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Development of a Pan-European Citizen Lab within a European University Alliance Using Action Design Research

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ABSTRACT

The paper describes the development process of a Pan-European Citizen Lab initiative driven by the European University of Technology (EUt+) alliance. EUt+ is a consortium of nine institutions that was selected as one of the European University Alliances by the European Commission. The partners are all technological universities from across Europe. Our vision is that the co-design of the Citizen Lab based on an analysis of societal needs will foster user-driven innovation. The expected impact will be an increased participation of citizens, an increased awareness of research, and social issues addressed at the community level. To achieve our vision, we have chosen Action Design Research (ADR) as one of the main tools for the creation of the Citizen Lab. ADR is a design research methodology that considers both technological and organizational contexts, shaping artefacts (innovations) through design and use, including users and researchers in the process. Originally focused on the IT knowledge domain, ADR was not originally

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designed to co-create innovations for diverse users in ecosystems, the EUt+ consortium views ADR as a highly promising hypothesis that needs further adaptation and verification for this new purpose.

1 INTRODUCTION

1.1 European University of Technology and Needs Analysis

EUt+ is an alliance of nine institutions that was selected as one of the European University Alliances funded through the 2020 Erasmus+ call. Its members are all technological universities from across Europe, diverse in culture and historical trajectories, that share the commitment to form new generations of European citizens and empower them with the mindset and appropriate skills to serve society. For this, EUt+ aims to develop a new model of a university: one that requires a fundamentally novel approach to technology, deeply integrating humanities and social sciences in the way education and research are performed. The objective is to ensure that the people EUt+ trains, the research EUt+ undertakes and the innovations EUt+ fosters are geared towards real societal impact by addressing global challenges. The transversal approach to EUt+ is one of co-construction. The hypothesis underlying it is that “adequate design” of the university of the future can only be achieved through considering the real needs and concerns of the people involved: first by understanding the needs, then by the active participation of the people in the co-construction process. This transversal co-construction approach of EUt+ has laid the foundation of its Citizen Lab. The needs analysis upon establishment of EUt+ revealed that all the knowledge and know-how that the partner institutions possess, and pool together could be put to the service of the socio-economic fabric of Europe to keep proposing new products and services to our evolving societies in a citizen-led way. It is envisaged that the model for the Citizen Lab that will be created in EUt+ will be easy to replicate, multiply and connect with other European Universities in the making.

1.2 The Experience of other Living Labs

Observing the largest network of Living Labs in Europe (ENoLL) which consists of 155 active members from 37 countries, it is clear that a Living Lab is seen as a local community of practice that focuses on co-creation, rapid prototyping, testing and scaling up innovations and businesses (ENoLL Living Lab community Members Catalogue, 2023). In the EUt+ context, the Citizen Lab is seen as a community of knowledge where the joint formalization of learning is the most important outcome that can initiate, transform or lead to a practical application, but the primary outcome in its initial stages is joint knowledge creation with scientific merit. There are existing European Commission funded projects that foster creation and bring together Living Labs from EU and non—EU countries, a good example being project GRANULAR that is addressing topic of better understating rural areas by opening 7 new Living Labs and 9 Replication Labs (Project Granular, 2024). Community building is at the core of the EUt+ mission and we seek not to anchor Citizen Lab in one particular country of EUt+. In contrast to the clustering policy of Living Labs, EUt+ aims to develop a more integrated, joint European community space. A Typical model of a Living Lab includes similarities to the ADR methodology – joint problem searching and development of interventions or solutions to these problems. In that context ADR adds the dimension of formalization of learning in search of also theoretical and

scientific artefacts, that would allow a community of knowledge to be established in an international setting. By fostering a culture of cooperation and knowledge exchange, EUt+ aims to bridge the gap between technological innovation and societal needs. Central to this effort is the strategic partnership with a variety of organizations, educational entities, associations, etc. The wealth of expertise of EUt+ in participatory and collaborative approaches are integral to our ways of doing research. The University of Technology of Troyes' Living Lab (Living Lab ActivAgeing, 2020) exemplifies a participatory design lab which employs a multidisciplinary method to create solutions that empower vulnerable social groups, actively engaging them in the innovation process. Moreover, the European Culture and Technology Laboratory (ECT Lab+, n.d.) established within the EUt+ framework promotes transdisciplinary and multidisciplinary approaches, integrating humanities and social sciences into research. The Cyprus University of Technology has also embraced the Citizen Lab concept as a crucial methodology to narrow the gap between research activities and the public. This approach aims to not just draw citizens closer to current research but to actively integrate their viewpoints into the research processes. Adopting this approach enables universities to foster an inclusive research environment that values community input and reflects its needs and aspirations, thus boosting the relevance and impact of their efforts.

1.3 Vision of a Pan-European Citizen Lab

Citizen Labs resemble other collaborative laboratories dedicated to the production of open knowledge that have emerged in the early 21st century, such as the European Living Labs, and certain community workshops for digital production, the Fablabs and Makerspaces. The Living Lab is a new research area that introduces new ways of managing innovation processes viewed both as innovation milieu and an innovation approach (Bergvall-Kåreborn & Ståhlbröst, 2009). The main distinction between a Citizen Lab and a Living Lab is the former's connection to a social movement that sees the commons as a path to build societies geared towards overcoming the hegemonic economic model: capitalism at its neoliberal stage (Savazoni & de Andrade, 2019). A Citizen Lab is therefore about creating knowledge and about creating commons, respectively "for society" and "with society."

The design and methodology applied within the Citizen Lab should include a range of activities, guidelines, tools and principles that will support design-based and user-driven innovation. The international perspective of operating the Lab in more than one EU country presents technical challenges in connectivity that must be addressed. The suggested use of the ADR methodology discussed in this paper can mitigate this concern through its adaptability to an online context.

2 METHODOLOGY

2.1 Action Design Research

In order to answer the needs mapped out within the first chapter, EUt+ has chosen Action Design Research (ADR) as a promising framework to develop a Pan-European Citizen Lab model. ADR originates from the Information and Technology field and was first introduced by Sein et al. (2011) as a design-research method for generating prescriptive design knowledge through building and evaluating ensemble IT artefacts in an organizational setting. It has four stages and seven principles (see

Figure 1) that lead from problem formulation to building, intervention and evaluation while concurrently reflecting and learning and then finishing with the formalization of learning with generalized outcomes. The aims set for the EUt+ Citizen Lab correspond to the design science; as defined in Hevner et al. research there are seven guidelines for Design-Science Research: design as an artifact, problem relevance, design evaluation, research contributions, research rigor, design as a search process and communication of research (Hevner et al., 2004). This outlines the ties between technology, design science, organizational context and problem solving.

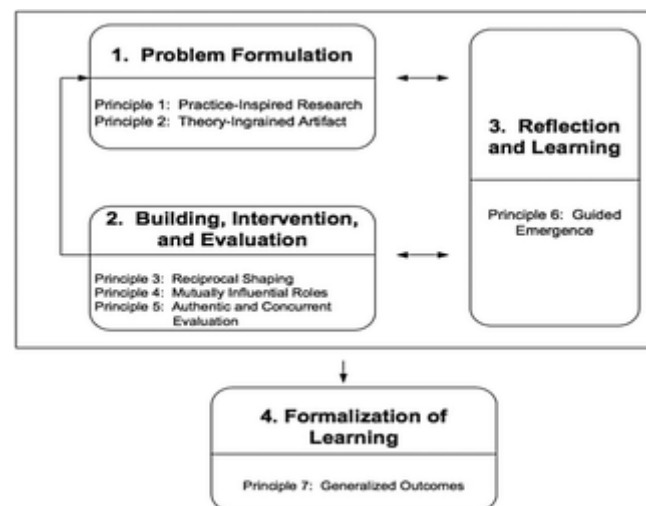


Fig 1. ADR stages and principles (Sein et al., 2011)

The ADR Method has been developed upon a technological premise and by the assumption that most problems today could have a solution or innovation that involves technology. This is a promising foundation for the application of ADR in a Citizen Lab. User-driven innovation has been set as a key drive for the Citizen Lab and should be considered an innovation environment, which can be characterized as a place where open innovation and technology are boosted (Baierle et al., 2021). As Bigliardi et. al. (2021) has pointed out in an extensive open innovation text mining research study, there are nine thematic clusters that correspond to open innovation research – context dependency, collaborative frameworks, organizational dimension, performance and success, external search and specific fields of open innovation. The majority of these correspond to the gap analysis of our Pan-European Citizen Lab; namely, that actions of citizen science should be context-dependent, form collaborative frameworks, consider the organizational dimension and there must be a technological element present. Thus, open innovation in a user-driven setting assisted by technology is the most appropriate approach in creating a Citizen Lab. However, it must be emphasized that the focus should not be on technology more than on people (Marek, 2021) as it could produce negative results. It is important to first and foremost consider the needs of the participants (citizens) as technology serves an auxiliary purpose to enhance the participatory nature of the Citizen Lab. Mark Bilandzic and John Venable in 2011 proposed a new research method called Participatory Action Design Research for studies in Urban Informatics that reflects upon issues across social, technology and design-oriented sciences applied in the urban context. Their research highlights the contrast between Information Systems and Urban Informatics, the latter being more social and open and, in a sense, universal. While ADR has become widely accepted as a prominent research method

within the field of IT, several scholars have reported a lack of guidance of method support at the micro level. Stefan Cronholm and Hannes Göbel in 2022 brought forward an empirical Action Design Research project that supports project managers in this regard. This research provides support for ADR at the micro level for all its stages: procedural support, guiding concepts, and various techniques for the documentation of project tasks. They argue that is essential to integrate method support at macro and micro levels and these can be described by three guiding principles: 1) relationships between normative and prescriptive method support should be identified; 2) continuous shift of focus between the whole and its parts should be supported; 3) completeness of ADR in action must be ensured (Cronholm & Göbel, 2022).

2.3 Contextualization of the Citizen Lab

As foreseen in the inception phase of the EUt+ Citizen Lab, the Lab would not be fixed on one particular theme and would be based on the research expertise of the partner institutions. Hence, the Lab should operate in versatile ecosystems. Open Innovation Platforms (Rho et al., 2021), Service Ecosystems (Trischler et al., 2020), Ecosystem Strategies (Altman & Tushman, 2017) and various clustering policies address the issue of contextualization for the ecosystem encompassing the problem and citizens in question. Therefore, we have chosen to create separate user-driven innovation schemes that would include the following characteristics: generic problem, specific context, core partners and empirical evidence. When these characteristics are defined, a user-driven ecosystem will emerge and bring together active citizens, researchers, and other interested parties as participants. The participants will interact in participatory workshops (online and face to face) and desk research while going through the Action Design Research stages, which will lead to formalized learning for both practical and knowledge merit.

3 RESULTS

3.1 Citizen Lab in Practice

Since participation and experimentation are among the indicators that are to be examined to assess the societal impact of EUt+, it is necessary to evaluate the different levels and conditions of stakeholder participation in the numerous European Research Institute test beds. However, determining the impact of stakeholder participation is not easily achieved. The problems met by the practice of societal impact assessment have been identified (European Commission, 2005). These two different ways of doing research, focusing either on scientific impact, characterized by the academic interests of a scientific community, or on societal impact, have been described as “Mode 1” or “Mode 2” science (Gibbons et al. 1994). The assessment of societal impact of research is difficult compared to the assessment of scientific impact. For societal impact assessment, a commonly accepted framework is still to be constructed. This is precisely the contribution of EUt+ Citizen Lab through using ADR methodology; namely, ADR provides the necessary structure for the Citizen Lab to be replicable. The first test of applying ADR methodology in the EUt+ Citizen Lab consisted of an in-person participatory workshop at the SEFI Spring School 2024: Democracy in Engineering Education at the Technical University of Berlin (April, 2024). During this workshop, a group of Spring School attendees participated in a test of the first phase of ADR: problem formulation. The goal of this Citizen Lab

workshop was to identify the value gap between three sectors: sustainability education, institutions and the citizen sector. Due to time constraints, the focus of this workshop was limited to the first phase of ADR. During the SEFI Spring School test, it became evident that participants require clear activity objectives to successfully move through the first phase of ADR. Without a continuation of the subsequent phases of ADR, the participants did not understand the purpose of the activity and struggled at times to engage in problem ideation. Following the experience of the first attempt to implement ADR during the SEFI Spring School, a pilot of the Citizen Lab was carried out in June 2024 online. This activity was adapted to fit an online environment using video conferencing and online participatory tools to address the Pan-European aspect of the Citizen Lab. Learning from the experience of the first test of the ADR Citizen Lab at SEFI Spring School, it was determined that the full cycle of the Citizen Lab would take at minimum three workshops; the first focused on phase one of ADR: problem formulation. The second workshop allowed participants to delve deeper into collaborative speculative ideation, formulating concrete action points for intervention during phase two of ADR: building, intervention, and evaluation. Finally, participants engaged in a third workshop focused on phase three of ADR: reflection and learning. In this phase, participants continued formulating an action plan for interventions revisiting the issue formulated in workshop one and the ideal solution proposed in workshop two.

The second pilot of the Citizen Lab took place over the course of two days with the first and second Citizen Lab workshops combined into one day and the third workshop on the following day. In total, there were eight participants representing five European countries: Latvia, France, Ukraine, Georgia, and Cyprus. The participants were students and recent graduates. Each workshop was 1.5 hours long. The first and second workshops were combined due to participant availability constraints. The workshops were facilitated by two moderators, since participants were split into two breakout groups. The Citizen lab workshops continued on the subject initiated in the SEFI Spring School – Democracy in Higher Education. Applying the three elements of ADR method, it was possible to gain insights of the full cycle of ADR and how it will be further used within the EUt+ Citizen Lab.

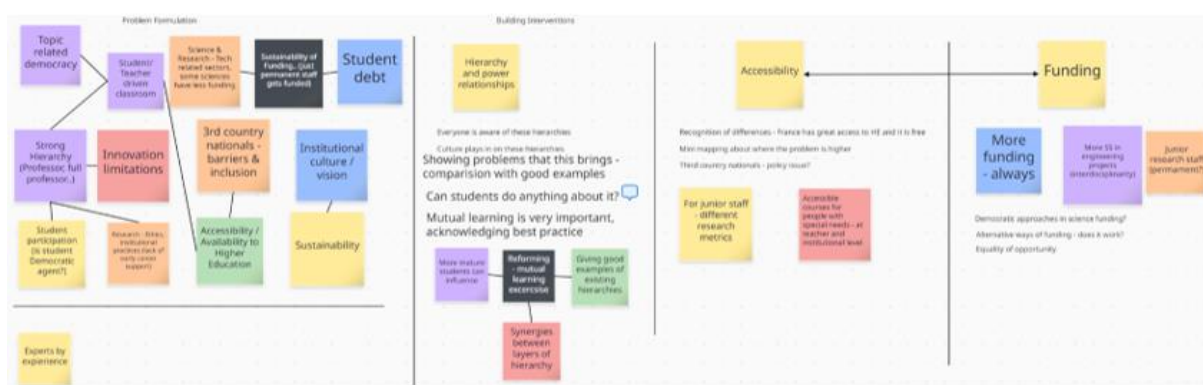


Fig. 2. Contributions of participants from first and second online workshop

The first and second workshop was set to address two key elements within the ADR method – problem formulation and building potential intervention while concurrently reflecting on the process and opinions. During the session participant inputs were gathered in a free form of sticky notes within a Zoom platform whiteboard (see Figure 2). Participants were split in two groups where they worked on sharing their empirical knowledge, experiences, and opinions.

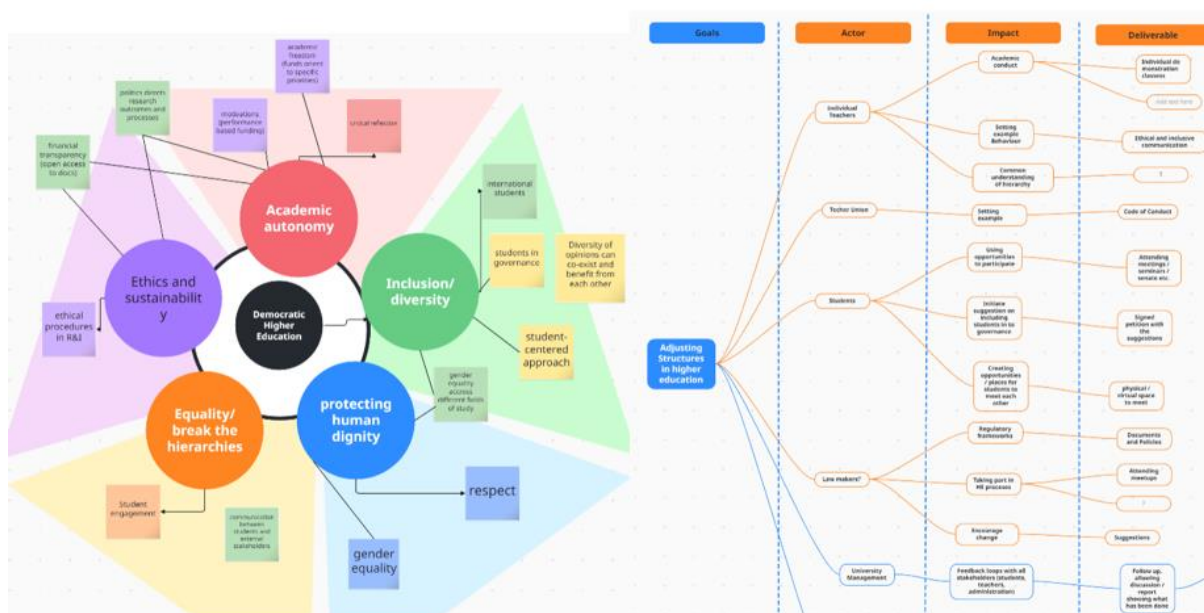


Fig. 3. Contributions of participants from third online workshop

The objective of the final online workshop was to formalize the learning from the first workshop, reflect on the knowledge that was shared and generated to proceed with outputs that can have practical or scientific merit. During the third workshop participants worked on a Value Taxonomy for Democracy in Higher Education (see Figure 3 on the left) where each participant formalized their individual learning from the first workshop into a specific value, clustering together rubrics discussed in the first workshop. As a continuation of the formalization of learning participants worked collaboratively on a generalized implementation plan draft (see Figure 4 on the right). By structuring the formalization of learning it was possible to see cross-country opinions and experiences that were synergized together in a single chart. The outcomes of the three online workshops suggest that:

1. ADR method was applicable and helped to structure engagement with citizens in an international setting.
2. Format of online workshops is a valid Citizen Science approach when dealing with participants from more than one country.
3. It was possible to formalize learning in the shape of knowledge creation for scientific merit (outputs from the third workshop).
4. A smaller group of participants (8-10) is optimal for effective and fruitful online collaboration.

The participants were asked to fill out a short survey once the three workshops were completed. They reflected that opportunity to express their opinion was sufficient, in addition, a few organizational improvement suggestions were made (example: for future workshops to use slides for the introduction part). The team of facilitators from the EUt+ consortium also discussed and reflected on their experiences from the workshops, outlining the overall success, but also addressing future improvements – two facilitators necessary for each group, a more structured scenario, time keeping. It is necessary to facilitate a clear separation of each phase and its specific objectives. It is also necessary to reconsider the language used in the workshops: the ADR terminology should be adapted to participant needs. Adjusting the language used in the workshops (e.g. “Problem formulation” could be changed to “Issue

exploration”) can help manage participant expectations and guide the discussion in the right direction. It is also important to be transparent with the participants and clearly indicate what outcomes they can expect from the workshops: the EUt+ Citizen Lab is still at its primary stages and any subsequent workshops must indicate the self-reflective, research-driven nature of these initial iterations of the Lab to the participants.

4 DISCUSSION

Observing outcomes of the three online pilot workshops, it is possible to approve ADR as suitable methodology to be used within EUt+ alliance for development of the Citizen Science through a Citizen Lab. Connecting theoretical aspects of ADR with the practical knowledge gained during the seminars there are further developments to be done toward the practical implementation links of the outcomes generated, which most probably can be achieved by bridging the EUt+ Citizen Lab with other local communities of practice within the EU. The main merit of the full ADR cycle contributes the most to the formalization of learning that can reveal scientific artefacts that can be further used by the research community while also giving credit to the active citizens and stakeholders that participate in Citizen Lab activities. To be able to fully convert these outcomes into practical, tangible outcomes, a link with other external communities (representing the respective ecosystem) must be made. A solution to this could be enrolling EUt+ Citizen Lab within the ENoLL network, to collaborate with other University Alliances or, alternatively, involving participants who are already established within a community of practice in Citizen Lab workshops. In regard to the ADR method in practice – it works well if facilitators have understood the mechanics of ADR methodology, the sequence of processes and, most importantly, the formalization of learning section. Further gathering of data is needed to establish a common, replicable and practical use of the ADR method for upscaling of Citizen Science within the EUt+ alliance.

5 CONCLUSION

EUt+ Citizen Lab has proven ADR as suitable methodology that will be kept for future Citizen Lab activities. At the same time, the pilot test showed the improvements that are needed for the online international interactions (majority of them being related to organization and facilitation). As defined in ADR method, there were several artefacts found during the pilot test – refined terminology of identified challenges by participants, ability to switch between macro and micro levels of themes, channeling of knowledge between groups. EUt+ Citizen Lab will keep developing with the emphasis on co-design and co-creation, facilitated by the partnership with diverse living labs and the strategic use of economic and social tools ensures that the Citizen Lab initiative is a vibrant and inclusive platform for innovation and Citizen Science. As we move forward, our focus remains on strengthening these connections and expanding our community, guided by the vision of fostering a more engaged, informed, and capable generation of European citizens.

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