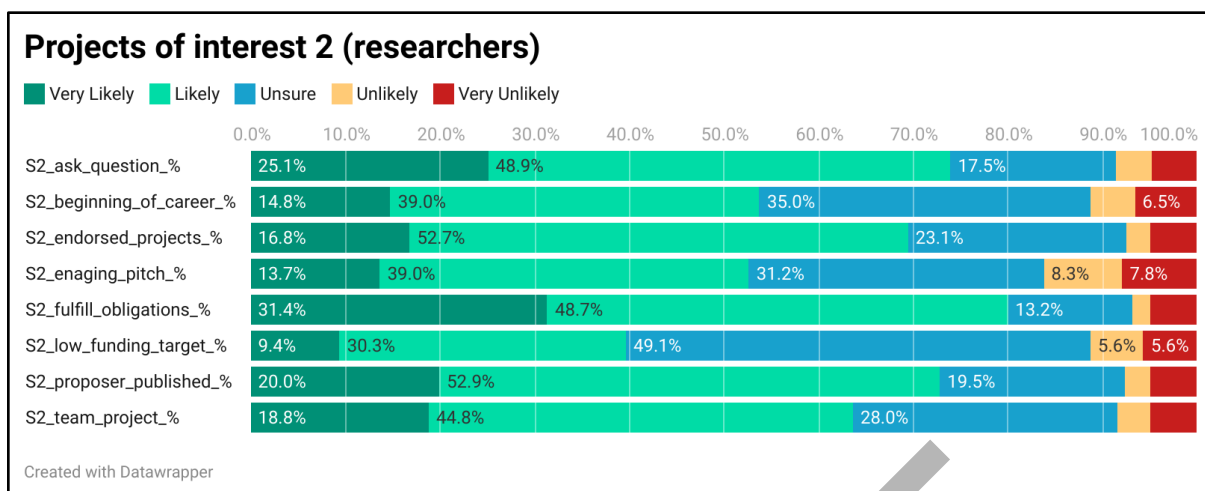


Figure 51. Projects of interest, that participants would more likely fund (Researchers response), second part

TABLE 7 - INDEPENDENCE TEST RESULTS

Question	U	p	H0
S2_ask_question	27611	0.77	accept H0
S2_beginning_of_career	28247	0.89	accept H0
S2_endorsed_projects	24989	0.038	reject H0
S2_engaging_pitch	22507	0	reject H0
S2_fulfill_obligations	26677	0.35	accept H0
S2_low_funding_target	24404	0.01	reject H0
S2_proposer_published	27194.5	0.56	accept H0
S2_team_project	25193	0.06	accept H0

Main Take Away Points

Overall, the main take away points from this block of questions are as follows:

- Both groups considered (public/ researchers) present a similar distribution of responses for the majority of statements, but we have also detected some significant differences.
- A clear societal impact of the proposed projects is seen as the most important aspect for the likelihood to fund a project by both groups, together with clarity on the fact that the proposers will fulfil their obligation in a project.

- Both groups also expressed positive likelihood about having the opportunity to ask questions to the project proposers as well as on them having already publications in the discipline area of the project.
- There are some differences in relation to projects' partnerships, where the public is marginally keener than researchers, to see projects collaborating with business partners. The public also sees more favourably than researchers' projects that are endorsed by other experts (e.g. experienced researchers in the area of the projects).
- Participants in both groups are also more likely to fund projects of interest to them. However, this statement measures a highly subjective aspect which will not be easy to translate into a concrete decision.

8.3.6 Block 6 - After the project

We will look now at the final block of the questionnaire which was composed of a number of Likert statements focusing on the investigation of what should happen after the project is funded. Also this block was designed explicitly to obtain some actionable knowledge for taking decisions about the GoTriple crowdfunding services.

We will look again at the two key demographics of researchers (Figure 52) and the public (Figure 53) and compare where possible. Overall, from the graphs we can see a majority of positive responses on all the statements. Both the public and the researchers provided a strong positive response to the question about being informed of the project completion (**A1_project_completed**) with 96.3% and 96.7% of positive responses respectively. Clarity on ethical implication (**A1_etichal_implications**) of the project also is significant to note with 94.1% of positive responses for the public and 92.1% for researchers. Three other statements received for both groups positive responses above 90% (or near to this figure), in particular the ones related to: the acknowledgment in publications that the project was crowdfunded (**A1_acknowledge_crowdfunded**); the possibility to received information about the progress of the project (**A1_progress_information**); the importance of the data collected by the crowdfunded project to be released as open data, where possible (**A1_data_open**).

Two statements received, if compared to the previous ones, relatively low positive responses (nonetheless still above 50%). The first one is the statement asking participants if they would be interested to be involved more in a project (e.g. as citizen scientists) (**A1_involved_more**). The positive response is comparable for both groups with 61% for the public and 61.9% for researchers. The other statement was asking whether respondents would be interested to discuss the results of the project with the researchers (**A1_discuss_results**). This presents 51.5% of positive responses for the public (with 35.3% of undecided) and 60% for researchers (with 30.3% of undecided).

Generally, the responses for both groups present the same distribution except from two statements, as can be seen in Table 8. These are the statements on the acknowledgement that the research was crowdfunded

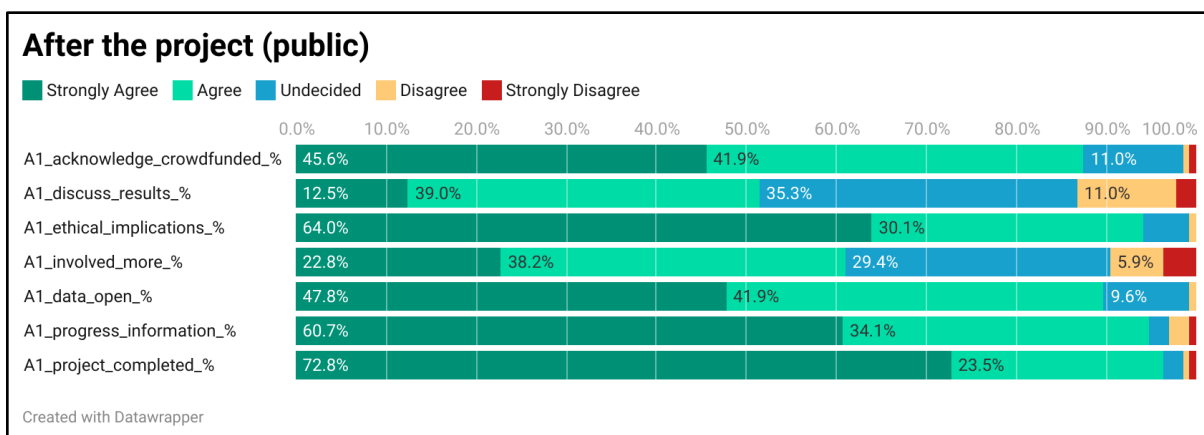


Figure 52. What should happen after the project is funded (public response)

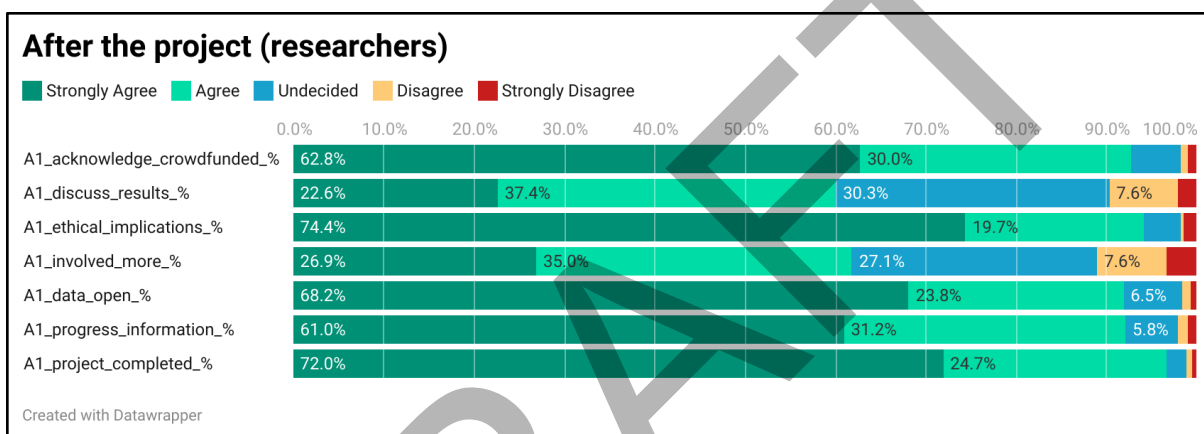


Figure 53. What should happen after the project is funded (Researchers response)

TABLE 8 - INDEPENDENCE TEST RESULTS

Question	U	p	H0
A1_acknowledge_crowdfunded	9222	0	reject H0
A1_discuss_results	9110.5	0	reject H0
A1_ethical_implications	8056.5	0.26	accept H0
A1_involved_more	7847	0.6	accept H0
A1_data_open	8402	0.09	accept H0
A1_progress_information	7562.5	0.95	accept H0
A1_project_completed	7633.5	0.83	accept H0

Main Take Away Points

Overall the main take away points from this block of questions are as follows:

- Both the public and researchers gave positive responses to all the statements. It is thus in the granularity of this response that we need to look for knowledge we can use for decision making.
- Respondents would like to know when a project they funded has been completed and would also like to receive updates about the progress of the project.
- Strong positive response was also given to the statements on ethical implications, suggesting that respondents will also look at the fact that the projects should also have a sound discussion of the ethical aspects.
- Generally (although still positive), respondents are less keen to discuss the project results with the proposers at the end of a project, although researchers appear to be keener than the public on this aspect.

8.4 Concluding remarks and recommendations for Crowdfunding

The goal of this part of the deliverable was to obtain additional actionable knowledge (in addition to the co-design results) to support decision-making for setting up the GoTriple crowdfunding solution. In particular in this analysis, we have looked at the differences between two potential audiences of the GoTriple crowdfunding: researchers and the public, both considered as groups which can make donations toward a crowdfunded research project.

Overall, we have noted that while there are some differences between these two groups, in most cases the distribution of responses appears similar. This offers the ground for a first recommendation: **promote, initially, projects whose aspects satisfy both the general public as well as researchers, as this has the advantage of not risking alienating one group or the other.** Among other aspects to note, both groups had strong positive opinions in favour of funding projects with clear societal impact, which suggests that the expected impacts of a project should be made very clear in the pitch which will be published in the platform. A further aspect is that both groups had strong positive opinions on the possibility to ask questions to the project proposers, which may suggest finding a way to have this feature in the GoTriple platform (via a direct communication channel for example, or a public forum/commenting section). A further case of strong positive opinion for both groups is related with the will to fund projects where it is clear that the proposers will fulfill their obligations, which again suggests these aspects should be made clear in the pitch and via the interface.

A similar recommendation can be made to what should happen after the project: **make sure the aspects that satisfy both groups for what should happen after the project is funded are prioritised.** This includes clearly the fact that both groups want to know when a project has been completed and to receive updates on the progress of the project. This suggests that communication channels should accompany the lifetime of a project in order to provide updates to the funders. Moreover, it may be important to make sure that one of the conditions for receiving the funding is that any publication produced by the project should acknowledge the GoTriple Crowdfunders. This may require preparing a standard statement that authors can easily reuse and that can be made available directly in the crowdfunding solution. Ethical implications

were also seen as important by both groups, project proposers should be made aware even before proposing the project to explicate what are the ethical implications of their projects and to present, during the project conduction, how they dealt with ethics.

One entire block of questions shows overall strong negative opinion for both groups (although we have seen the distribution between them are different). This was the block on the attitude toward crowdfunding. In particular neither group sees in the publication of a project in a platform a guarantee that the project is serious or that the project proposers are serious. This suggests **that work will need to be done to report back the results and build pathways to increase the perception of seriousness over time**. This will not be a short-term outcome and it is better to address this issue as a medium-term objective.

Other aspects need to be considered even if the response received does not show a strong positive opinion, since some choices will need to be considered regardless. For example, two statements asked participants on whether they would prefer to fund low or high-risk projects. There was more positive opinion toward the former, which suggests that it would be recommendable **to prioritise, at least at the beginning in the bootstrapping phase, projects which carry low risks but that can reach their objectives and satisfiable completion**, rather than risky projects. This may help build trust toward the platform and its capacity to deliver on the projects promoted there. Similarly, there was an overall positive opinion in both groups on favouring projects proposed by a team of people rather than by a single researcher. It would be recommendable **to prioritise, at least at the beginning in the bootstrapping phase, projects which are team based rather than individual based**. Again this may help build trust toward the platform in its initial phase.

To note also that both groups have a strong opinion on open data in relation to the crowdfunded projects. Thus, a further recommendation is that, **whenever possible, it should be a condition of the publication of the project in the GoTriple crowdfunding that the researchers make their data open at the end of the project** (once the relevant publications have been completed).

A final note is that there is sufficient positive opinion from funders to be otherwise involved in the projects (e.g. as citizen scientists), however the appetite for this is lower than other aspects (as presented in the Block 6). **It may be recommendable to experiment only on a few projects rather than wholesale, at least initially, the possibility to involve the funders in the project directly**. Experimenting on a few projects may allow for some monitoring of this direction for collaboration between proposers and funders to understand if it delivers optimal results. At which point, a decision could be taken to make this a more prominent aspect of the GoTriple projects appearing on the crowdfunding solution.

Overall, the results of the questionnaire thus offer good indication for the decision making around the GoTriple crowdfunding solution, in relation to which projects should be piloted at the beginning in order to establish a better solution and to allow for building initial trust.

9 CONCLUSIONS OF DELIVERABLE 3.2

Deliverable 3.2 of the TRIPLE project has reported on the work conducted for the co-design of the GoTriple new and innovative services. Eight separate research-intensive activities were conducted in order to co-design with potential GoTriple end-users, key aspects of the innovative services of the platform. In two of these activities, we investigated in-depth the existing user journeys. We found that a huge variety of tools are used for discovery, although common themes exist across most disciplines. Issues important to consider for the design of the GoTriple platform were listed in section 2.2.3, and include the issue of problematic search terms, silo effects (for research articles), lack of Access (and lack of clear labelling for access), along with themes such as Active/Passive and Serendipitous Discovery and the different ways that this happens. How researchers modify their workflow when collaborating was also of interest, and how research material (e.g., a research paper) may be stored and annotated in different ways when working individually or in an internal or external team environment.

We have also seen that researchers do things without explicitly saying that they are doing it, e.g., there is a component of tacit knowledge involved in discovery. The journey mapping activities (both the Cognitive Walkthrough and Media Ecology Mapping) were useful in identifying the current Pain Points those researchers encounter during their work, and also enabled us to think about activities that happen in between the active searching phases of their work, such as starting work and finding an inbox full of different recommendations from various platforms have arrived while you were asleep.

In five of the other activities, we have conducted hands-on co-design workshops for investigating the key GoTriple innovative services (the recommender system, the annotation tool, the visualisation tools and the crowdfunding solutions). Several important aspects have emerged, for example a preference for the knowledge maps and the streamgraphs as visualisation tools. The need for researchers to have a good level of control over the recommendations they receive was also noted. On crowdfunding, it was revealed that the interface should be able to convey transparency about the potential research project, and also the funding and how it will be managed. Additionally, a Europe-wide questionnaire was conducted which revealed several important insights from the funder's perspective, such as for example a preference for low risk projects and the need to receive regular updates about the progress of the research and the findings.

In conclusion, this work has offered relevant lessons and promoted key take-aways points from each research activity. These lessons and points have been passed on to the interface design team and to the developers of the innovative services in a timely manner, during several ad hoc meetings, in order to tailor these services better around user needs and expectations. For example, at the end of July 2021 a meeting took place between the leaders of T3.2 and the partner in charge of the design of the GoTriple interface, in order to review all the findings and make sure that important aspects of this research did not go missing or be presented too late to be taken into account for important design decisions. Likewise, a meeting took place at the end of February 2021 between the task leader and the partner in charge of the recommender system development, to discuss the findings of the co-design, assess their feasibility and ensure that user needs are duly taken in account before the tool is integrated in the platform.

The next steps for this work will be related with Task 3.6 and the end-user evaluation where the WP will investigate how well the GoTriple design has captured user needs and implemented them in the platform.

DRAFT

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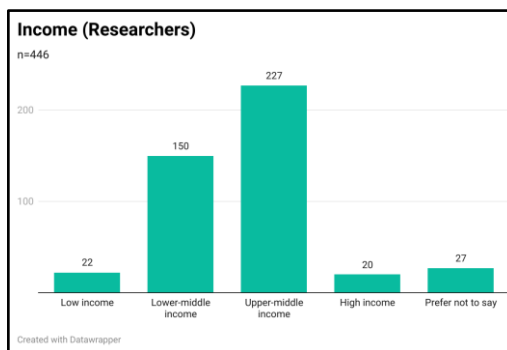
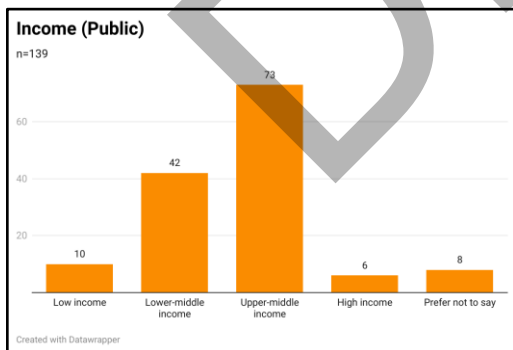
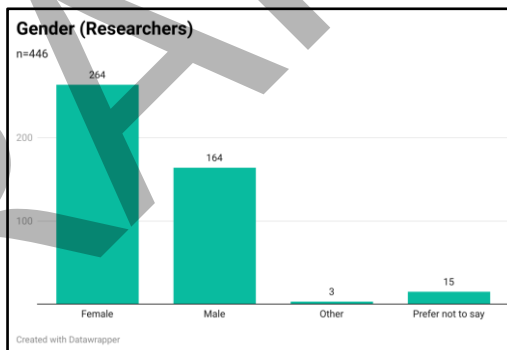
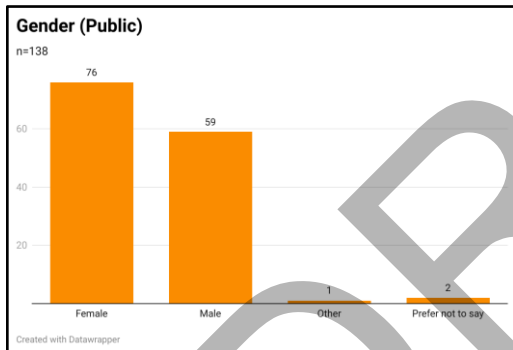
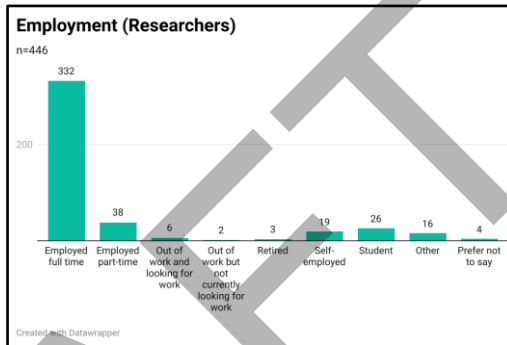
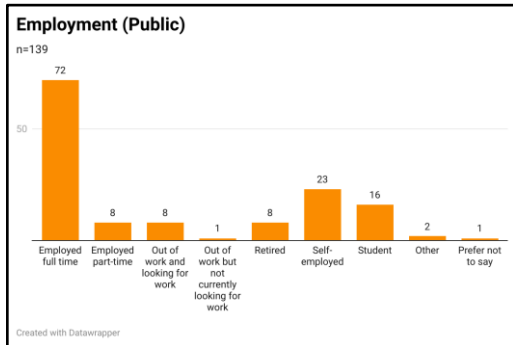
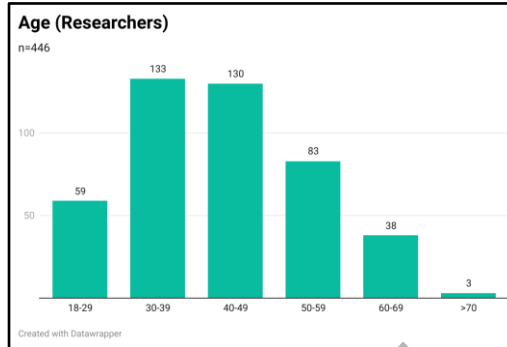
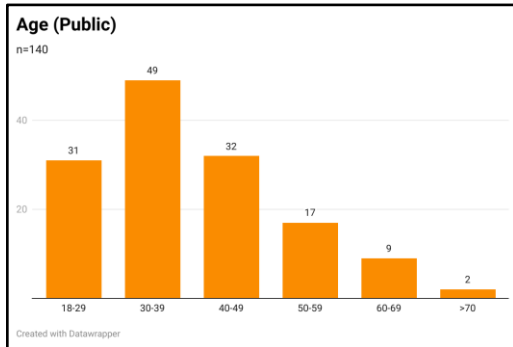
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APPENDIX 1 - DEMOGRAPHICS GRAPHS FOR PUBLIC AND RESEARCHERS - CROWDFUNDING QUESTIONNAIRE



APPENDIX 2 – CROWDFUNDING QUESTIONNAIRE

TRIPLE Crowdfunding Questionnaire



Welcome!!

The following questionnaire is part of the research conducted for the European project TRIPLE (<https://www.gotriple.eu/>). The questionnaire is aimed at the general public. In the following you will be asked mainly a number of questions about your attitudes about the funding of science and about crowdfunding, the practice of funding a project or venture by raising money from a large number of people who each contribute a relatively small amount, typically via the internet. Known crowdfunding platforms include kickstarter, Indiegogo or gofundme. This research will help the project in taking some decisions for the creation of a crowdfunding platform for supporting research in Social Sciences and Humanities.

The questionnaire contains 15 questions and it should take approximately 10 minutes to complete. TRIPLE was launched on 7 October 2019. At the heart of the project is the development of the GOTRIPLE platform, an innovative multilingual and multicultural discovery solution for Social Sciences and Humanities. Thank you for your cooperation and for your time. Please visit our contact page if you would like to get in touch with us or if you have questions about the questionnaire.

There are 17 questions in this survey.

Informed Consent

Please review the following informed consent before completing the questionnaire.

Project title: TRIPLE

Researcher name(s): Stefano De Paoli & Andreea Oniga (Abertay University (<https://www.abertay.ac.uk/>)) on behalf of the TRIPLE Consortium

What is the research about?

TRIPLE is an European project aimed at building a discovery platform for Social Sciences and Humanities research. More details about the project and the platform can be found in the project website (<https://www.gotriple.eu/>). The goal of the questionnaire is to obtain a public view toward the crowdfunding of science and Social Sciences and Humanities more specifically. The analysis of the data will inform the design of our platform and will allow us to design a novel crowdfunding solution.

Do I have to take part? & What will I be required to do?

It is up to you and you alone whether you wish to take part. If you do decide to take part you will be free to withdraw at any time without providing a reason and without penalty. You are asked to complete a simple anonymous questionnaire, with questions focusing on your opinion toward the funding of research and crowdfunding. This means that nobody including the researchers could reasonably identify you within the data. Your data will be stored in the Abertay University secure research drive. Your responses are treated in the strictest confidence - it will be impossible to identify individuals within a dataset when any of the research is disseminated (e.g. in publications/presentations). Abertay University acts as Data Controller (DataProtectionOfficer@abertay.ac.uk).

Retention of research data

Researchers are obliged to retain research data for up to 10 years' post-publication, however your anonymised research data may be retained indefinitely (e.g., so that researchers engage in open practice and other researchers can access their data to confirm the conclusions of published work). Consistent with our data retention policy, researchers retain consent forms for as long as we continue to hold information about a data subject and for 10 years for published research. We attach high priority to the ethical conduct of research.

Please consider the following before indicating your consent on this form.

Indicating your consent confirms that you are willing to participate in the research, however, indicating consent does not commit you to anything you do not wish to do and you are free to withdraw your participation at any time. You are indicating consent under the following assumptions:

- I understand the contents of the participant information sheet and consent form.
- I understand that my participation is entirely voluntary and that I can withdraw from the research at any time without penalty and without having to provide an explanation.
- I understand who has access to my data and how it will be handled at all stages of the research project.
- I understand that anonymised and aggregated data could be used for scientific publication

Do you consent to take part to this questionnaire? *

❗ Choose one of the following answers

Please choose **only one** of the following:

- Yes, I consent
- No, I do not consent (questionnaire will terminate)

Age

Please tell us your age range? *

❗ Choose one of the following answers

Please choose **only one** of the following:

- <18
- 18-29
- 30-39
- 40-49
- 50-59
- 60-69
- >70

Demographics (1)

What is your gender?

❗ Choose one of the following answers

Please choose **only one** of the following:

- Female
- Male
- Other
- Prefer not to say

Do you currently work or have you previously worked in research or academia?

❗ Choose one of the following answers

Please choose **only one** of the following:

- Yes
- No

Demographics (2)

Please tell us your current employment status

❗ Choose one of the following answers

Please choose **only one** of the following:

- Employed full time
- Employed part-time
- Self-employed
- Out of work and looking for work
- Out of work but not currently looking for work
- Student
- Retired
- Prefer not to say
- Other

Please tell us your level of education (the last achieved)

❗ Choose one of the following answers

Please choose **only one** of the following:

- Less than High School
- High School
- University Degree (Bachelor)
- University Degree (Master)
- PhD
- Prefer not to say
- Other

How would you describe your household overall income?

🗳️ Choose one of the following answers

Please choose **only one** of the following:

- Low income
- Lower-middle income
- Upper-middle income
- High income
- Prefer not to say

General Section - attitudes toward research & funding

DRAFT

Please tell us if you agree or disagree with the following statements

Please choose the appropriate response for each item:

	Strongly Agree	Agree	Undecided	Disagree	Strongly Disagree
I am generally interested in science, research and scientific discoveries	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I have a great deal of trust toward the scientific community	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Public opinion should be taken in account when taking decisions about science	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Social Sciences and Humanities research is as important as natural, medical or technical sciences	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Scientific research is generally underfunded	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I would like the opportunity to give my opinion on how public research funding is used	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I would be happy to make small donations to help fund science	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
There should be much more funding available for Social Sciences and Humanities research	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Crowdfunding use

This questionnaire is about the attitude of the public toward the crowdfunding of science.

Definition:

Crowdfunding is the practice of funding a project or venture by raising money, for example in the forms of small donations, from a large number of people who each contribute a relatively small amount, typically via the internet. Known crowdfunding platforms are kickstarter, Indiegogo or gofundme.

Have you ever heard of crowdfunding - people getting together to invest/donate small sums in companies or projects, using Internet platforms? *

❗ Choose one of the following answers

Please choose **only one** of the following:

Yes

No

Crowdfunding contribution

Have you ever contributed or participated to a crowdfunding campaign? *

Only answer this question if the following conditions are met:

Answer was 'Yes' at question '9 [Crowdfilter]' (Have you ever heard of crowdfunding - people getting together to invest/donate small sums in companies or projects, using Internet platforms?)

❗ Choose one of the following answers

Please choose **only one** of the following:

Yes

No

Amount pledged

What is the highest amount you pledged to a crowdfunding campaign?

Only answer this question if the following conditions are met:

Answer was 'Yes' at question '10 [Crowdfilter2]' (Have you ever contributed or participated to a crowdfunding campaign?)

🗳️ Choose one of the following answers

Please choose **only one** of the following:

- Between 1 -10 Euros
- Between 11 and 50 Euros
- Between 51 and 100 Euros
- Between 101 and 200 Euros
- More than 200 Euros

DRAFT

Which of the following crowdfunding platforms have you previously used?

Only answer this question if the following conditions are met:

Answer was 'Yes' at question '10 [Crowdfilter2]' (Have you ever contributed or participated to a crowdfunding campaign?)

🗖️ Check all that apply

Please choose **all** that apply:

- Kickstarter
- Indiegogo
- Patreon
- GoFundMe
- Facebook Fundraisers
- ArtistShare
- MightyCause
- InKind
- Crowdfunder
- Give
- Charitable
- AngelList
- Ulule
- None of the above

Other:

Crowdfunding Motivations

What normally drives you to make a crowdfunding donation/investment

Only answer this question if the following conditions are met:

Answer was 'Yes' at question '9 [Crowdfilter]' (Have you ever heard of crowdfunding - people getting together to invest/donate small sums in companies or projects, using Internet platforms?) *and* Answer was 'Yes' at question '10 [Crowdfilter2]' (Have you ever contributed or participated to a crowdfunding campaign?)

Please choose the appropriate response for each item:

	Strongly Agree	Agree	Undecided	Disagree	Strongly Disagree
General interest in the idea/project	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Trust in the crowdfunding platform	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Social impact of the project	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Personal knowledge of the idea proposer(s)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Sharing the same values of the proposed project	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Competencies and track record of the proposer(s)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Good expectations on the return for myself or society	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Information is clear on how the funding will be used	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Somebody told me about the project (word-of-mouth)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Attitudes toward the crowdfunding of science

Our goal is to understand what aspects we should take in account in the design of a new crowdfunding platform for research projects in Social Sciences and Humanities.

Please tell us if you agree or disagree with the following statements

Please choose the appropriate response for each item:

	Strongly Agree	Agree	Undecided	Disagree	Strongly Disagree
Crowdfunding will allow the public to decide what research projects should be conducted	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Crowdfunding is the solution for the underfunding of science and research	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The publication of a research project on a crowdfunding platform guarantees the seriousness of the project	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The publication of a research project on a crowdfunding platform guarantees the seriousness of the proposers	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Projects of interest (1)

If you had the opportunity to make a donation to a research project (whether via crowdfunding or via other channels).

What kind of research projects are you more likely to support

Please choose the appropriate response for each item:

	Very Likely	Likely	Unsure	Unlikely	Very Unlikely
Projects on research related to my geographical area	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Projects on research of interest to me, even if I do not know the researcher	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Projects proposed by a researcher that I know, regardless of my interest in the project ideas	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Projects from a researcher working in a University in my geographical area, regardless of my interest in the project ideas	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Projects that are ambitious but have a high risk of failure (like not accomplishing some the goals)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Projects that are modest, but the risk of failure is minimal	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Project that work with partners from the civil society (e.g. charities, public administration)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

	Very Likely	Likely	Unsure	Unlikely	Very Unlikely
Projects that work with business partners	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Projects that have the potential to make a societal impact	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Projects of interest (2)

[Continuation]

If you had the opportunity to make a donation to a research project (whether via crowdfunding or via other channels).

DRAFT

What kind of research projects are you more likely to support

Please choose the appropriate response for each item:

	Very Likely	Likely	Unsure	Unlikely	Very Unlikely
Projects where the proposer has already published something related to the project area	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Projects that are proposed by a team rather than by an individual researcher	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Projects that overall have a low funding target rather than projects that seek high funding target	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Projects that are endorsed by other professional scientists or other individuals	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Projects where there is enough evidence that the researchers will fulfill their obligations	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Projects from a researcher at the beginning of their career, rather than an established scholar	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Projects where there is an opportunity to ask questions to the researchers	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

	Very Likely	Likely	Unsure	Unlikely	Very Unlikely
Projects that are pitched in an engaging way, for example with videos	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

After Funding

DRAFT

Please tell us if you agree or disagree with the following statements of what should happen after you made a donation and the project you funded has started or completed

Please choose the appropriate response for each item:

	Strongly Agree	Agree	Undecided	Disagree	Strongly Disagree
I would like to receive information on the progress of the project I donated to	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I would like to be informed when a project is completed and what was achieved	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I would like to have an opportunity to discuss the results with the researchers	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Researchers should acknowledge in their publications that the the research was crowdfunded	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I would be interested to be involved in the research I crowdfunded if there was an opportunity (for example as a citizen scientist)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

	Strongly Agree	Agree	Undecided	Disagree	Strongly Disagree
Data produced by the project I crowdfunded should be made publicly available, if possible	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Ethical implications of the research I crowdfunded should be clear	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Thank you for participating in the TRIPLE crowdfunding questionnaire. Please visit our contact page (<https://www.gotriple.eu/> (<https://www.gotriple.eu/>)) if you would like to get in touch with us or if you have questions about the TRIPLE project.

The results of this research will be published in approximately October 2021 and they will appear in a report available in Zenodo (<https://zenodo.org/communities/operaseu/?page=1&size=20> (<https://zenodo.org/communities/operaseu/?page=1&size=20>)). Please visit this page at around this time to read the report or get in touch with us, via our website.

For specific queries about the research methodology please contact Dr Stefano De Paoli (s.depaoli@abertay.ac.uk)

Submit your survey.

Thank you for completing this survey.