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DoCS4Design

Doctoral Courses System for Design

# Developing the WunderLibrary Prototype (O3/4)

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Erasmus+ project DoCS4Design (Doctoral Courses System for Design)

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## Topic & Need

The term Open Educational Resource (OER) was precisely coined in 2002 at the forum on Open Courseware in Higher Education organized by the United Nations Educational, Scientific and Cultural Organization (UNESCO), which since then has become one of the most influential promoters of OERs diffusion. UNESCO (n.d.) defines OERs as "learning, teaching and research materials in any format and medium that reside in the public domain or are under copyright that have been released under an open license, that permit no-cost access, re-use, re-purpose, adaptation and redistribution by others [...]". Alongside UNESCO, more and more institutions are pushing the transition to OERs and the EU states (2023) that any output produced with the

Erasmus+ support must (at least) grant to the public: (i) the capability to use the output; (ii) the capability to adapt the output as needed (e.g. translate, shorten, modify local text, etc.); (iii) the capability to reproduce and share the original and adapted output to others (e.g., with students in the classroom, with peers, online, etc.). Moreover, the creator has to indicate whenever the output or a derivative is used or shared, that the work cannot be used commercially (e.g., sold by others, integrated into a commercial textbook, etc.), and that any derivatives have to be shared under the same license or licensing terms.

OERs are a concrete expression of several concepts pursued by UNESCO and EU, such as universal access to information through education, peace, sustainable social and economic development, intercultural dialogue, quality of learning, knowledge sharing, and equity.
However, as a network of PhD programmes in Design, there are four additional crucial reasons to promote the OERs transition:

- Connections. Our six schools have built a network because of the necessity to talk and exchange ideas with others. Working in isolation is limiting and, to a certain degree, also dangerous because you keep your biased vision without questioning if there are new, different, better educational models. Indeed, PhD programmes in the Design field can be surprisingly divergent, leading to very unique ways to teach, practice and intend the research profession. In this scenario, OERs are the optimal vehicle to convey part of this exchange thanks to their capacity to be easily retained, reused, revised, remixed, and redistributed (Miao et al., 2019).

- Quality. The inclusive and dynamic nature of OERs is a key factor in the development of a new educational environment in which the traditional dichotomy of teacher/student is exceeded, and more actors are active participants, pushing the boundaries of cooperation, debate and knowledge (Butcher, 2015). A wider and more aware audience can work together to reach further goals, and to employ efforts in a more efficient way, for example converging forces into a single OER instead of many, expensive and isolated duplicates.

- Accessibility. OERs are a practical means to increase the accessibility to educational material, essential for those who cannot afford any because of financial, technological or other personal reasons. In relation to PhD programmes, this could mean sharing knowledge outside our schools' borders, enabling more people to benefit from it.

- Participation. The principle of allowing adaptation of materials provides the possibility for people, such as students and educators, to become active participants. Viewing the academic environment as a repository of knowledge and talent, the involvement of multiple actors ensures that these valuable resources are not wasted.

Based on the centrality of OERs in our project, we decided to build a platform to share them, within, possibly also outside, our programmes.

## Goal

When reflecting upon students' path PhD programmes in Design, we understood that they can alternate moments of formal research with moments in which they seek inspiration. Throughout the PhD journey, whether these shifts occur frequently or infrequently, they can represent pivotal moments capable of significantly altering the course of the entire research. For this reason, our goal was to build something that could provide students with both information and inspiration. This concept can be found if we look back some years ago in the so-called 'Wunderkammer', or cabinet of art and marvels (Wolfram, 2002). The Wunderkammer was a Renaissance collection featuring diverse objects such as natural specimens, human-made artifacts, and scientific instruments. These cabinets aimed to mirror contemporary knowledge and were characterized by a universal and encyclopedic display of items from various origins. The Renaissance period, marked by exploration and intellectual curiosity, saw the emergence of these cabinets, which showcased extraordinary and mysterious items, including monstrous remains and artistic achievements. With this in mind, we decided to combine, as equal ingredients, the efficiency of the digital repository in collecting educational resources and the surprise of the 'Wunderkammer' in navigating them.

Thus, we named our digital repository the 'WunderLibrary'. The platform is shared among the PhD programmes and aimed at enhancing our potential as a network of knowledge. In other words, the WunderLibrary prototype is not just a final product of the DoCS4Design project, but a foundation from which to strengthen our network in the upcoming years.

## Method (how we worked)

In line with WunderLibrary's dual purpose of serving as an OER repository and a source of creative inspiration, the primary concept guiding its development is illustrated in figure 1.

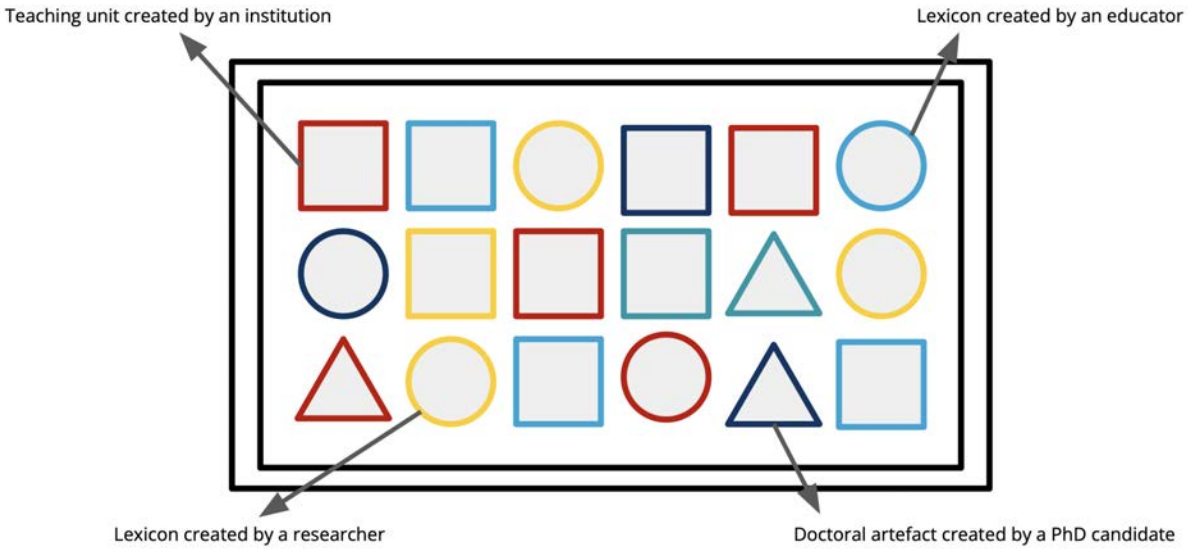


*Fig.1 - WunderLibrary platform design concept.*

The platform is designed to function as a repository of OERs encompassing a wide variety of content types (i.e., teaching units, glossaries, doctoral artifacts, etc.) from different authors (i.e., institutions, researchers, PhD students, and educators). The result is a digital and online equivalent of a "Wunderkammer", providing users with the freedom to explore and discover materials that can enhance their PhD research endeavours.

Furthermore, we envisioned the WunderLibrary as a platform that empowers users to curate their own collections, similar to creating playlists, by connecting various OERs (fig.2). This approach would enable users to go beyond simply downloading materials from the WunderLibrary; instead, it would become a valuable tool for seamlessly integrating these resources into their academic pursuits.

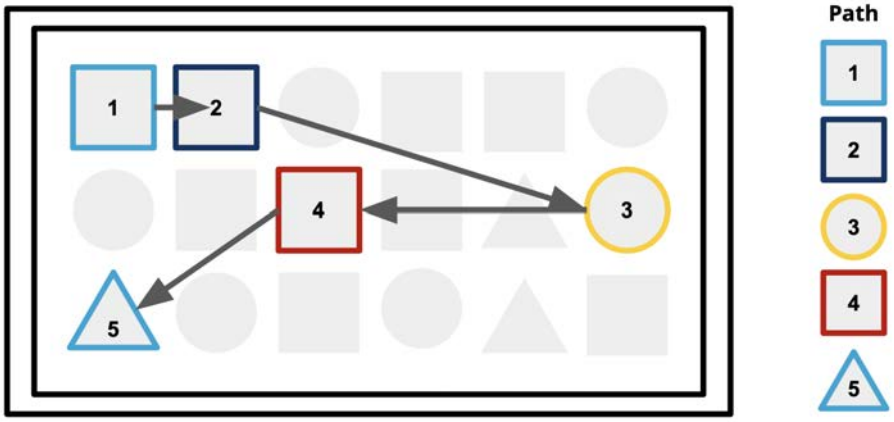


*Fig.2 - Users can customize their own path through the items of the WunderLibrary.*

To gather external feedback on the core concept of the WunderLibrary, we conducted four focus groups. The initial two sessions took place in October 2021 and involved advisors, while the subsequent two occurred in January 2022 and included PhD students. The discussions helped us refine our scope, the platform's functioning, and gain a deeper understanding of the most significant opportunities and challenges, with intellectual property matters being the foremost among them.

Most PhD candidates interacting with the prototype in the mentioned trials appreciated the potential as a support for finding materials and possibly network buddies across the network.

Originally the idea for the WunderLibrary started as a repository: a place where previous work can be found. Along the process we recognized that its potential can be larger as a social networking tool: in accommodating the learners to find each other and each other's work during their PhDs, not just after; this is in tune with the developments at many (university) libraries today: to restore the function of the library as a space to meet, not just a place to store work.

To build the platform's ontology (fig.3), it is helpful to create an initial network of connections among the OERs content tags, we conducted a comprehensive analysis of keywords and metadata from a dataset of 342 PhD theses from the network spanning the past decade (the full analysis is described in the report 'Keywords analysis', and article; see below). These theses were typically

accompanied by three to six freely chosen keywords, provided by the respective authors. collecting, analyzing, and organizing keywords served the purpose of constructing a dataset conducive to the efficient organization and retrieval of OERs pertinent to the field of PhD in design within the platform.

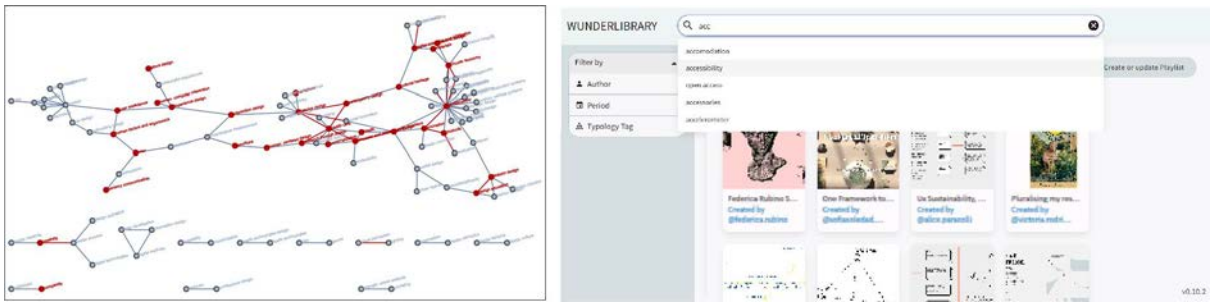


*Fig.3 - On the left, the graph shows 112 combinations of 101 curated keywords listed by at least two theses (grey) or more (red); keywords in red are part of at least 25 combinations. The whole graph contains 2916 combinations and 748 keywords). On the right is the Wunderlibrary prototype, where, using the search bar, users can display level-3 keywords as content tags.*

Following the definition of the WunderLibrary's concept, ontology, and feedback, we initiated its prototyping. The development process was divided into two distinct phases. The first phase concentrated on implementing the sign-in system and OER upload functionalities, whereas the second phase prioritized the research function (fig. 4).

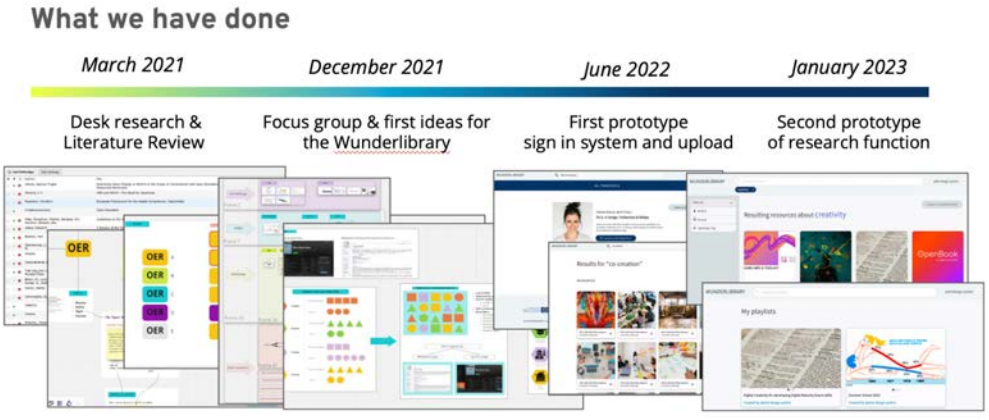


*Fig.4 - The WunderLibrary cornerstones from March 2021 to January 2023.*

Multiple trials were conducted to evaluate the WunderLibrary prototype. Specifically, during the first phase, a trial took place at the Politecnico di Milano 'Summer School' in June 2022, focusing on testing the authoring, uploading, and downloading features of the platform. Subsequently, to assess the search functionality, less intensive yet regular internal trials involving PhD students from Politecnico di Milano were carried out from November 2022 to October 2023. A final trial was conducted at IIT in October 2023.

## Results

The up-to-date version, shown in fig.5, while still a prototype is already showing great potential. Users can register to the platform, find other users, upload and search OERs, download them, and combine them into unique playlists. The primary outcome of the WunderLibrary is that it provides students and PhD participants with an informal and user-friendly platform for sharing their knowledge and receiving insights from others. Furthermore, in the often isolated environment of PhD research, having a digital but tangible meeting place represents a valuable asset.

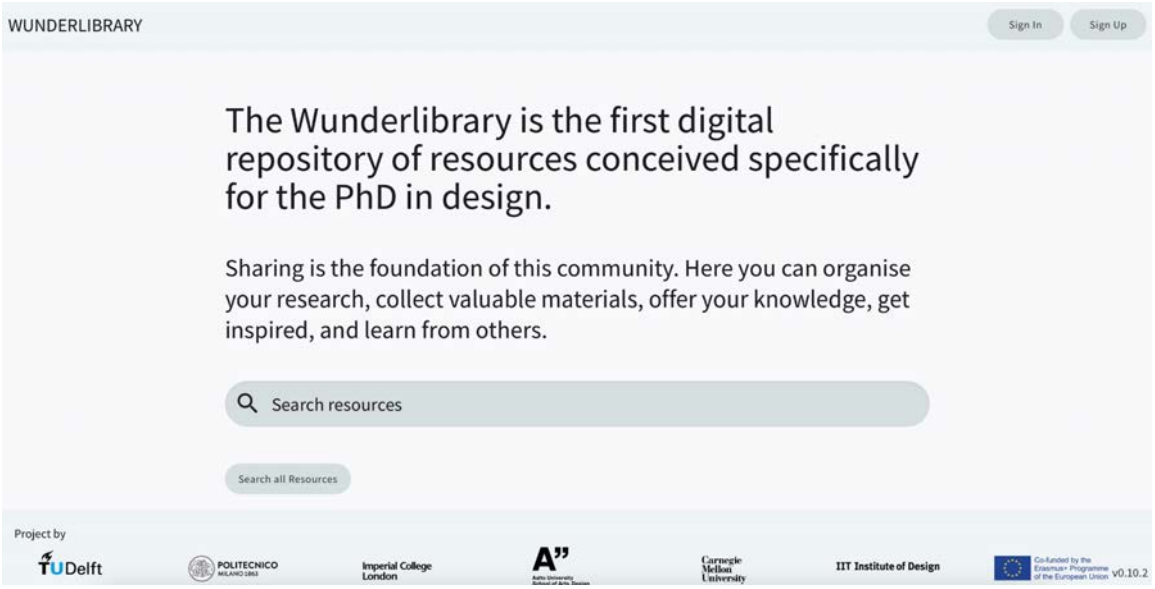


*Fig.5 - The WunderLibrary homepage.*

## Outcomes

The development of the WunderLibrary is poised to have a multitude of long-term impacts.

- Strengthen the Network: The WunderLibrary's development can enhance the cohesion within the network of participating universities. By collaborating on this platform, these institutions can build stronger relationships, leading to future joint projects, shared resources, and an improved academic experience for students, researchers, and faculty.

- Going Beyond the Network: By transcending the boundaries of the collaborating institutions, the WunderLibrary has the potential to connect with other universities and institutions globally. This extended reach will foster greater collaboration and cross-pollination of ideas, benefiting not only the existing network but also enriching the global academic community.

- Making the PhD in Design Visible: The WunderLibrary serves as a platform to showcase the innovative work conducted within design PhD programs, thereby increasing the visibility of this specialized field. This heightened visibility can attract more talent to these programs, encouraging prospective PhD students to explore design as an academic path.

- Leverage on the Design PhD Peculiar Characteristics: Design PhDs often involve diverse approaches, from creative projects to theoretical research. The repository can highlight these distinct characteristics, helping students, researchers, and educators appreciate the multifaceted nature of design research. This can lead to a more comprehensive understanding of design and its contributions to academia and society.

- Knowledge Preservation and Accessibility: By housing a wealth of design-related OERs, it ensures the preservation of valuable academic content for future generations. Its open nature facilitates accessibility, making knowledge available to a broader audience and promoting lifelong learning.

## Prototype

Link to the WunderLibrary's prototype: https://wunderlibrary.i3lab.group/

## Feedback/Evaluation

Wunderlibrary focus groups with PhD advisors (Jan 2022):

- *Abstracts of research and emerging topics, possibility to organise small talks, guidance, best experiences…*
- *Find people that can help you (other PhDs, experts). The external expert can become the external reviewer.*
- *Let the artifact travel in an open way.*
- *We envision a digital place where you can direct your students.*
- *From a temporal point of view, we can have both 'established' piace of knowledge and the 'hot topics' discussed in the specific moment.*

Wunderlibrary focus groups with PhD candidates (Jan 2022):

- *It is difficult for a PhD to share contents that are not finalized. Somehow the platform can give us support on this.*
- *Not just a "celebration" of structured research results. Less formal and more free.*
- *Find opportunities to collaborate or co-author articles / run conference sessions, etc.*
- *We can see this platform as an "accelerator" for first-stage candidates.*
- *What are other PhD students working on, understanding the landscape?*
- *'In the making' vs. 'the making of' (past, finished product, easier to share, could even be the end of a certain phase of the project).*

## References

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## Credits

The WunderLibrary conception and development was organised by Politecnico di Milano.

The WunderLibrary's ontology (Keyword analysis) was conducted by Politecnico di Milano and TU Delft.

The report was edited by: Fabio Antonio Figoli, Beatrice Gobbo, Francesca Mattioli, and Lucia Rampino.

All partners contributed to the output:

| | |
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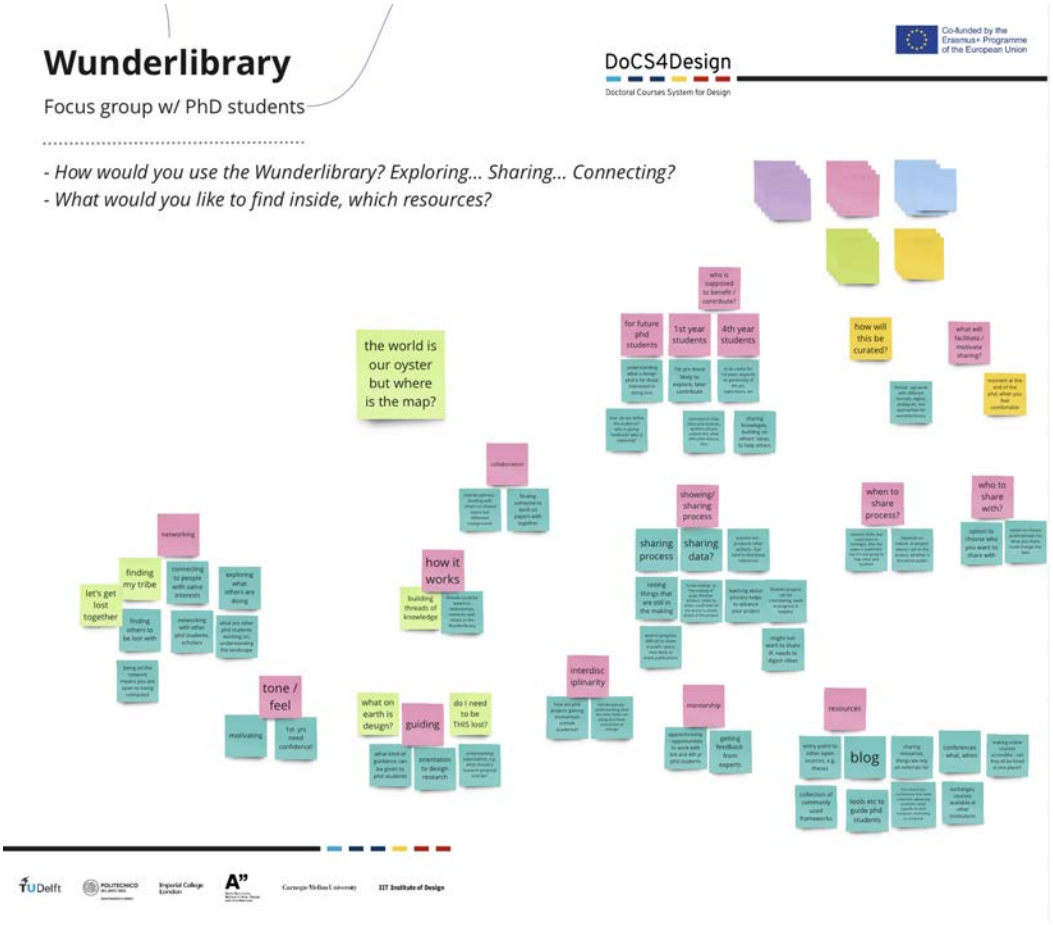
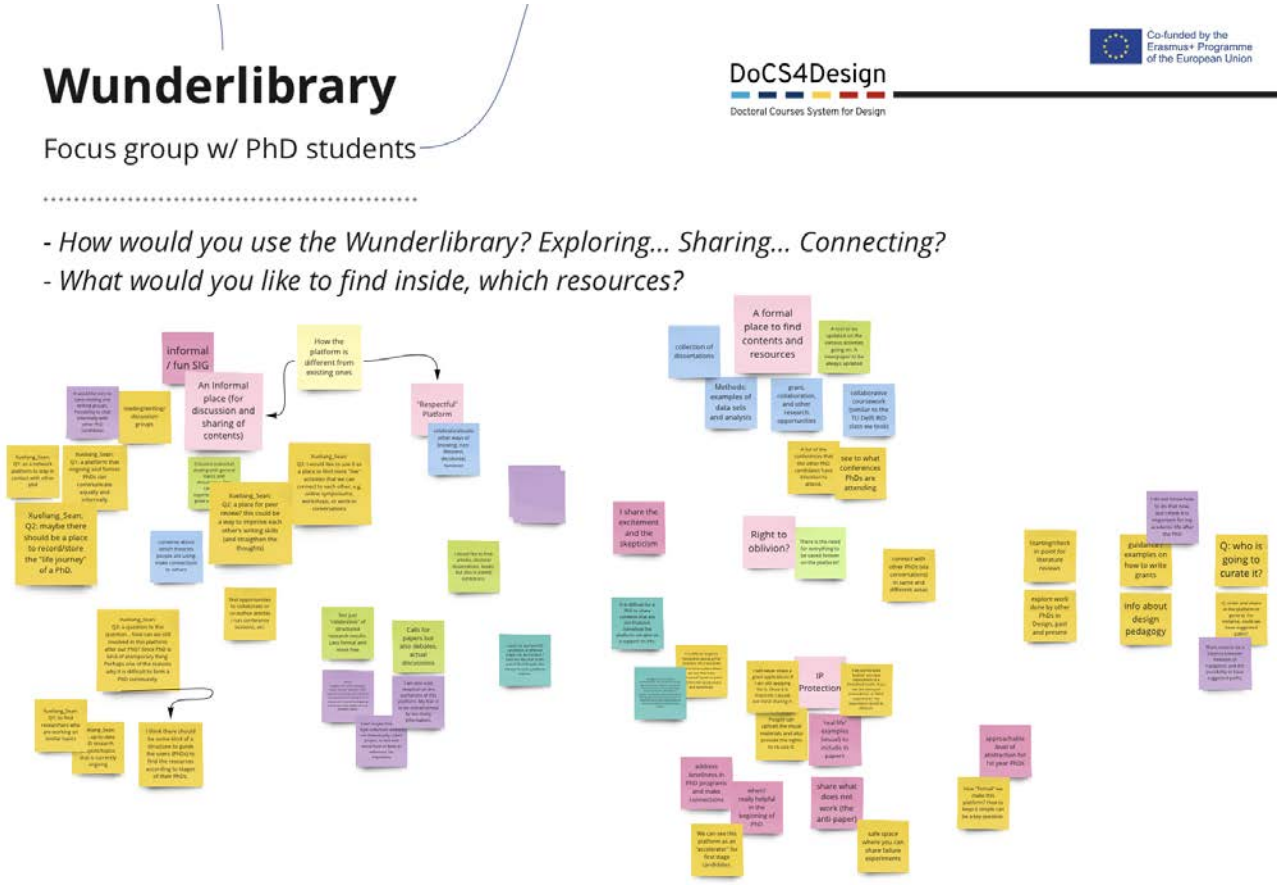
| Aalto University | Elise Hodson, Guy Julier, Michel Nader, Sampsa Hyysalo |
| Carnegie Mellon University | Jonathan Chapman |
| Illinois Institute of Technology | Carlos Teixeira |
| Imperial College London | Rafael Calvo, Weston Baxter |
| Politecnico di Milano | Annalinda De Rosa, Beatrice Gobbo, Fabio Figoli, Franca Garzotto, Francesca Mattioli, Giulio Antonio Abbo, Lisa Corsaro, Lucia Rampino, Lukasz Moskwa, Paola Bertola |
| TU Delft | Annemiek van Boeijen, Erika Hajdu, Pieter Jan Stappers, Wilhelm F. van der Vegte |

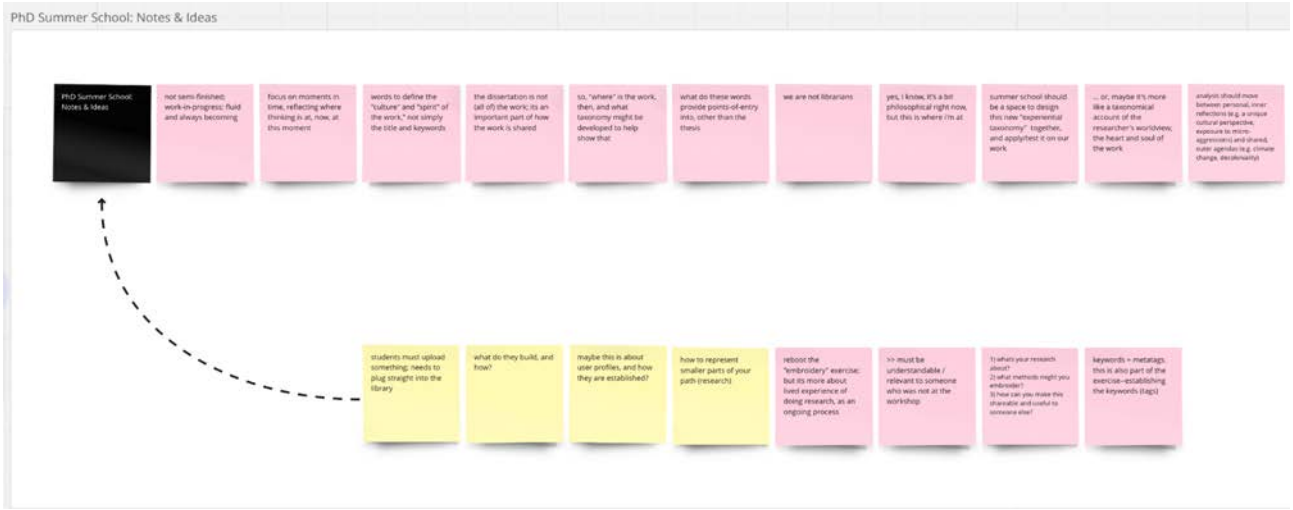
# Appendix - examples of workshop feedback collections



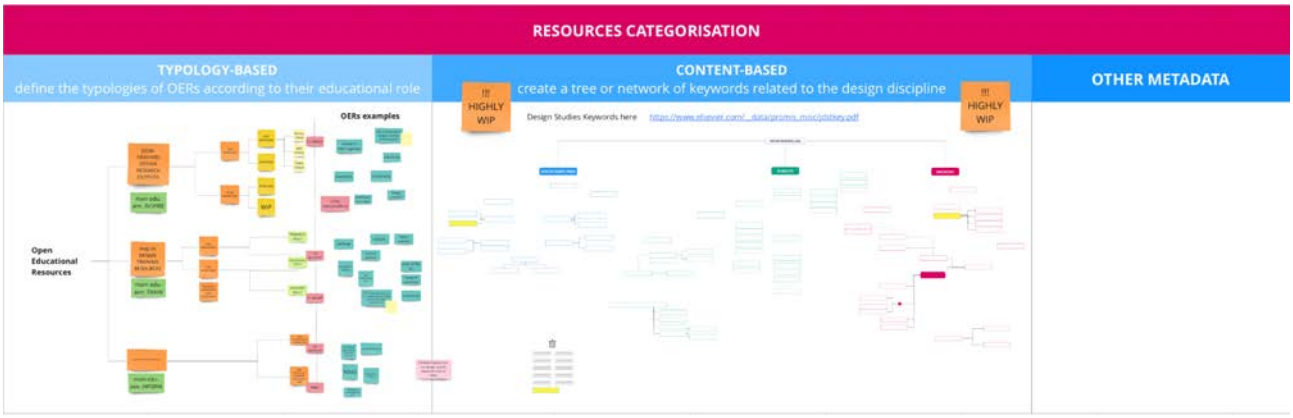

*PhD students' thoughts take shape on a Miro board during a focus group session. #1*



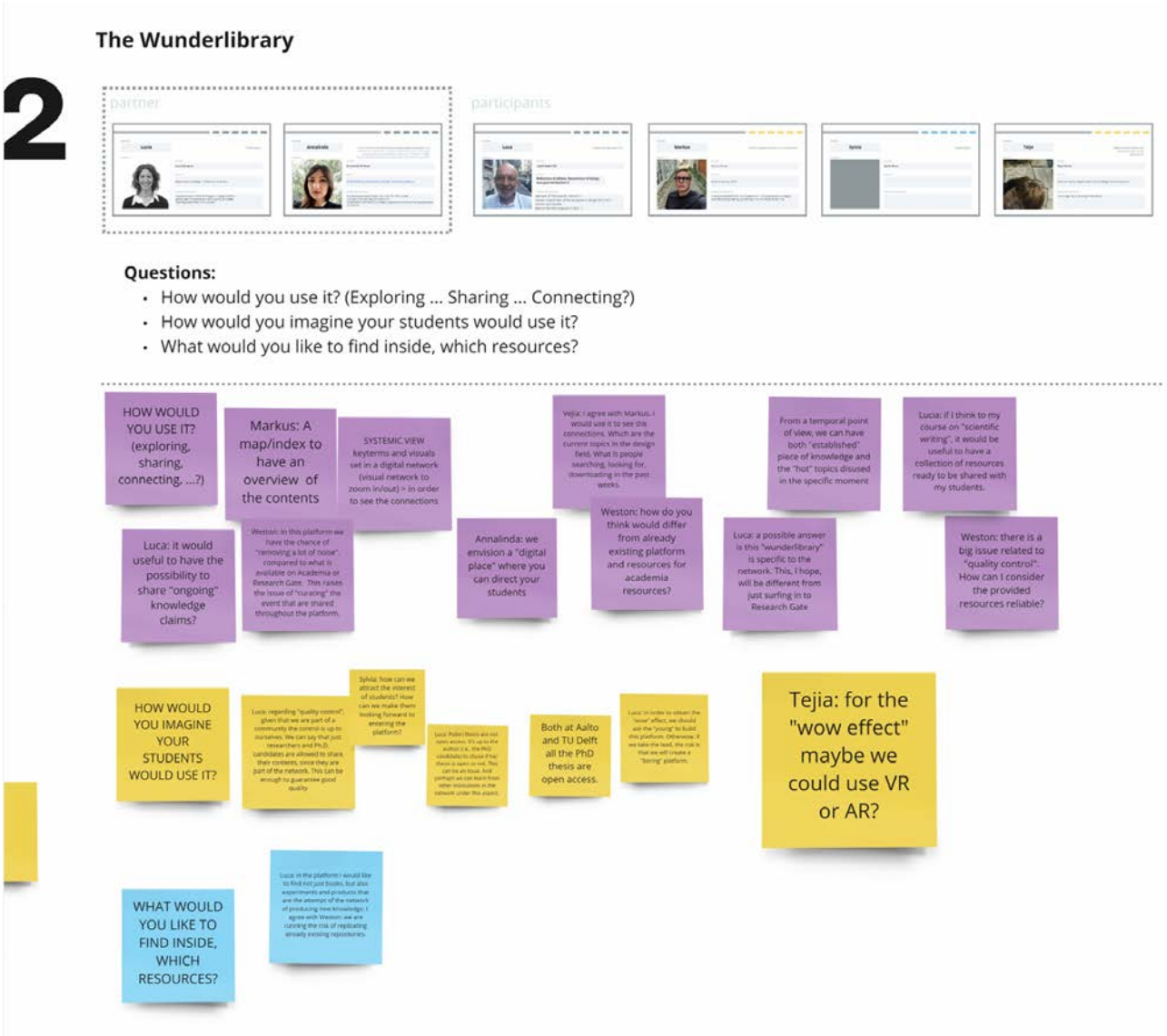

*PhD students' thoughts take shape on a Miro board during a focus group session. #2*



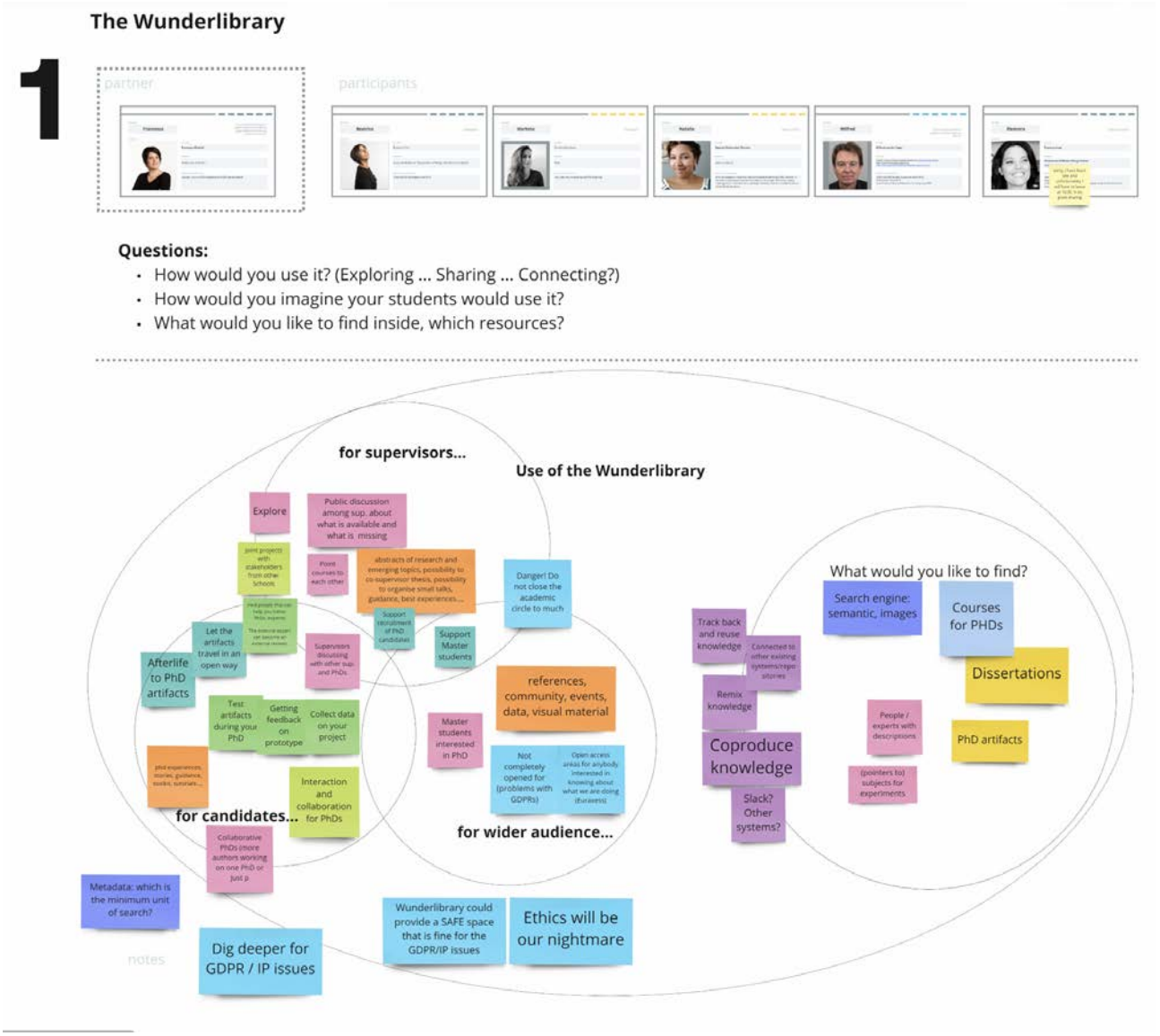

*Notes and ideas from the Summer School.*



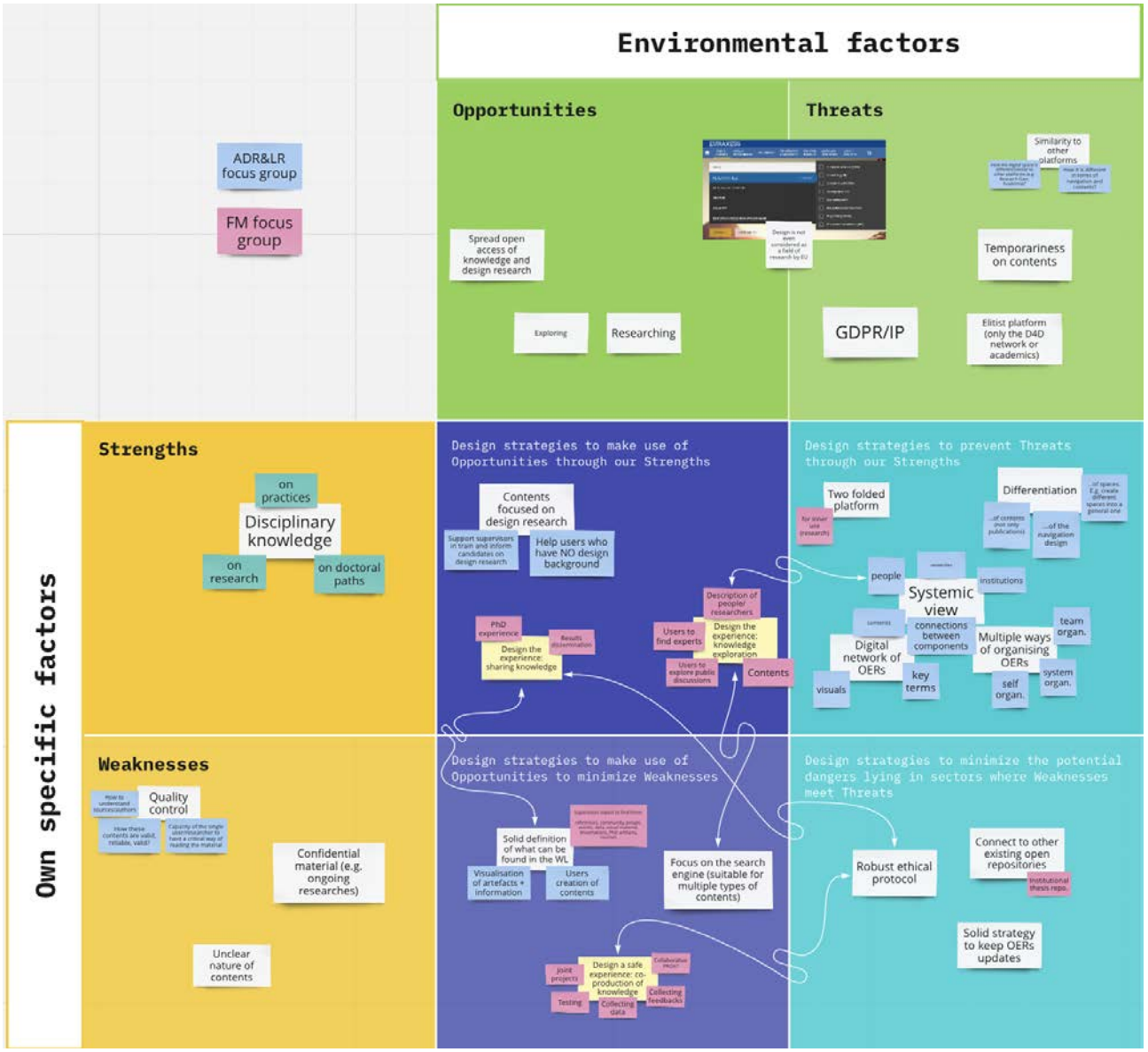

*Part of the study on resources categorisation.*



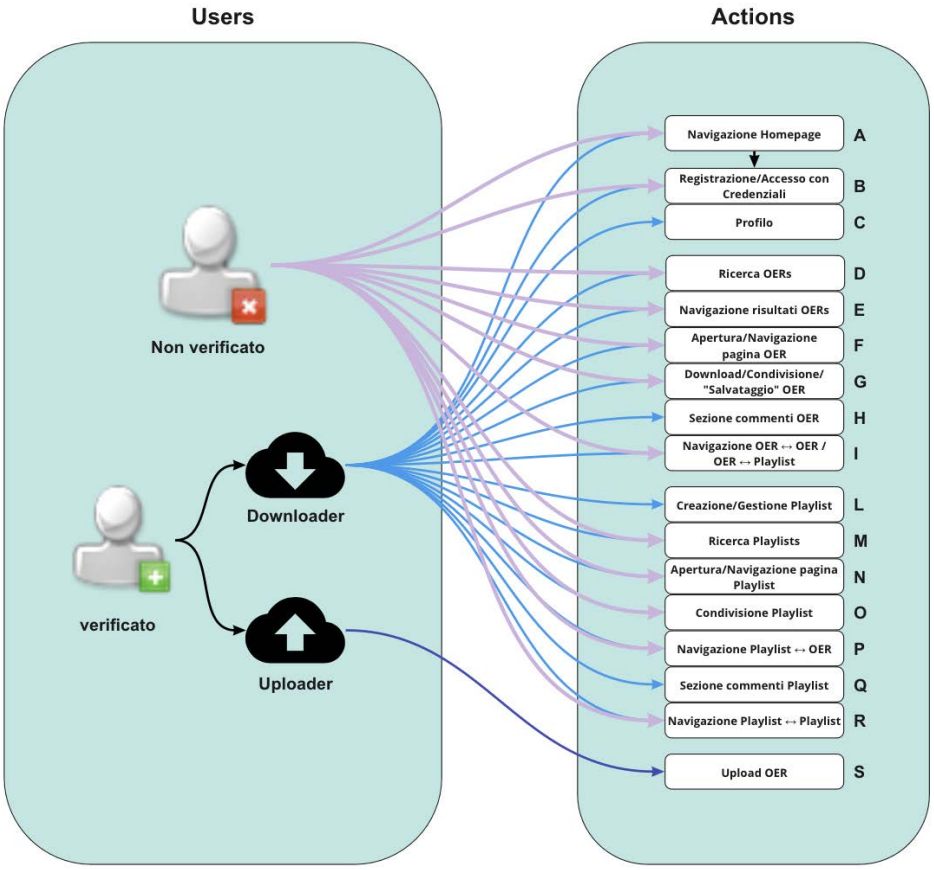

*PhD advisors focus group results #1*




*PhD advisors focus group results #2*




*PhD advisors focus group results #3*




*Part of the study on users' accessibility and actions.*