Your guide to **Hackathons**

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Hackathon Guide

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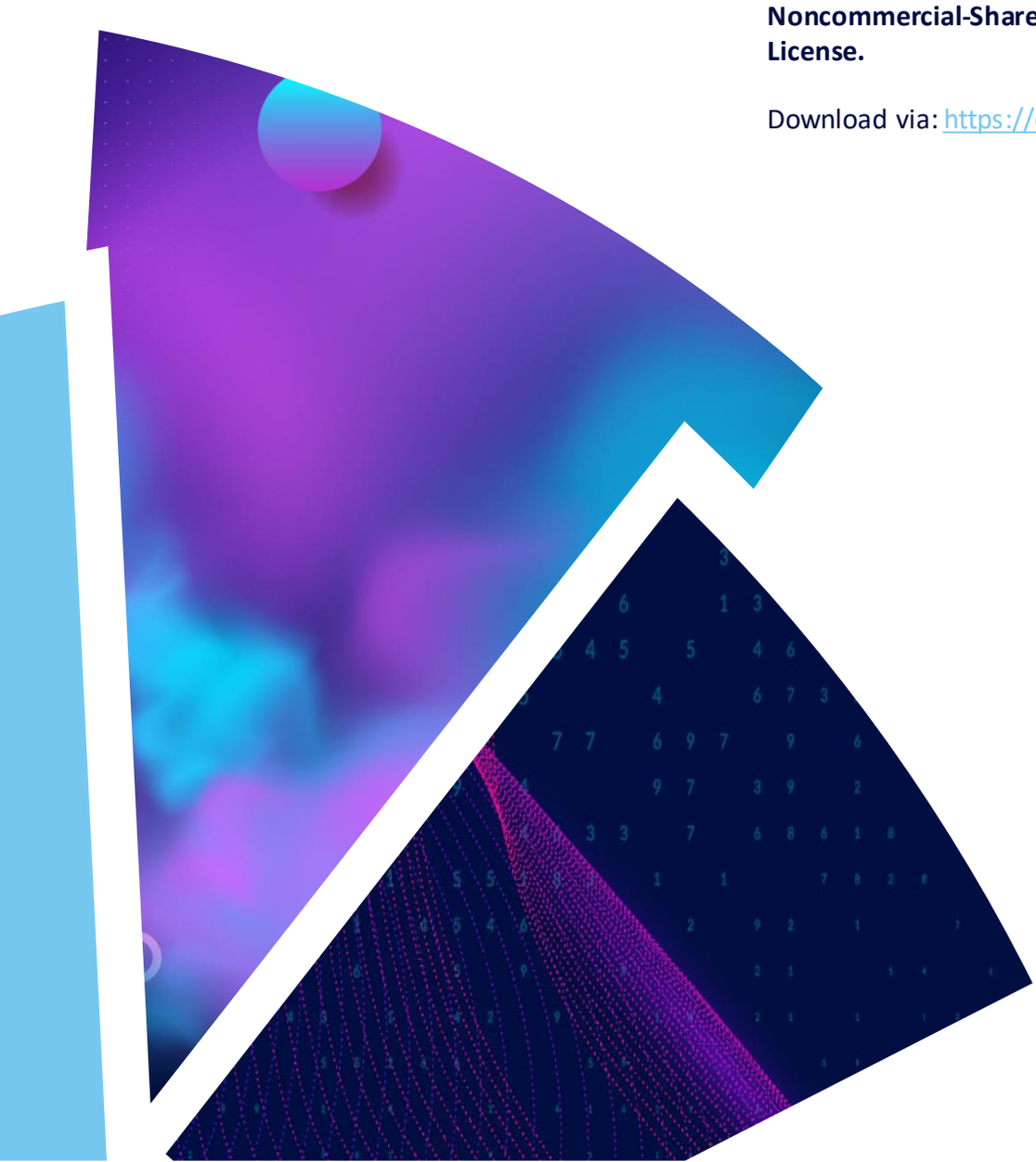


Introduction

What is the IDOL project?

COVID-19 has impressively shown how conceptions of 'age' can divide generations at a time when social cohesion and intergenerational solidarity are particularly important. Media has portrayed many older people as vulnerable, weak and in need of protection. Similarly, intergenerational tension was felt among the younger population, as social distancing and other public health measures were primarily aimed to benefit older generations, yet the economic and social costs of these measures were imposed overwhelmingly on young people.

At the same time, the pressure felt by younger people to live up to moral expectations was high, and when not done as expected they were denounced as selfish. Therein, intergenerational solidarity is now needed more than ever.

Intergenerational digital Service-Learning represents a pedagogical approach that has the potential to address the issue of intergenerational solidarity.

It faces concerns for the civic engagement responsibilities of higher education institutions (HEIs) during the pandemic and the need to help students tackle intergenerational tension, while also meeting community needs. Intergenerational digital Service-Learning, hence, meets the requirements of the Third Mission and social responsibility of HEIs.

HE managers and wider education stakeholders are aware of the fact that they need scalable, practical ways to integrate democratic and social values into curricula and study programmes so as to better prepare students for 21st century adult life. Intergenerational digital Service-Learning also has enormous potential to address the multiple negative impacts of the pandemic, and by engaging more people in Service-Learning and civic activities, intergenerational digital Service-Learning can contribute to a more inclusive society.

SERVICE-LEARNING is an increasingly popular pedagogy across HEI as a way for universities to achieve their Third Mission goals of impacting society by consolidating student learning with community needs. However, with the pandemic, the practical facilitation of Service-Learning was hindered by distance learning. Many lecturers felt ill equipped to shift the didactic model of Service-Learning into the digital sphere.

INTERGENERATIONAL DIGITAL SERVICE-LEARNING (IDOL) presents an innovative approach to Service-Learning, incorporating a digital and an intergenerational element, as well as an innovative pedagogical model for internal "teaching tandems" across HEI units. The guide comprises a research-based resource and establishes the conceptual foundations of intergenerational digital Service-Learning.

Purpose of the hackathon guide?

The hackathon guide is a document that introduces HEI lecturers and staff to the concept of a hackathon on intergenerational digital Service-Learning techniques & tools and guides them on how to facilitate digital Service-Learning projects for students and older learners..

A hackathon is an activity focused on creative problem solving and can be carried out both virtually or in person. Although the goal is to help adult learners and younger students to solve a community problem by designing a creative solution, the educational benefit is evaluated by progress in the application of transversal knowledge and skills rather than by the quality of the solution itself.

What is a hackathon?

What is a Hackathon in general?

In this chapter we will introduce the fascinating phenomenon of hackathons. Hackathons have been organized for decades especially by technological companies but lately they have become more common in different fields such as a wide range of companies and universities.

The expansion of hackathons has meant that the definition of phenomenon has also changed. The chapter will explore specifically the hackathons in HEI but will also cover some of these changes. According to Kohne and Wehmeier (2020), the first hackathon-kind of events were organized in USA in the late 1970's. They were specific events where similar minded people met to develop computer programs. The first event that was called a hackathon was organized in 1999 in Canada. In this event, OpenBSD1 developers gathered for a weekend to fix and develop bugs and networks in operation systems. The first large-scale modern hackathon with competition, prizes and sponsors, was the "Hack Day" by internet company Yahoo in 2006. Since then, the hackathons have become more known for wider public (Kohne & Wehmeier, 2020).

As hackathons have become more popular, there has been a need in research to define, what they actually are. The term itself is a combination of two words: "to hack" and "marathon". However, the similar events are also organized with other names such as Hack Fest or Code Days. In all these events a bunch of interested people gather to innovate new ideas or technologies together. In practice, this happens in small groups and in as short time as possible. Usually, the event ends with the participating groups presenting their new innovations to other participants and an evaluating jury (Kohne & Wehmeier, 2020). Related to Kohne and Wehmeier (2020) the event includes three phases: (1) the preparation phase where a detailed plan for the hackathon will be set up, (2) the practice phase where the actual event takes place and (3) the follow-up where innovative ideas will expand to product development. All these phases comprise documentations and communications (Garcia 2023 cited after Kohne & Wehmeier 2020).

The first hackathons were hosted by tech companies or similar organizations and their duration was just 24 hour or a weekend. Thus, the development for new innovations was done rapidly and intensively (Lawrence, 2016). This is characteristic for hackathons. In popularizing hackathons, their inclusiveness has been beneficial. In last decades, this has led to the spreading of hackathons to other fields outside technology such as to educational, creative and civil sectors. (Yarmohammadian et al., 2021).

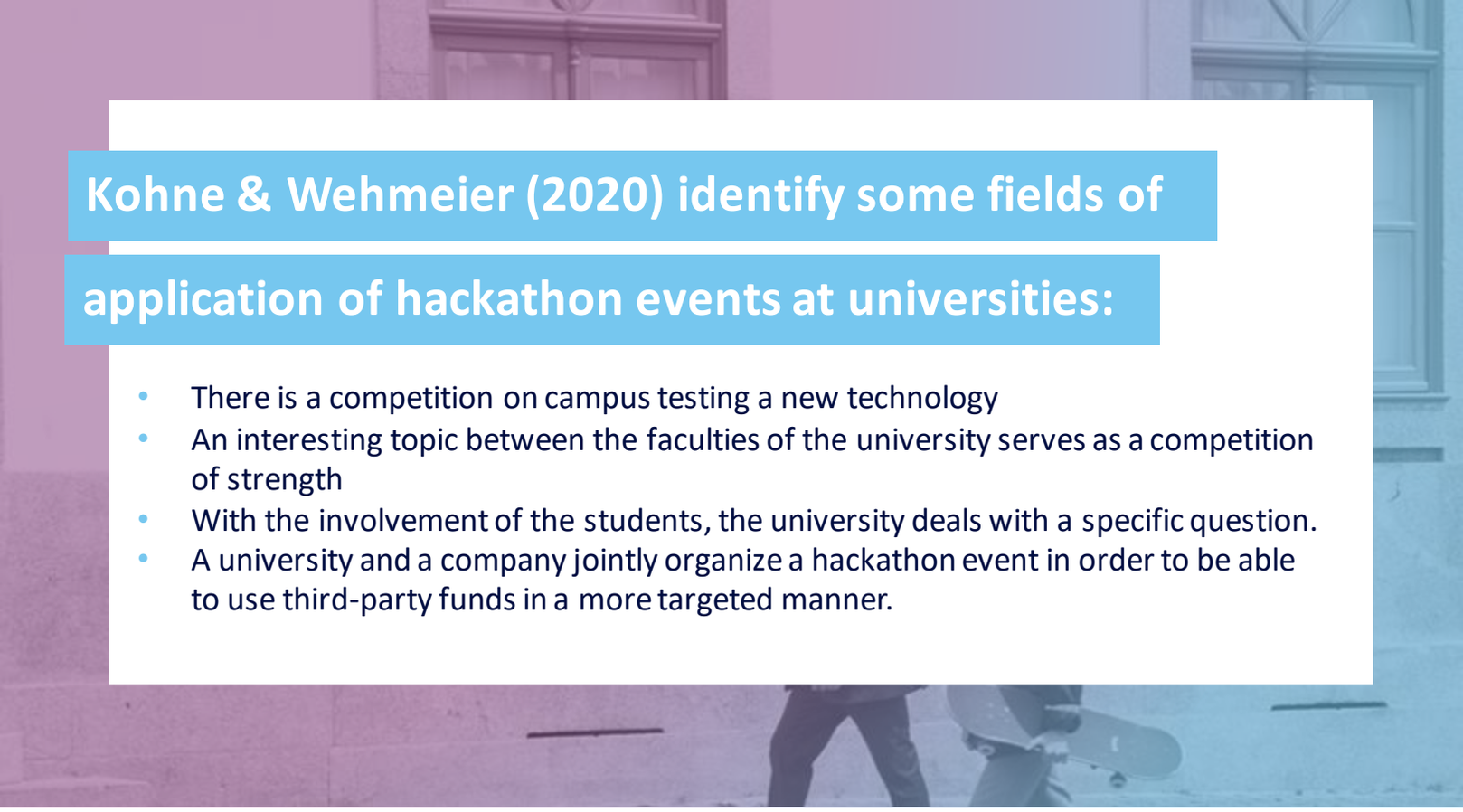
V Because of the previously mentioned spreading of hackathons to educational spere, the civic and social hackathon have established themselves. In the social sciences, civic hackathons are receiving increasing attention (Berg et al. 2021 cited after Dickel 2019; Baack et al. 2020). Civic hackathons are a novel variant of conventional hackathons that address societal problems. Proposals for action are specifically developed for these problem situations with the involvement of civil society. During the Corona pandemic, (digital) hackathons received a new boost.

Digital events were held internationally with the aim of developing solutions within a short period of time in order to respond to the social consequences and challenges posed by the pandemic (Berg et al. 2021). Unlike the Civic hackathon, the social hackathon involves Service-Learning activities that address social issues in the context of civic engagement (Rückert 2020). Therefore, they combine both- a service in the community/in an organization while participants get a "first-hand insight" (Students' Union UCL n.d.) and working on innovative ideas for current issues the organization deals with (ibid).

How does a Hackathon work within HEI context? Do Hackathons support tandem teaching?

In the research that is done about hackathons in Higher Educational Institutions (HEIs), they have been seen for example as a "Campus Event of a university" (Kohnen & Wehmeier 2020, p.14). The teachers and students at universities follow curriculums in their teaching, learning and researching. In these structures it is not easy to be creative, think outside the box and innovate new ideas and solutions to problems. These skills are easier to achieve outside the traditional curriculum in learning formats such as hackathons (Kohne & Wehmeier, 2020).

Students play an important role for educational innovations which makes hackathons attractive for the educational context in HEIs: In this learning format, students can use their talents and skills for problem-solving and benefit from experiential learning due to an more authentic learning environment which connects theoretical learning with real-life situations rather than in traditional classroom settings (Garcia 2023). Hackathons encourage collaboration, promote skills and respond to the needs of students and society (ibid. cited after Garcia 2022). Hackathons with the focus on community-based learning give students the chance to collaborate with community partners and to develop ideas with them for a valuable output to the community which meets the respective needs of the target group. These events are usually sponsored by external and internal (university) funds. The specific topics for possible projects can be requested/suggested e.g. from local NGOs, small business or educational institutions. Organizers of the faculty work within a close partnership with the community partners to make sure, that all sides are clear about the expectations (Lara & Lockwood 2016). Based on this, it can be deduced, that Hackathons can be-in context of the aims of the IDOL-Project and the third mission of universities- appropriated for the planning- and problem-solving process within civic engagement activities. It also shows that Tandem-Teaching as part of civic engagement in the context of HEIs (mentioned in the first handbook of the IDOL-project) can play a main role in Hackathons, so it can be beneficial to get familiar with the approach in advance, before the project begins.



Kohne & Wehmeier (2020) identify some fields of application of hackathon events at universities:

- There is a competition on campus testing a new technology
- An interesting topic between the faculties of the university serves as a competition of strength
- With the involvement of the students, the university deals with a specific question.
- A university and a company jointly organize a hackathon event in order to be able to use third-party funds in a more targeted manner.

Hackathons have a lot of potential for research. One possible viewpoint are educational hackathons especially in studies related to HEI.

According to Suominen et al. (2018) hackathons can be used in HEIs for example as a methodology to teach the fuzzy front end of innovation. During these educational hackathons the students are introduced to a business context which needs innovation and the required tools for them to generate the new ideas for the given problem. These hackathons would be most beneficial if they were organized in cooperation with the Higher Educational Institution and a company (Suominen er al. 2018). Hackathons can also be used as tools for collaboration and modeling educational efforts in HEIs. In addition to the practical skills student achieve during completing the projects of hackathon, they get the chance to learn practical skills to operate with companies such improved communication skills. All in all, hackathons are efficient tools to teach several new skills which are useful for in nowadays working life (Happonen & Minashkina, 2018).

Any best practice examples of Hackathons within HEI in general?

Next, we will introduce examples of hackathons which follow the previous format of educational hackathon.

In 2017, a university-industry hackathon "The Easy Livin' Challenge" was organized in Finland to teach the fuzz front end of innovation. The hackathon was conducted by two HEIs and a nationwide media and service organization. The aim of the event was to develop service and products which would make peoples' lives in their homes easier and which the participating company could provide them. The participants were bachelor's and master's level students from the field of technology or business. They were able to gain credits from their participation according to their level and field of studying (Suominen et al. 2018).

Process of that educational hackathon

Case Study

“The Easy Livin’ Challenge

Duration

One day long

Aim

The aim of the one-day long Easy Livin’ Challenge -hackathon was to present the students an opportunity to familiarize themselves to business world in a meaningful project, to network with current and future experts and experiment new ideation and collaborative working methods. .

Goal

The goal was to provide students with working tools for idea and concept development and sales.

Official task

Which services would you like into your home? How would you ease the everyday living of the people? Concrete ideas for easing the life and potential for new businesses.

Structure

The structure of the day was a three-fold process with alternating sessions with activities

1. Idea Breaks, sessions comprising teaching
2. Team ideation sessions, and
3. Collaboration with case company/jury. It was designed as an entity in a manner, that the ideation process was consciously interrupted by the facilitators in every one hour. Each interruption called ‘Idea Break’ lasted approximately thirty minutes. In the Idea Breaks the facilitators, i.e. responsible teachers handled the themes regarding innovation and encouraged to question and enlarge the scheme of things by introducing creative thinking or innovation methods or tools.

Case Study

Social Hackathon- University Vechta

The University of Vechta in Germany hosted a two-day Social Hackathon in 2019 with the topic "Innovations & Collaborations - Solutions for Care Opportunities of Tomorrow". The event was open to students from different academic disciplines of the University of Vechta, students from national and international universities as well as citizens of the city of Vechta and the respective practice partners. The goal of this hackathon was to develop potential solutions for local and regional partners working in the field of child, youth and senior care. In this hackathon, the research question was already developed in advance by the practice partners. In a cross-generational exchange of 43 participants, innovative ideas were developed in small groups, each consisting of a partner organization and the students (University Vechta 2019). This social hackathon was held without participating in an organization.

Process of social hackathon (ibid.2019)

First Day:

- Started at 2:00 pm (CET) where people got to know each other
- Followed by a workshop about social innovation through design thinking
- Introduction into the challenges and team formation
- Duration of hacking 2 hours
- Day ended by 08:00 pm due to event block

Second Day:

- Hacking from 08:00 am to 05:00 pm including two workshops about “How to pitch your idea?”
- In the end of the day the pitches (presentations) were held and evaluated by live/voting.

The benefit for organizations of this hackathon should be

- Working on socially relevant problem solutions within interdisciplinary teams in a short period of time
- Networking
- Insights into problem situations of other sector members

The benefit for students of this hackathon should be

- Strengthening and application of skills: acquired knowledge from studies can be applied in a practical way within the framework of a "real-life case
- Self-initiative- co-designing social & public service projects
- Work in a heterogeneous team
- Networking with practice partners
- Generation of ideas for study purposes (research work)

Case Study

Social Hackathon- University College London (UCL)

Another practice example worth to introduce comes from the University College London (UCL). The Students' Union of UCL organizes regularly social hackathons outside the curriculum for students involving volunteering work in their program. During the pandemic, UCL managed to carry out its projects digitally and is therefore a great example for showing how hackathons and civic engagement/volunteering work online (UCL n.d.).

Process and use of social hackathon (UCL n.d.)

- **Duration:** between 3 or 4 days in general, hosting different hackathons with individual aims each day, which means 1 day for 1 Hackathon
- Students can join one or more hackathons during this time range
- Since November 2020, hackathons are regularly held in November, February, July
- Students from different disciplines are volunteering each day in one of the participating organizations of the hackathon
- Working in one team together with an organization, students can use their different skills to work on innovative ideas, connect to each other and get insights into the work of different organizations and the challenges their confronted with (Students' Union UCL 2023)
- Inspiring many students for further volunteering work in an organization

Digital social hackathon

- **Duration:** 6 hours
- Hackathons focused on digital topics e.g digital inclusion, creating online content, developing digital apps ,...
- Participants got the chance to work across different countries and time zones
- Beneficial use of digital tools, improving digital skills
- Connecting the digital environment with real-life impressions e.g. a virtual visit on a farm

Case Study

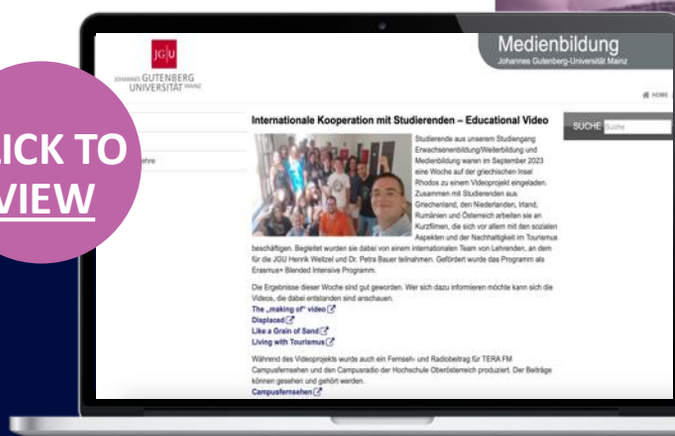
Digital Video Challenge - EDIT

Furthermore, a case study was examined in more detail in a qualitative interview. At Johannes Gutenberg University in Mainz, students of the Department of Education with a focus on Lifelong Learning and Media Education have the opportunity to participate in the annual digital video challenge "EDIT" as part of their studies. EDIT is an international cooperation of 7-12 universities and their students from 11 countries within the EU.

During a four-day hackathon, the respective student groups each create a video that must meet annually changing specifications. The videos are then evaluated (online) by a jury consisting of members of the international cooperation and subsequently awarded with prices: “Well, this EDIT is always a video challenge […] they get -sometime in November on Wednesdays- three terms […] and have to create within four days to this a teaching-learning video. […] On Sunday evenings the videos have to be uploaded on Youtube and then there's an international jury […], the videos are judged according to three criteria, educational value, artistic and technical, it's all on the website, and there is a winner and there is a trophy from the 3D printer that is sent somewhere else every year and we send goodie bags to each other […] and we also had […] money [prizes].” [Interview no. 1]

Beyond the Challenge, there are various face-to-face meetings and conferences throughout the year where the consortium participates and presents the results: ”What we are doing now for the second time is adding a BIP, a blended intensive program, which runs through Erasmus+, […] we still do a video screening evening, like a movie night, where we network and moderate and the ten best videos, i.e. we have already had 70,80 videos some years, we then look at everywhere in the countries and have such a switching conference. […] Last year we were in Linz, I was in Linz with 20 students. […] And in September we will meet in Rhodes.” [Interview no. 1]

The case study incorporates intergenerational learning at the student and faculty level. In addition, the videos are sustainably used by JGU students for Service-Learning projects with seniors in which they are engaged: “We had the request to cooperate with [a radio- /television station] and they have the page Silver server, [bring] seniors into the network, and they wanted us to create only teaching and learning videos for seniors during the EDIT.” [Interview no. 1]. “I even have the synergy effect of adult education in there, if it's a teaching-learning video for seniors and media education in there, then I've even served our course twice.” [Interview no. 1]



CLICK TO VIEW

Although research material about hackathons in the education sector as well as about hackathons with a service component is rare, these examples show -related to IDOL- that hackathons could have a great potential to carry out Service-Learning projects in the context of intergenerational and digital learning because they offer the opportunity to work effective in a short time period, to work in intergenerational and heterogeny teams, to reach out to people digitally and open the “global” sphere as well as encourage not just project aims but also the skills of all the participants.

02

The role of hackathons with (digital) Service-Learning

Introduction to the role of hackathon with Digital service learning/service learning

UNESCO (Institute for Lifelong Learning, 2015; 2020) reflects on hackathons being a pedagogical formula created from and for communities that could be likened, organisationally speaking, to a city.

In this aspect, the hackathon constitutes a genuine forum where individuals contribute, through different themes, to forge a better world, and to share their experiences and solutions to make communities grow and improve. In some cases, the hackathon is thus synonymous with learning about other people's learning opportunities, thus demonstrating that participants in educational hackathons practice conviviality (Lionaite, 2020).

Using hackathons in education is also synonymous with increasing learning opportunities. In some cases, when participants are interviewed, they state that during hackathons they recreate educational competencies that have to do with a spirit of teamwork, collaboration, learning new technologies, understanding different ideas, empathy, creativity, connecting with other people, implementing ideas and prioritizing solutions under a given timeframe, among others (Lionaite, 2020).

The same author also argues that the hackathon is also being used as a way to improve digital skills. In order to develop digital literacy, digital tools are convenient techniques that can solve problems through virtual environments such as Google Meets, Zoom, Microsoft Teams or Skype.

However, it has not been possible to find enough information about literature on Service-Learning and hackathons, which shows the novelty and topicality of the topic addressed here. Finding cases and examples of digital Service-Learning and hackathons has not been easy either, as the digital divide is more evident after COVID-19, which makes it a topical issue with hardly any practical cases that ratify the trend and shed light on the pedagogical possibilities of both socio-educational tools, as well as their impact.

How can a hackathon be used with digital Service-Learning or Service-Learning modules in Higher Education Institutions?

The hackathon methodology is useful for various topics in education, as outlined in the previous chapter, and it may be used at different educational levels, including Higher Education Institutions (HEIs). This section will refer to how the hackathon is useful for Service-Learning and digital Service-Learning, respectively.

01 **Service-Learning**

02 **Digital Service-Learning**

01 Service-Learning

The pedagogy of Service-Learning is related to the implementation of hackathons and it may be worth mentioning that both methodologies have commonalities. Firstly, they both aim for students to learn curricular skills and competencies so they can put their service to a social group that requires it into practice. Secondly, a hackathon is an event where participants engage with a problem or project in a short-term intensive working group (Čović & Manojlović, 2019), just like Service-Learning. And thirdly, hackathons are intended to be experiential with an interaction component between experts, novices and stakeholders. Participants learn from their peers and mentors in a learning environment (Roisin Lyons, 2022).

Service-Learning, in that it is participatory learning in universities, has the potential to link students with diverse communities and create links between the two in an interdisciplinary way. In general, the Service-Learning model of teaching students focuses on various skills such as social skills, attitudes towards self and school, and civic engagement (Chmelka et al., 2020), not to mention academic achievement. In turn, Service-Learning is linked to course content, so the Service-Learning activities established in this formula are compulsory, regarding the credits within a pre-established curriculum (Aramburuzabala, 2019; Holland, 1997; Furco, 1996).

Limited examples linking and integrating digital Service-Learning into the hackathon methodology are available and have been implemented in other European universities. For example, the University of Helsinki developed a social hackathon to provide solutions to actual local social problems (Ikäheimo, 2017). This hackathon was carried out in groups of students who had to work in teams to solve a problem defined at the end of the event and within a set timeframe. The aim was to develop a solution to an issue by creating dialogue and collaborating through academic research on a topic (Helsinki Think Company, 2017).

The ideas developed by the team for the solution to the problem are presented to a jury responsible for evaluating the work based on stipulated criteria and deciding on a winner with the award of a final prize. In teams, all participants develop ideas for a project for each social issue. Finally, participants choose a winner. Subsequently, they produce a report for each project presented in which feedback is given, including the reflection on the project itself. The hackathon, in this case, is seen as a way to open up dialogue between different groups of people and as an appropriate way to dismantle pre-established roles by doing it together (Chmelka et al., 2020).

With this example, we can see how the link between the development of a hackathon and the application of the Service-Learning methodology becomes closer and converges, being able to detect similar elements in both, such as the performance of group work, the curricular nature of the activity, the development and encouragement of critical thinking about a real social problem, the insistence on learning social skills, the time limitation of the task and the presence of the activity (although there is the possibility of developing hybrid or digital hackathons).

02 Digital Service-Learning

Defining the concept of digital Service-Learning means referring to the learning methodology that takes place when some of the didactic components take place online (Waldner et al. 2012, p. 125).
The use of digital platforms in learning methodologies favors the integration of students with new learning. Technological tools provide Service-Learning in a collaborative environment while allowing for the generation of communicative acts and incremental learning (Sandy & Franco, 2014). Furthermore, there is proof of the benefits of digital tools and platforms in Service-Learning projects by creating collaborative environments and enabling better communication and learning (Sandy & Franco, 2014).

Along the same line, digital platforms have become a means to enhance the Service-Learning experience by strengthening exchange relationships with the community and forging a critical and social spirit. At the same time, in the aftermath of the pandemic, the importance of digital tools as motivating factors for meaningful learning, to the detriment of traditional education, has been identified. On the other hand, universities need to offer socially relevant programmes in their curricula, especially those focused on the use of technology.

With the COVID-19 pandemic, the educational paradigm shift in HEIs is more than evident. In these, students remain the undisputed protagonists of Service-Learning and they are the ones who make the experience possible. They need learning stimulation experiences to acquire new competencies that prepare them for future social challenges. Nowadays, students are, in general, digital natives. It is, therefore, relevant that they are trained by experienced teachers in the digital area so that they can become citizens capable of using new technologies appropriately, taking advantage of their opportunities and making use of their rights (Aramburuzabala et al., 2021).

The same author states that also, about the digitisation of Service-Learning, both the actors and the community believe that the development of digital competencies must go hand in hand with digitization, as there are infinite options -although the possibility of distraction and decentralisation in digitization is always present and therefore caution must be maintained in this respect. That is why it is necessary to make good choices in the digital tools used. In addition to the above, it is essential to raise awareness in the community about the proper use of digital tools.

An example of digital or virtual Service-Learning in which the pedagogical methodology is carried out online among the participants and, therefore, using a collaborative video-calling tool, is the project called The Rural Project 3.0: Service-Learning for Rural Development (2022). This is an innovative project that aims to bring together rural partners and HEIs in a shared work based on Service-Learning and to develop social entrepreneurship between HEIs teachers and rural entities.

02

Digital Service-Learning

Due to the difficulty of transport among (university) participants to travel to rural areas (due to lack of means or long distances), online organization among participants living in rural areas is key. These features are shared with hackathons, given that students get the chance to work on social and civic action through a digital Service-Learning tool. In this way, university students, together with rural community organisers, beneficiaries and faculty, develop an academic and community training module on rural Service-Learning and distance entrepreneurship (Weinlich et al., 2020). In this case, the common task is to produce a joint document with a list of rural entities and universities interested in community-university partnerships.

On the other hand, the application of the hackathon takes place when participants work in groups and are in charge of reflecting and elaborating a series of solutions to real problems in rural contexts through a pooling of ideas. Thus, on the one hand, digital Service-Learning is carried out by performing structured and educational tasks, while ending with a critical opinion or group sharing in digital form. The applications used in this case are, for example, Mentimeter, to provide opinions, and note.ly, to create notes. For all these reasons, this case described above would exemplify a digital Service-Learning process using the hackathon method.

In the same field, Aramburuzabala et al. (2020) propose this project to organise a social hackathon for all students participating in rural Service-Learning projects in European countries to offer innovative solutions for rural development. In this case, some of these activities consist of meeting virtually with students, communicating and reporting on rural Service-Learning projects in each country, sharing opinions on different experiences or debating and reflecting on the values and meaning of Service-Learning cases, among others. In short, a social hackathon seeks to promote collaborative work over a short time to generate challenges, ideas and projects based on social innovation (Flow to the Future, 2022).

University Students/ Learners

Students are the protagonists of Service-Learning, as they need to learn through scenarios that stimulate them to improve their skills and critical thinking.

Students are in a process of personal development and the Service-Learning experience can help them. Generally, students learn from each other by sharing their experiences and working together to solve real problems, with the understanding that the transition from theoretical challenges to practical approaches means that they experience noticeable improvements in their educational process. It is not always necessary to be present to carry out Service-Learning projects, as already mentioned concerning the possibility of digitalisation. It is also important to bear in mind that projects should be aligned with the interests and needs of the learners. In addition to the given reasons, it is a way for students to earn ECTS (credits) as part of their university degrees (Cinque et al., 2022). All of the above are based on the importance of acquiring group work competencies, which both hackathons and Service-Learning make possible (Chmelka et al. 2020).

For the participating students, hackathons offer many pedagogical tools, such as those that help to acquire or improve programming skills, those that make it possible to work in groups to solve a community problem or those that are identified with the acquisition of increased personal development, among others (Rural 3.0 consortium Service-Learning for the rural development. Partners. https://rural.ffzg.unizg.hr/impact/). Along the same lines, it is worth highlighting the benefits that students obtain after participating in Service-Learning in the development of critical thinking and project management, in addition to improving their communication, imagination, and real problem-solving, among others (Decker et al. 2015).

Ultimately, HEIs participants, grouped in teams, are rewarded with a methodology that allows the acquisition of several competencies and skills. All of these are to be taught by HEIs teachers, who themselves need to have experience in Service-Learning to guide their students in academic activity. Furthermore, it is vital to understand that teachers support activities focused on a specific topic to develop innovative activities, for example, in the case of the Rural 3.0 project, which accompanies rural development projects at the local level to revitalise rural areas, create jobs and undertake entrepreneurial activities (Aramburuzabala et al., 2020).

Stakeholders

In a hackathon related to a Service-Learning methodology, the main actors can fit into groups of students, teachers, community members and HEIs as organisers. The participation of all of them enables the exchange of ideas, the reflection of values and the realisation of Service-Learning, as Guarino et al. (2022) point out.

On the other hand, Aramburuzabala et al. (2020) announce that foundations emerge as crucial actors to share experience and knowledge when developing plans, e.g. stakeholders such as public administration, village council, politicians, residents and civil society.

Together with the learners, the community has the power to think about the learning needs (also digital) of its members. According to the study The Service-Learning & Digital Empowerment Manifesto (2022), the communities involved in digital Service-Learning and hackathons are not only information carriers but full members of the project. The search for skilful yet creative employees and the new perspectives that are opening up in terms of employment are the prime goals envisaged by the community organisers.

In addition, due to the COVID-19 crisis, the digital divide in today's society is more visible than ever and the process of digital transition continues unstoppable. For instance, some banks or the personal sale of train tickets are no longer operational and people are increasingly working with digital platforms such as the Internet. From this scenario, the organisers need to be aware of the needs of the community members to bring about a change that also helps the learners involved in Service-Learning. Thus, the community is determined to take an active and leading role in the project, being proactive and co-creating value while implementing the service.

The Role of Mentors (teachers)

It has already been stated that teachers play a leading role in the hackathon and Service-Learning processes. According to Cinque et al. (2022), in the study Service-Learning as a pedagogy to promote Inclusion, Diversity and Digital Empowerment, the task of teachers, as well as in their mentoring role, is to organise courses and take responsibility for the process and phases of Service-Learning.

Their importance lies in their ability to create and coordinate experiences even in possible lack of infrastructure within institutions. The primary objective of the faculty is to seek the best learning conditions for the students and to ensure that they have a meaningful experience, as well as the responsibility to bring value to the participating communities by taking into account the most vulnerable groups and ultimately allowing them to participate. The aim is to create a strong bond between the community and its most pressing socio-educational issues, as well as to provide inspiring and contributing connections to forge the projects of all Service-Learning participants.

Therefore, teachers will be responsible for guiding learners, not just teaching them. In the same way, teachers become mediators between learners and the community. They are responsible for creating the tasks for all participants to gain from making conscious choices and be able to opt for using digital or face-to-face tools, as appropriate

Other roles of teachers in Service-Learning may be (Cinque et al., 2022)

- Encouraging students to work together and share their learning process.
- Offering students time to explore, investigate and understand community service.
- Using communication appropriately with transparency and respect for diversity.
- Creating learning objectives with other members.
- Providing community immersion resources to enhance interaction between students and communities.
- Assessing students for their learning, not their outcomes.
- Stimulating student reflection through specific tools.

Service-Learning Hackathon Case studies

This final section presents two examples of hackathons embedded in Service-Learning that help to make visible the success of this pedagogical link.

In the first example, the ACEEU project and Vilnius Tech (2021-2023) focus on the third mission of universities and promote the concept of the future of universities as an approach of collaboration and innovation that fosters real-world problem-solving. The collaborative hackathon tackles problem-solving and aims to promote civic engagement and responsibility in HEIs by supporting 21st-century students to improve their abilities in problem-solving, interpersonal communication, critical thinking, self-efficacy and co-creation of creative solutions for industry. The hackathon method runs online and the topic is practical knowledge on the methodology to deliver digital Service-Learning in a short event aimed at university faculty and students.

Some of the recommendations made by the project identify with the use of relevant software to conduct the hackathon, e.g. Zoom or MS Teams. In addition to video communication, it is also necessary to undertake a written part of the group work. It is crucial before the event to provide participants with a reminder of the programme, a guide, the timetable, etc., which can be done, for example, via WhatsApp. It is also necessary to use other digital applications to carry out the hackathon effectively.

Therefore, in this case, the hackathon is a creative learning event based on problem-solving. During the event, students can familiarise themselves with social problems in the community to implement innovative solutions, in this case, with digital applications. In this fully digitalised event, the multiple advantages of a non-face-to-face event are reinforced by the fact that fewer resources and costs, such as space rental and staff, are needed. Digitizing the event means less investment in software, less planning time (due to room search and preparation of materials) and less logistics. At the same time, it improves accessibility, as participants can attend from home by connecting online.

The second example, entitled Rural 3.0 Consortium Service-Learning for rural development (Project Partners, 2021), consists of a social hackathon as an opportunity for students to share their Service-Learning experiences and solutions to different social problems. With Zoom, a digital platform, it was possible to develop a hackathon in which a working group and discussion could take place, whereas, with Padlet, a digital application, it was possible to visualise the opinions of the different projects and to organise the talks around the topics. In this case, the hackathon follows from a previous Service-Learning experience.

The online session of the hackathon took place in the following phases

- Presentation of each group of pupils.
- Presentation of the rural community participating in each group, taking into account their context and the objectives they want to achieve. In addition, the participating groups, represented by a spokesperson, summarise their personal experience after the Service-Learning and approaches the solutions for the social hackathon according to their previous experience.
- Social challenge proposal: What were the biggest challenges of the experience with the community? From your point of view, what are the principal needs to meet and how can they be solved? Can you think of the implementation of Service-Learning to answer these questions?

In this hackathon, participants were divided into several online rooms coordinated by several HEIs moderators. Each working group presented its experience through a spokesperson, its social challenge, and identified needs in the rural community. Subsequently, they were arranged in working groups to discuss various issues guided by the moderators, such as:

Can the challenge/need be identified in the different contexts of the participants? In what way?

What could be possible solutions and/or proposals to respond to the challenge/need?

What are the resources to address it, and what are the obstacles?"

In conclusion, the social hackathon, together with digital Service-Learning, allows us to identify some common challenges in rural contexts in different parts of the European Union, such as intergenerational relations and digitalisation in educational key, as well as to share ideas for further implementation of rural Service-Learning.

Case Study

Educational Hackathons with Carlos Gómez Chuliá

Background

Carlos Gómez Chuliá, a Spanish educator technician, has been at the forefront of organizing educational hackathons. Originating from Catalonia, the EDhack model aims to connect people under a similar educational paradigm for social transformation. With experiences dating back four years, Carlos' hackathons have ranged from small events to more expansive post-pandemic gatherings. Participants generally consist of 60% active teachers, 10-15% students, and the rest associated with non-formal education.

Approach

Hackathons under Carlos' leadership focus on answering questions like "where do cows come from?" with designs generated by heterogeneous groups. Prizes often vary, but as Carlos says, “The reward was also, in this case, to have a guide to accompany them (such as mentors, i.e. the participating teachers), and the participants took contacts and the finished design home with them.” [Interview No. 2].

Tips for Organizing

Create Sharing Opportunities: Carlos believes in providing ample space for participants to interact and build bonds. "This provides very positive aspects for the collective construction of knowledge," he remarks. [Interview No. 2].

Environment Matters: The physical space should be friendly and conducive for participation. "The design and distribution of the space, the furniture, the lighting, etc., are important," says Carlos. [Interview No. 2].

Role of Facilitators: Carlos emphasizes the importance of well-prepared facilitators. “I would like to highlight the crucial importance of the figure of the facilitators. They accompany the groups during their work throughout the day.” [Interview No. 2].

Adaptability in Formal Education

Carlos notes that hackathons can adapt to formal education settings but require focus on depth of learning and timing adjustments. "Learning by doing is the key," he adds. [Interview No. 2].

Benefits and Challenges

Presential Hackathons: While they require more preparation and funding, the outcomes are generally excellent.

Virtual Hackathons: Easier to organize but generally lower in participation.

Tools and Competencies

Recommended tools include Wordpress, Youtube, Zoom, and Webmail. For educators looking to run impactful hackathons, key competencies include networking, time management, and social skills.

Conclusion

Carlos Gómez Chuliá’s approach to educational hackathons offers a comprehensive guide from planning to execution. His emphasis on community-building, adaptable learning, and the vital role of facilitators provides valuable insights for anyone looking to engage in educational hackathons.

Pedagogic principles of hackathon

03

The hackathon from an educational perspective

Hackathons originated from the technology sector and are now beginning to be transferred to the educational context (Garcia, 2022; Jussila et al., 2020; Martín García & Almaraz Menéndez, 2021; Suominen et al., 2019). Over the last 20 years, hackathons have become a phenomenon of significant popularity in the IT industry but are only slowly being adapted to the field of (higher) education (Rys, 2021).

Originally, hackathons served the development of technological solutions, however, now applied to other fields, the "solution" can be a teaching method or an educational tool. There are only few written experiences of intergenerational hackathons, e.g. one involving older people, encouraging them to join the technological revolution (Kopeć et al., 2018). Generally speaking, hackathons are not a method of innovation production and inventions. However, as Garcia (2023) points out, the educational hackathon literature is still very limited and research needs to be further expanded, especially in the education sector.

According to a literature review by Garcia (2023), computer science, social sciences, and engineering are the most studied academic disciplines where the hackathon method is applied, and engineering education is the most trending topic on which hackathons are centered. These findings argue for further hackathon studies outside of computer science and engineering to gain a better understanding of the hackathon method and its pedagogical potential.

A hackathon is a suitable methodology for tackling complex and interdisciplinary problems, for which there is no simple solution. A hackathon is a contest method, in which teams develop solutions in a set amount of time, and sometimes end with an award or prize. However, the question is, how does learning take place in hackathon challenges and which didactic principles need to be taken into account in order for learning to take place.

Learning approaches in the context of the hackathon method

The hackathon method can be associated with different learning approaches

01 Experiential learning (Garcia, 2022)

02 Cooperative learning (Cwikel & Simhi, 2022; Garcia, 2022)

03 Inquiry-based learning (Kienzler & Fontanesi, 2017; Garcia, 2022)

04 Project-based learning (La Place et al., 2017; Garcia, 2022)

05 Problem-based learning (Wallwey et al., 2022)

06 Brainstorming (Rys, 2021)

01

As a method aimed at the promotion of innovation (Garcia, 2023), it offers students experiential learning opportunities. During a hackathon, students actively work on solving a task within a time-bounded period. They interact and collaborate with others while finding new solutions. They engage physically, cognitively, and socially – all key components of experiential learning (Morris, 2020). Thus, hackathons have the potential to facilitate "experiential learning by offering students a real-world experience of problem-solving and collaboration through localized and time-constrained events" (Garcia, 2023, p. 2).

02

Cwikel and Simhi (2022) define hackathons as methods that involve problem-solving in small groups under time pressure in order to develop creative solutions to a challenging problem and fostering cooperative learning (p. 1563). The most common elements that characterize educational hackathons are students, which are divided into small groups, work intensively on a given problem in a centralized location at the university, where there is technical support, guidance, and refreshments. Hackathons require educators which are comfortable with working informally with students in a non-hierarchical form. Through its intensity and uniqueness, hackathons are special experiences for students, which cannot be repeated and present a one-time learning opportunity. In terms of learning, students learn in a non-lecture based form. Cooperative learning is rooted in early democracy conceptions of John Dewey (1916/1993), which also promotes critical thinking, community learning and social responsibility.

03

Kienzler and Fontanesi (2017) and Garcia (2022) make a connection to inquiry-based learning. Hackathons have shown to facilitate collaborative learning through inquiry. In this case, a question-driven approach is preferred compared to a rather topic-driven approach, supporting self-directed learning of students. The most important task of a learner (what the learner does), is to create knowledge. Inquiry-based learning as in hackathons are especially recommended for first year students to learn how to work in interdisciplinary teams and remove barriers to interdisciplinary approaches in general. Hackathons can draw on different forms of inquiry-based learning according to Aditomo et al. (2011) and can have their focus on simplified research, discussion-based inquiry, applied research, simulated applied research, enactment of practice, or role-playing. Students – in applying these methods – move from learning to discovering contents more effectively while at the same time developing critical thinking and problem-solving skills. However, guided instruction is still needed.

04

Hackathons are connoted with project-based learning (La Place et al., 2017) as teams create and develop solutions to problems in a short time. Developing solutions for complex problems require elements of project management to take place, such as dividing tasks in work packages in small groups or deciding on a timeline. At the end of a project cycle, usually, new project ideas emerge.

05

In problem-based learning (Wallwey et al., 2022) participants resolve complex and real problems together, for which there is not one correct solution or answer. The challenge, worded as a “hackathon challenge” in the beginning of the event, is a problem that triggers problem-based learning. The advantage for students is learning outside the classroom in a real-world context in interdisciplinary teams.

06

Rys (2021) distinguishes three types of hackathons: (1) the classic IT-hackathon, which is attended by participants in the IT industry, (2) the free hackathon, which has no predefined target group, and the (3) mix hackathon, which is currently the most frequent form and involves an IT element. From an educational perspective, hackathons evolve from brainstorming and always contain elements of brainstorming, however, the method should not be mistaken as a long brainstorming session. In a hackathon, a product or solution is developed, which is far more than brainstorming. Both individual and group performance is welcome.

Compared to other learning events or exams, students benefit from the availability of all necessary resources for the hackathon (like in an open-book exam), the autonomy and self-governing of small groups and being encouraged to fail openly and share lessons with others (Kienzler & Fontanesi, 2017). Connecting the hackathon method to learning approaches proves its relevancy to incorporate it more strongly in the education sector.

The phases of a hackathon process

Kohne and Wehmeier (2019) divide the **hackathon process** into **three phases**:

PHASE ONE

The first phase consists of preparation, in which a detailed plan of the hackathon is developed, the objectives and the topic of the hackathon are defined, and the framework conditions are set (date, location, conditions of participation).

PHASE TWO

The second phase focuses on operation. This phase mainly consists of the content work where the participants work in teams to solve a task. Afterwards, the results are presented in plenary and in front of a jury. The hackathon event concludes with an award ceremony.

FINAL PHASE

The final phase is the follow-up in which the developed ideas are transferred into practice, e.g., for a product development or the implementation of a concept in an organization.

Komssi et al. (2015) also distinguish the hackathon process into three phases. Suominen et al. (2019) adopted them for their case study about an urban-educational hackathon in the City of Rauma (Finland):

- In the pre-hackathon process, in addition to planning, training was offered to the participants. This is seen as useful if the duration of the hackathon event is short, otherwise it can be also part of the hackathon event. In their case study, Suominen et al. (2019) provided video clips on creative methods held by lecturers which supported the ideation process at the hackathon event. In the creative development phase, guidance from topic experts is necessary (Wallwey et al., 2022).

- The hackathon-event process represents the next phase, which is the central one. It consists of team building, the ideation process, the group work and the award ceremony. In the case study, the creation process of team building and idea generation were supported by two methods (Suominen et al., 2019, p. 49): The “Idea Walk” served as a brainstorming method where participants (individually or in small groups) walk around the room and write their ideas for certain topics on large empty sheets. This method was followed by the “Open Space” where students voluntarily presented their ideas and invited others to be part of their team. After that, each team worked on a hackathon task with the support of lecturers, who served as facilitators and mentors. After the teamwork, the awards ceremony took place in which the groups pitched their ideas to a jury. The winning team usually receives a prize (e.g., a gift voucher) and the other groups receive smaller rewards.

- The post-hackathon process forms the final phase. In the case study by Suominen et al. (2019), students wrote a report as part of the learning process, which was assessed by the lecturers who acted as facilitators at the hackathon event. In a final phase, participants finalize their prompts to overcome the challenge or problem. In this phase it is important to engage in stages of reflection and repetition in a no-blame, learning-from-failure environment (Wallwey et al., 2022).

Benefits for students participating in hackathons

Hackathons are great opportunities for students to learn the complexities and interdisciplinary nature of addressing real-world problems of a community, school, NGO, business or university.

Hackathons are considered a pedagogical approach at the "nexus between practical, theoretical, and technical dimensions of teaching and learning" (Garcia, 2022, p. 1913). They are favored as an innovative pedagogical method that combines what students learn in classes with real-life scenarios in collaboration with stakeholders outside the university campus (Garcia, 2022; Jussila et al., 2020). From a pedagogical perspective, hackathons are seen as a participatory method in which participants work together in multidisciplinary teams to develop an innovative solution to a technical and/or societal problem (Suominen et al., 2019).

Applying the hackathon method in a higher education context can lead to various benefits for students. According to Porras et al. (2018), hackathons meet the needs of students by promoting hard and soft skills, they foster collaborative work essential for later workplaces, and they stimulate students to take responsibility for real problems in society.

Garcia (2023) also highlights the potential of hackathons to build students' skills and competences that prepare them for the workplace. Students are given the opportunity to network and connect with stakeholders in a professional field that they are interested in (Jussila et al., 2020).

During a hackathon, students are engaged in hands-on, experiential learning opportunities where they can develop creativity and problem-solving skills and learn how to best collaborate with others to reach a certain result in a time-constrained period. In a study by Jussila et al. (2020), hackathons are framed as an innovative pedagogy that fosters students' entrepreneurship competences: "[A] hackathon allows the students to exploit their knowledge, explore new knowledge, and be creative in a fun, motivating, and collaborative way that truly enhances their innovation competence – and thus entrepreneurship competence." (Jussila et al., 2020, p. 63)

An important point for learning is highlighted by Jussila et al. (2020), who view the hackathon as a "collective experience" (p. 65) where students can contribute their strengths, and all are 'experts' at the same level. Students experience "the feeling of belonging to the group" (Martín García & Almaraz Menéndez, 2021, p. 58) that strives to achieve a common goal, and they learn how synergies can work successfully in an individual and collective way: "everyone learns a bit more than they would have in an individual experience." (Jussila et al., 2020, p. 65)
Civic hackathons have the additional potential to reduce stereotypes and prejudice towards specific population groups less known to university students. Also, they inform the wider public (and not only a specific business or group) (Wilson, Bender & DeChants, 2019).

Case studies of hackathons within the (higher) education context

The literature reports several hackathons in the context of (higher) education

Students gained and created knowledge in a hackathon for a global health challenge (Kienzler & Fontanesi 2017). In this hackathon students were asked to develop infographs with visual elements, content elements and knowledge elements for a global health challenge, which were later on presented in a poster session in the department of public health. The hackathon was clearly output-driven. The hackathon challenge was written by students themselves in a participatory approach with lecturers in the framework of a course. Before the full day event, several working sessions took place in the course to define the global health problems and write out the hackathon challenge in a feasible form. The hackathon itself produced several solutions to the posed problems. Finally, the course (and the integrated hackathon) was evaluated.

Wilson et al. (2019) report a hackathon with 27 students and 5 others who attended a 7-hour event, involving expert panels, rapid iteration, and solution pitches on the topic of community homelessness. The homelessness hackathon was organized by an interdisciplinary Steering Committee consisting of 13 university faculty, staff, and community members. The Steering Committee met for 4 months to plan the event agenda, design promotional materials (Wilson, Bender & DeChants, 2019, p. 739). The event itself started off with welcoming remarks, followed by a team-building exercise for participants to get to know one another and by a brief presentation about local homelessness by a community expert. Then teams engaged in a structured brainstorming activity designed to help them identify the problem they wanted to address and possible solutions. While developing solutions, consultations took place with rotating experts. Finally, teams were instructed to prepare pitch presentations lasting no more than 3 minutes.

In addition, one case study was explored further in the context of this study in a qualitative interview

The development plan of the University of Freiburg (Germany) included the objective of developing a Center for Learning and Teaching. For the conception of the center, staff members of the departments Teaching Strategy and eLearning intended to involve members of the university for this purpose. They came up with the idea to organize a hackathon. One of their goals was to make the hackathon method better known on the university campus, as the coordinator notes in the interview: “That was also a bit of our aim, to make the hackathon known as another form of developing something.” [Interview No. 3].

The organizational team of the hackathon sent out invitations to university members through university channels (e.g., email, flyers). Participants were able to register in advance on a digital platform where they obtained an overview of the challenges and signed up to work on one of them. The topics of three challenges were set in advance and one challenge was open for participants to define a topic themselves. The three challenges were: (1) defining the center's services and structures, (2) creating a concept for the center's website, and (3) designing a concept for the center's building and its facilities. Team building was therefore organized in advance during registration to allow more time for group work during the actual event, as the coordinator explained: “We did that before the hackathon, that we have the group work intensively.” [Interview No. 3]

The hackathon was planned as a one-day event. It started with a short welcome, followed by the group work, where each team worked in a separate room. The coordinator remembers that the groups worked very concentrated. She also saw the group work as the main learning part of the hackathon, when asked about it: “The collaboration, I think, was the most important thing. And the personal interaction.” [Interview No. 3]

In terms of the didactic framework, she endorsed the openness of the hackathon method deployed by her team that was facilitating the hackathon: “We were relatively open. That’s the concept of the hackathon, that you don't dictate so much how the groups arrive at their result. You want them to structure themselves. That's why we said we wanted to provide them with lots of materials, such as laptops and sticks.” [Interview No. 3]

At the end of the teamwork, each group prepared a pitch about their result and the participants voted for the best solution based on certain criteria (e.g., concept is convincing and feasible). Each result was presented at the university’s Day of Teaching and Learning by poster presentations and the concepts were also shown to the Rectorate.

When the coordinator was asked in the interview about the specific teaching format of the hackathon, she replied: “There are small groups working together, a bit under pressure. They are supposed to present something, and it's supposed to be competitive. (…) That's the vibe: We are a small group, we have a challenge, so to speak. (…) And now we are challenged to bring something in a short time. And yes, that's the challenge: Bring something, and how you do it doesn't really matter.” [Interview No. 3]

Limitations of the hackathon method

Critical voices underline some problems with hackathons like follow-through or follow-up of solutions and further development, installation of software or products, and maintenance of the products (Decker et al., 2015).

However, critics notice that the product might be a secondary outcome of the hackathon while attending the hackathon as a citizen might be the primary outcome, contributing to civic attitudes and solidarity (Kienzler & Fontanesi, 2017). Further disadvantages of hackathons are their rather high risk of failure and requiring participants to go through stress, exhaustion and dedication to complete the entire experience in one day (Rys, 2021).

Creating a hackathon challenge is a task that takes time, since participants must receive the same parameters of the challenge to be overcome, the same amount of time and resources, in order to be creative. Most hackathons last from 24-36 hours and take place in open working spaces, so that participants or teams can see what others are developing (Wallwey et al., 2022). Challenges which need to be met didactically are communicating between research disciplines and finding connections between disciplines that finally lead to a phase of creative development and explore potential paths forward to overcome a challenge (Wallwey et al., 2022). From a research perspective, a hackathon is a difficult research topic as they are hard to observe, as there are many things happening at the same time (Rys, 2021).

04

Development of base problems for Hackathon

The first step to organizing a successful Hackathon for intergenerational digital service-learning is to clearly identify the problem and develop a strategy for addressing it. This requires a deep understanding of the situation and the ability to analyze and evaluate it objectively.

Identifying the problem. What problem do you want to solve?

" if I were given one hour to save the planet, I would spend 59 minutes defining the problem and one minute resolving it."

Albert Einstein Spradlin, D. (2019b, August 23

With the help of this statement of the famous scientist emphasizes the importance of defining and analyzing the problem before solving it, which is usually underestimated by many newbies. Before the deep problem analysis, first we should understand how the problem identification can initiated.

Problems can be defined in various ways depending on the context and the nature of the problem

01 The most frequent and common way for problem definition is our observation and self-identification, namely experience. Problems can be identified by simply observing and noticing issues or inefficiencies in a particular system, process or situation. For example, if a teacher observes that their students are struggling to collaborate on digital service-learning projects, this could be a problem that needs to be addressed.

02 You can identify the problem through the receiving a feedback from the stakeholders, which can provide insight into problems that, may not be immediately apparent. This can be done through surveys, focus groups, or other feedback mechanisms.

03 Problems can be identified through data analysis, such as examining performance metrics or financial reports. For instance, if the data shows that older learners have difficulty accessing digital resources or services; this could be a problem that needs to be addressed.

04 Problems can be identified by comparing current outcomes with desired outcomes. For example, a student might identify a problem with their studying habits by comparing their grades to their study time and identifying a lack of effectiveness.

05 Identifying problems can be done by brainstorming with a group of people, such as colleagues or stakeholders, to identify potential issues and areas for improvement.

Once you have identified the crucial problem, which is needed to be solved, your main task is to focus on its space and origin. By conducting the research, you gain a deeper understanding of its causes and impacts. The question is what kind of strategy creators to study the problem space in the most efficient way should follow.

The Six W Questions

The six W-questions (Who, What, When, Where, Why, and How) are powerful tools for understanding problems and gathering information about them.By asking these questions, you can gain a deeper understanding of the issue and identify potential solutions: (see Annex 3) (Al, R. Firend Dec 2014).

- **Who:** Start by asking who is affected by the problem. Understanding the people and groups involved can help you better understand the problem and its potential solutions.
- **What:** Ask what the problem is, what its symptoms or consequences are?
- **When:** Ask when the problem occurs. When did the problem start?
- **Where:** Ask where the problem is occurring. Where is the problem happening?
- **Why:** Ask why the problem is occurring. Why is it happening?
- **How:** Ask how the problem can be solved. How can the issue be addressed?

In order to promote intergenerational collaboration in digital service-learning projects, it is important to identify the stakeholders who will be impacted by the project.

This includes recognizing the needs and perspectives of both older and younger learners who will be involved, as well as any organizations or groups that may be affected. Understanding the goals and desires of all stakeholders in relation to the project is essential, as is recognizing the challenges and pain points that they may encounter. To accomplish this, a collaborative persona canvas can be created using the template provided in Annex 4. This will facilitate the identification and understanding of the various stakeholders involved, allowing for more effective and impactful digital service-learning projects

Guidelines on how to use each component of the Persona Canvas template

01 **Arrange for a comfortable environment**. Create a creative atmosphere and have plenty of colourful materials and magazines at the ready.

02 **Fill out the persona with your team**. Try to come up with things that your persona experiences, and discuss what they might feel about the experience. What will their response be? Try to be specific, and selective.

03 **Create a story based on the filled template**. When you are creating a story you can use the template to map your audience(s) and what their perspective is.

04 Do **storytelling** and make group discussions about your persona canvas[1].

1 *Design A Better Business. Tools | Persona Canvas*. https://www.designabetterbusiness.tools/tools/persona-canvas

Identify Potential Solutions

When organizing a hackathon focused on intergenerational digital service-learning, it's crucial to identify potential solutions to the problems at hand. This involves generating ideas and evaluating them based on feasibility, impact, and potential risks and benefits.

One of the most effective tools for generating ideas is brainwriting, which is particularly useful when brainstorming sessions become dominated by a few individuals or when group dynamics impede creativity (Rohrbach, B 1969). Brainwriting involves each member of the group writing down their ideas on a piece of paper, then passing the paper to another member who reads the ideas and adds their own. This process is repeated several times, with each member building on the ideas of the others until a comprehensive list of potential solutions is generated.

Brainwriting is an inclusive process that ensures that all members of the group can contribute, thereby avoiding dominance by a single voice. This approach encourages participants to think more deeply and creatively about the problem at hand, leading to more innovative solutions. It is a valuable tool for facilitating intergenerational collaboration in digital service-learning projects for both students and older learners.

Example - Please collect as many ideas as possible and discuss them!

01 *Take 15 minutes and note as many ideas as possible in max 5 words (big) on a sticky note.*

02 *Put the sticky notes on a flipchart, present them and cluster them*

Once a list of potential solutions has been generated through brainwriting, the next step is to evaluate each idea using the how-now-wow method. This approach is particularly useful for intergenerational digital service-learning hackathons, as it helps to prioritize efforts and focus on the most promising solutions.

The how-now-wow method involves categorizing each idea into one of three categories: how, now, or wow. Ideas in the "how" category are practical, feasible, and can be implemented in the near future. These ideas are focused on improving existing processes or solving immediate problems. (Przybyłek, A., & Zakrzewski, M. 2018).

Ideas in the "now" category are considered realistic and valuable, but may require additional resources or time to implement. These ideas are often focused on improving current systems or products, or addressing current market trends.Ideas in the "wow" category are the most innovative and potentially transformative ideas. Although they may not be immediately practical, they have the potential to completely transform the way the problem is approached or solved.

By categorizing ideas in this way, the how-now-wow method allows teams to prioritize their efforts and focus on the most promising solutions. This approach encourages creativity and innovation, while also ensuring that practical considerations are taken into account. This is particularly important for facilitating digital service-learning projects for intergenerational collaboration, as it helps to ensure that solutions are effective and sustainable in the long term (see Annex 5).

In the context of an intergenerational digital service-learning Hackathon, the next stage of prototyping plays a crucial role in the problem base projects. A prototype is an early version of the proposed solution, which helps visualize and assess the design, functionality, and user experience (Elverum et al., 2016). By creating and testing prototypes, teams can gain valuable insights into the effectiveness of their solution, uncover potential flaws and limitations, and make necessary changes and refinements to create a final solution that meets the needs of both younger and older learners. Prototyping can be implemented by sketches and diagrams, paper Interface, storyboards, role-playing and physical models.

Guidelines for prototyping in the context of an intergenerational digital service-learning Hackathon

- **Start with a basic prototype:** Begin with a prototype that focuses on the core functionalities of the solution. This will help you identify any flaws or limitations early on and make necessary changes before investing more time and resources.
- **Refine through iteration:** Prototyping is an iterative process, and you may need to go through several rounds of testing and refinement before arriving at a final version. Use the feedback from users and stakeholders to make changes and improvements to the prototype.
- **Conduct user testing:** It is essential to test the prototype with real users to get feedback on the usability and effectiveness of the solution. Conduct user testing to observe how users interact with the solution and identify any areas for improvement.
- **Develop multiple versions:** Create several versions of the prototype to test different features or functionalities. This will help you identify the most effective solution and refine it further.
- Focus on the essentials: Keep the prototype simple and focus on the core functionalities. The goal of prototyping is to test and refine the solution, not to create a perfect final product[2].

In order to create prototyping during the development of an intergenerational digital service-learning Hackathon, the following template in Annex 6 can be used.

2 *DesignABetterBusiness.Tools | Prototype Canvas. http://www.designabetterbusiness.tools/tools/prototype-canvas*

What problems could different generations work on collaboratively?

In a rapidly changing world, it is becoming increasingly important for different generations to work together to address complex challenges. Intergenerational problem solving is a collaborative approach that involves individuals from different age groups working together to identify, analyze, and solve problems. By leveraging the unique perspectives, experiences, and skills of different generations, intergenerational problem solving can lead to more innovative and sustainable solutions. While collaborating in different generations work the most frequent question appears what challenge can unit all Hackathon's members and make them work in a team.

These problems should address the needs & interests of different generations, for example

- **Climate change:** Climate change is a global issue that affects all generations. Different generations could work together to come up with innovative solutions to reduce greenhouse gas emissions, adapt to the changing climate, and promote sustainable lifestyles.
- **Aging population:** With the aging of the population, there is an increased demand for healthcare, housing, and social services. Different generations could collaborate to come up with solutions to address these needs and provide support for seniors.
- **Technology and innovation:** Technology is rapidly changing, and different generations could work together to come up with innovative solutions to address technological challenges and promote digital literacy.
- **Social inequality:** Social inequality is a persistent problem that affects different generations. By working together, different generations could identify ways to reduce inequality and promote social justice.
- **Education:** Education is important for all generations, and different generations could collaborate to improve access to education, develop innovative teaching methods, and promote lifelong learning.
- **Health and wellness:** Different generations could work together to promote health and wellness, including developing new approaches to healthcare, promoting healthy lifestyles, and reducing the stigma associated with mental health issues.

A case study example highlights an intergenerational problem within a hackathon

The interview with the hackathon participant sheds light on their experience with hackathons and provides insights into the intergenerational problem within such events.

During the interview with the hackathon participant, an insightful example emerged that shed light on the intergenerational dynamics within hackathons. The participant shared their experience with hackathons and provided a specific hackathon they organized or attended as an illustrative case study. The timeless virtual hackathon in question was organized by Conesult, an online business incubator that embraces the hackathon methodology to foster collaboration and innovation. Conesult coach is everyone within the community, from students to senior professionals, and the business incubation program is integrated and automated within the platform. By creating it for intergenerational collaborations, it enables participants to look at their social problem form various perspectives. The participant's case was aimed to address social issues and create concepts, namely, to provide study and job opportunities for migrants from Africa. Therefore, with help of enlarging the network and communicating with other hackathon members, they came up with the decision to elaborate the concept of Education Sweden aiming at providing study and job opportunities for migrants from Africa.

Having elaborated the step-by-step manual starting with the challenge and finishing with prototyping and implementing, Conesult helped participants to test their idea and improve their product and service, gain portfolio experience and network, find a new idea and connect with the market, promote your concept or yourself in the meantime.

In terms of organising hackathons, the participant suggests avoiding complicated or technical language that might alienate participants from different backgrounds. They emphasize the importance of "user-friendly interfaces and clear communication, particularly for individuals who may not possess extensive technological or specialized knowledge". Additionally, the participant recommends "involving the target audience or potential users in the development process from the beginning". This approach ensures that the hackathon addresses the specific needs and preferences of the target group, leading to the creation of more relevant and impactful solutions. [Interview no. 4]

In conclusion, this interview participant's experience in the hackathon organized by Conesult exemplifies the power of intergenerational collaboration within the hackathon environment. Therefore, Conesult as a hackathon itself creates new horizons for new hackathons. The diverse range of participants contributed to the creation of a more holistic and impactful solution, demonstrating the immense potential that lies within harnessing the wisdom and perspectives of different generations.

Operational logistics of a hackathon

05

Hackathons: Where Tech & Innovation Meet

Digital transformation has been changing how we do things, and many are exploring to innovate leading to the rise of hackathons which is an emerging innovation practice.

While majority of hackathons revolve around fintech and IT services, other industries have followed suit. Hackathons are brainstorming events that bring together problem solvers and technology to hack real life problems and social issues on a given time frame. It is a tool to drive creative tangible solutions and address pressing problems. The concept of Hackathon using scientific literature is defined as “a type of organized, goal-driven innovation contest, a short time-bounded event with a challenge to be solved creatively in coopetition and collocation of teams, whose results are presented and recognized in a ceremony at the end of the event” (Halvari, et. al, 2020).

Organising a Hackathon: 12 Key Decision Process

While there are a multitude of guidelines available to prepare and run a hackathon, it is important to remember that when organizing a hackathon there are **12 key decisions from a hackathon planning kit** (Pe-Than, E.P.P, et. al, 2019) that organizers need to carefully consider and these below are the following:

01 SET HACKATHON GOALS

What do you want to achieve? Define a clear goal for the hackathon.

When setting the hackathon's goals, it is essential to involve the projected participants and potential stakeholders in the planning phase as this is a cross functional event.

A pre-hackathon survey can be conducted to gather the participants viewpoint and to be aware of the differences of goals and to prepare accordingly how it can be managed. This is strongly related to the participants satisfaction and outcome quality

02 CHOOSE A THEME

A theme or a multitude of theme provide framework for teams to brainstorm and execute an idea. Choosing a theme for the hackathon is generally created aligned with the goals.

03 DECIDE ON THE TYPE OF HACKATHON: COMPETITIVE OR COOPERATIVE

A competitive type of hackathon involves inviting a panel of expert judges, developing a criterion for evaluating, and determining the type of prizes to provide to the winning team. Part of the event is a presentation session where each team pitch their ideas in order for the judges to assess and choose the best team.

Prizes can differ from tech gadgets, cash prize and opportunities for continued development of the winning idea. A competitive hackathon is suitable for producing different solutions as the teams will be working under pressure.

A cooperative/ collaborative type of hackathon is structured on common goal and can run on a series if needed to develop an integrated solution or support a common cause.

04 WHAT IS THE LEVEL OF STAKEHOLDER INVOLVEMENT

Stakeholder's roles in a hackathon can vary and they can participate on any of the following ways:

- Sponsors – they provide support to the event and in return are mentioned in the hackathon website and other event paraphernalia
- Speakers – They can deliver talks, holds training sessions and workshops that contributes to the theme of the hackathon
- Mentors – These are seasoned professionals that can offer guidance, advice and feedback to the participating teams. Their primary responsibility is to motivate the teams to tum their beautiful ideas into realities
- Judges – They act as the evaluator of the presentation and/or submission and declare the winners of the hackathon

In some hackathons, stakeholders can also recommend specific challenges to focus

05 DEFINE THE TYPE OF PARTICIPANTS AND PLAN PARTICIPANT RECRUITMENT PROCESS

Who would be the target audience of the hackathon? This can be determined based on the event goal and themes. A selection process should also be devised to properly choose the right profile of participants for the hackathon.

Once organizers have decided on this crucial information.
Recruitment strategies can be planned.
There are generally two kinds of recruitment strategy that can be employed:

- **Open recruitment** – targets a wide range of participants with the aim to diversify the participants. This is suitable for fostering new collaborations and community building for a cause
- **Closed recruitment** – this is by invitation only for a specific group/ community to join the event.

06 CONDUCT OF SPECIALIZED PREPARATORY ACTIVITIES

Specialized preparatory activities aim to equip participants with the necessary technical knowledge (eg. framework, tools, software/ hardware) that will be required for the hackathon. These activities can be implemented in the form of webinars, provision of additional learning resource and onsite training.

07 SELECTING THE DURATION AND TIMING OF THE HACKATHON

Organizers need to decide how long the hackathon should run. The start and end date of the hackathon and breaks in between are dependent on type of the participants attending the event. The duration and time format can range from hackathons happening on Friday to Sunday, working days Monday-Friday, afternoon or evening spread out in a week.

A typical hackathon is about 48 hours divided into multiple days

08 IDEATION

The crucial part of the hackathon is the ideation process. This is the third stage of the design thinking process where participants generate ideas in sessions.

Some of the techniques from the Interaction Design Organization (2023) that can be applied:

- **Brainstorming** - participants build each other's good ideas
- **Brain dumping** - participants think of ideas individually
- **Brain walking** - participants walk around the room, adding to others' ideas
- **Body storming** - participants role play scenarios/ customers journey steps to find solutions
- **Worst Possible Idea** - A lateral thinking approach where participants can come up with worst solutions to a challenge and can be used to spark creative thinking, identify potential pitfalls, and ultimately guide the group toward more effective solutions.

There are more idea methods available and bottom line is "there are no bad ideas"

09 DEVISE TEAM FORMATION

The formation of teams usually happens at the beginning of the hackathon.
This can be formed by three approaches:

- **Open selection** - Participants are allowed to select the projects and roles they are interested in.
- A**ssignment** - Participants will be assigned to a project.
- **Hybrid** - Participants are offered projects and roles they are interested and qualified in. The choices have been filtered out by the organizer based on the registration sign up sheet filled out by the participant.

The size of a team is between 3 to 6 members, and it is important to have a similar team size for all participating teams.

10 DESIGN THE HACKATHON AGENDA

Agenda is the complete list of activities that will occur for the entire hackathon event. This contains the program schedule, and organizational details

11 IMENTORING STRATEGY

There are two kinds of mentoring approaches in hackathons:

- **On Demand Mentoring** - Mentors usually go around all the teams to give support when needed.
- **Dedicated Mentoring** - Mentors are assigned in one participating team throughout the event.

Checkpoint sessions can also be established wherein the participants can seek feedback on progress from the mentors.

12 MANAGE A CONTINUITY PLAN

Organizers can create opportunities where the participants can connect and collaborate. This will help build an active community even after the hackathon event.

Apart from Start-ups and development of an innovative product or service that will be launched in the market as the common continuation outcome of a hackathon, organizers can also take into consideration capacity building of a new technology that will be relevant with the assistance of stakeholders with similar interest

Types of Hackathons: Face to Face, Virtual and Hybrid

*Hackathons are customizable and the **12 key decisions for organizers** can be applied to face to face, virtual and hybrid hackathons. Face to face hackathons are the traditional offline in person event, virtual hackathons are fully implemented online while hybrid is a combination of both offline and online.*

In a hybrid hackathons, participants can choose to join physically or remotely. Organizers need to take note that virtual hackathons have additional technological requirements as this will be conducted online.

Most of the common **digital tools** being used are:

CATEGORY	SOFTWARE SUGGESTION
Digital collaboration tools: Speaking of exchanging ideas, sometimes teammates need to show, not tell. Online participants cannot scribble on the back of a napkin or scrawl across a chalkboard to help teammates more clearly visualize an idea or process. Remote attendees will need access to digital collaboration tools.	**Online whiteboard tools like:** • **Miro** is the online collaborative whiteboard platform that enables distributed teams to work effectively together, from brainstorming with digital sticky notes to planning and managing agile workflows. • **Google Jamboard** is a digital interactive whiteboard developed by Google to work with Google Workspace, formerly known as G Suite.
Briefing Sessions: Hackathons hold a session to inform the participants what is happening, and at the start of the event do a 'kick off'.	• **Google Hangouts:** Easy link to spin up if you use the Google Suite. • **Zoom:** Allow participants to enter your Zoom room, you can share screen and record the session.
Interactive Engagement: to ensure participants are fully engaged in the event and to peak interest throughout the Hackathon.	• **Menti:** easy, visual and compelling. Lots of features including ranking, quizzes, polls, word clouds, etc. • **Slido:** Use this if you want people to ask questions and vote on the questions/comments. The more votes it gets, the higher up the ranking it will go.
Centralized resource hub: An often overlooked aspect of any virtual event is a centralized resource hub. Ideally, attendees should be able to easily access event-specific information such as rules, schedules, FAQ's, and contact information. Giving participants access to a share file system means that answers are never more than a few clicks away and collaboration among teams is well organised.	• **GoogleDoc** can be used to create, and collaborate on online documents. Edit together with secure sharing in real-time and from any device, for free. • **DropBox** is a file sharing software that allows you to collaborate with friends, family, and coworkers. And store all your content in a single safe place and easily share files with anyone.
Registration trackers: ensuring participants register to the event so you have their contact details and keep in contact with them.	• **Humantix:** Aussie startup where a percentage of each ticket sale will go to a social cause. • **Eventbrite:** event management system that has large reach and can help with marketing your event.
Team submissions and voting: Team Submissions and Voting groups can put in their submissions for the hack whether it be a video via YouTube, GitHub depository, or link to the working prototype.	• **DevPost:** You can see all the submissions that come through and judges can go in and vote based on customised criteria. • **Google Forms:** Put in your team's group name, participants, and a link to what you have created over the period of time. Judges can go in and click on the links to either rank or score them.

Virtual Hackathons have started to become widespread as this removes geographical and financial limitations. *(Schulten, C.,et al, 2022).*

The Benefits & Breakthroughs of hackathons

Organizing hackathons have proven to come up with viable solutions and accelerating problem solving.

Some of the tangible benefits on both the participant and organizers side are the following:

- This can promote collaboration and a sense of teamwork among the participants as they work together as a group.
- This can increase problem solving skills and communication skills and unleash creative side of the participants/ employees.
- It is a great vehicle to bring employees together across roles, and departments which strengthen relationship building, inclusivity and engagement in the company/organization.
- It is cost effective and an efficient method to teach participants/ internal employees digital skills and use of new technologies.
- After the hackathon event, some companies, and organizations use this as hiring strategy for companies.

Case Study

A case study to highlight the operational logistics of organizing a hackathon: "Hacking education", Estonia

The interview with the hackathon organiser Helen Haga, the representative of Science Centre AHHAA (located in Tartu, Estonia) organized a 2.5-day education innovation hackathon for Estonian experts in education as part of the Hacking Education project. Helen helps shed light on their experience with hackathons and provides insights into how to organize an in-person hackathon event and the role of digital tools.

Firstly, the coordinator of the "Hacking education" had some useful tips that should help advise educators when organising a hackathon event of their own:

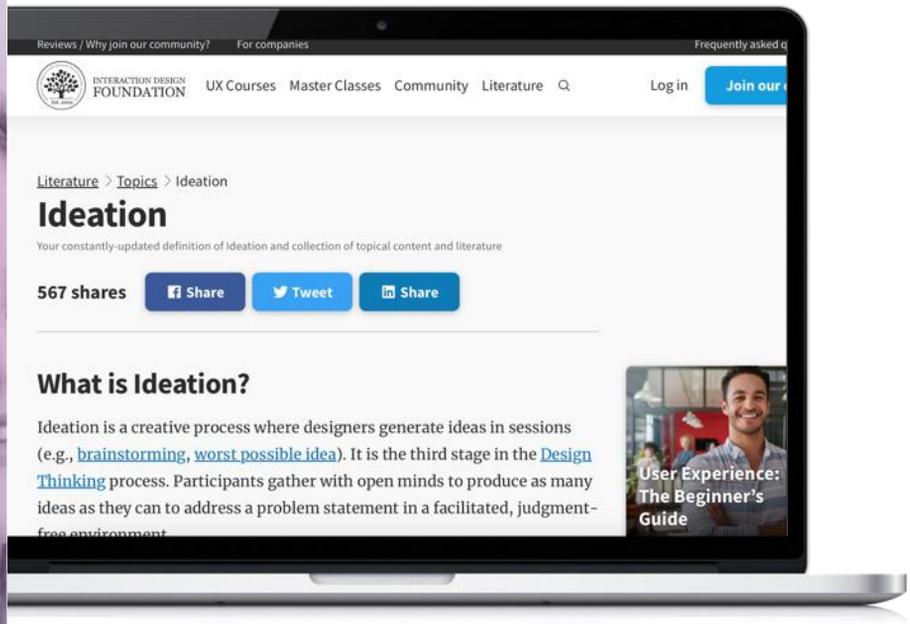
1. Find a reliable and motivated team to help you run the event.
2. Pay close attention to the premises and tools you need and make sure you prepare the venue/familiarise yourself with relevant details well in advance.
3. Ask the participants to specify what type of experts they would like to have as mentors already when they sign up for the hackathon so that you would have clear idea whom to look for well in advance.

Helen also specified some important points as to avoid: *"If I could organise our hackathon again, I would not have some teams share a room during individual teamwork sessions. I would make sure each team has their designated space. I would not expect the teams to get a grip on how to pitch as quickly as I did, so more pitching practice would definitely be worth it! Finally, I would not allow registered teams to cancel their registration less than 24 h before the event without some form of consequences."* [Interview no. 5]

We asked Helen if she had any insight on the use of digital tools within their EduHack hackathon, she outlined that she would recommend using "Mentimeter for feedback" as it is a very intuitive tool both for the poll creator as well as for the respondents. In the case of a hybrid or fully online hackathon, Helen suggested digital whiteboards such as Miro or Mural can be useful, "although they need some practice by the facilitator to make sure working on them runs smoothly". Out of the video conferencing apps/programmes available, Helen would recommend Zoom since the breakout room and annotation functions are very easy to set up and use. [Interview no 5]

Finally, we asked Helen about the benefits and challenges of having a face to face hackathon:
"The biggest benefit is that the participants can be present in the moment as they can see each other face-to-face and are able to read non-verbal cues better than in the case of online hackathons. The biggest challenges are the high cost and workload related to such hackathons: a face-to-face hackathon requires a physical space as a venue (which needs physical signage and being properly set up by the organisers), the participants should have access to snacks and drinks to keep them happy (and in the case of a multiple-day event, participants also expect lunches and dinners that can be quite costly) and to make sure the work flows, facilitators or hosts need to be hired/volunteer for the event." [Interview no. 5]

Additional Resources:



For more ideation methods, take a look on this website:
https://www.interaction-design.org/literature/topics/ideation

01

DCI Institute of Education held a virtual hackathon called the "Hack to Transform" where postgraduate research students solve an educational challenge which focused on Researcher Development Framework: Personal Effectiveness Competencies. At the end of the hackathons, the participants was able to cover create a solution for the educational challenge. Read more on https://blog.eera-ecer.de/hackathons-in-educational/

02

One of the successful hackathons that dealt with real life challenging issues such as developing sustainable food products, digital technologies and advanced manufacturing , sustainable tourism for a mountain valley etc. was conducted by E³UDRES² Hackathon last year 2022. Hackathons Hubs was also arranged in three different countries where teams can gather physically on site. The hubs was also connected virtually to have fully immersive hackathon experience. Read more on https://eudres.eu/hackathon-2022

06

The Role of incentives & awards within Hackathons

Introduction to incentives and rewards

Incentives and awards play a significant role in hackathons, serving as driving forces that foster motivation, engagement, and competition among participants. In the context of a hackathon, incentives not only motivate participants to contribute their best work, but also stimulate learning, innovation, and collaboration. The strategic use of incentives can effectively amplify the overall performance, engagement, and learning outcomes of a hackathon.

Deciding on the incentives and honours for a hackathon event can be a complex task, as the reward should encapsulate the hackathon's theme and objectives, whilst also being worthwhile to the varied individuals that make up the winning team. In the sphere of digital service-learning and education, inclusivity is a central tenet. Thus, it is likely that hackathon participants will hail from a range of backgrounds, professions, age groups, and so forth.

In choosing a prize for the hackathon, it is crucial to take into account the diverse nature of the participants, and to select a reward that is both useful and appealing to all. Just as with the selection of the hackathon problem, considerations of demographic, cultural, geopolitical, religious, linguistic, and economic contexts can also shape the choice of reward.

The Use of Incentives and Awards in Hackathons

Incentives in a hackathon can be both intrinsic and extrinsic. Intrinsic incentives stem from the personal satisfaction or fulfilment participants gains from the process, such as the joy of solving a complex problem, learning a new skill, or making a positive societal impact.

Extrinsic incentives, on the other hand, are tangible rewards or recognitions such as certificates, trophies, prizes, internships, or even potential employment opportunities. These incentives drive creativity and innovation by encouraging participants to think outside the box, collaborate with others, and leverage their skills to develop unique solutions. To foster a competitive yet inclusive environment, it is critical to ensure that incentives cater to a wide range of skills and strengths, recognizing not just the winning solution but also elements like best design, innovative idea, effective teamwork, or remarkable effort.The selection of appropriate rewards and incentives should hinge upon a preceding needs analysis, which takes into account the thematic interests of the participating demographic groups. Across several European Union nations, a Certificate of Participation is often seen as the most valuable incentive for students. While cash prizes also hold significance, there's a noticeable trend amongst younger individuals to prioritise the experience they acquire and the track record they establish. In contrast, for mature individuals and professionals engaged in service-learning and digital service-learning fields, cash prizes that reflect their efforts are of greater relevance. This is because they are often driven by the desire to bring their projects to fruition, particularly in an environment where such sectors typically lack sufficient funding

Assessing a Hackathon

Evaluating the success of a hackathon is an essential process that relies on established criteria reflecting the objectives of the event.

These might include the feasibility of the solution, innovation, teamwork, adherence to the theme, and impact potential. Judges, typically industry experts or educators, play a crucial role in the assessment process. Their feedback provides valuable insights for participants, guiding their learning and development. Furthermore, transparent, fair, and understandable judging criteria are imperative to ensure participants feel the competition is conducted with integrity.

The standards for recognising hackathon victors could be determined by the following essential questions

- **Does it hold commercial merit?** While this may be the least significant criterion, given our primary focus on the digital and service-learning aspects of hackathon solutions, the need for a feasible business or economic solution is inescapable even in the realms of service-learning and cultural intergenerational progression.
- **Will it have a meaningful effect?** This is a vital criterion when it comes to awarding winning solutions. We encourage our participants to be hopeful and ambitious, creative and fervent about their solution. Ultimately, a solution cannot be deemed a worthy victor unless it significantly impacts people (socially) and society (culturally or digitally).
- **Is it feasible? This** is of paramount importance. Although ambition and creativity are crucial, having attainable targets and goals also indicates that a winning team has put careful thought into their solution. If a solution is unrealistic, it's likely that it lacks sufficient commercial value, and it probably overestimates its potential impact. Therefore, a low score in this category often equates to a low score in the previous criteria as well.
- **Did the team innovate to create this solution?** This factor could make the difference between a solution being the best or worst of the hackathon. It's simple to mimic successful ideas, but it's much more challenging to amalgamate ideas, modify solutions or create entirely new ones. Originality can thrust an idea to the forefront, and it also demonstrates effective teamwork within the group.

Best Practices in HEI Context

Digital Education Hackathon (DigiEduHack) An EU initiative aimed at addressing challenges related to education and training in the digital age. In 2021, the focus was digital education for a sustainable world. DigiEduHack was composed of both a series of local events and a main stage event, with participation open to all. The event engaged diverse stakeholders, including teachers, educators, learners, policymakers, parents, and innovators, to co-create solutions for the future of education in the digital age. Three winning teams were awarded €5,000 each to start implementing their ideas and become DigiEduHack Global Ambassadors (European Commission, 2021). The event will return in 2023, with an expected participation of 75 hosting organizations and 2,500 participants through 55 events across Europe and around the world (European Commission, 2023).

Cultural Social Innovation Hackathons

Certainly, the hackathon methodology can be a transformative learning tool in formal education contexts, facilitating experiential learning and fostering innovative problem-solving skills. For instance, the Cultural Social Innovation project, another initiative of the Erasmus+ programme, is a compelling example of how hackathons can foster innovation and creativity in education. It provides a platform for learners, educators, and other stakeholders to collaborate and co-create solutions for cultural and social challenges highlighted by Covid-19.

During an interview, the Project coordinator of the Cultural Social Innovation EU (CSI EU) project outlined some advice on organizing hackathons: “My top three tips for a successful hackathon would be, firstly, ensuring a clearly defined problem statement or theme that aligns with the participants' interests and capabilities. This enables the teams to work with focus and purpose. Secondly, providing a conducive environment with necessary resources, including mentors and experts, helps facilitate learning and innovation. For example, in our Cultural Social Innovation Hackathon, participants worked on real-world projects/problems such as the effects of overusing social media, while learning new soft (such as teamwork) and technical (using digital platform) skills, which can be applied immediately. Lastly, creating opportunities for collaboration and networking enhances the overall experience, fostering a sense of community amongst participants.” [Interview no. 6]

Three things to avoid would be inadequate preparation, lack of diversity in teams, and poor communication. Inadequate preparation can lead to logistical issues, hampering the smooth conduct of the event. Lack of diversity in teams can limit the breadth of ideas and solutions. Poor communication can cause confusion and frustration amongst participants, affecting their overall experience and outcomes. [Interview no. 6]. As for educational material and examples, there are many available resources for organising and conducting hackathons. For instance, various online platforms provide guidelines, tools, and resources to facilitate hackathon organisation. Additionally, many universities and institutions have successfully incorporated hackathons into their curriculum. For example, the Aalto University in Finland coordinates the DigiEduHack, demonstrating how such events can be integrated into formal education to stimulate innovative problem-solving and collaborative learning. Such initiatives provide valuable insights into leveraging the hackathon methodology in a formal study context.

Potential Incentives and Awards for Digital Service-Learning Modules or Hackathons

Incentives in the context of digital service-learning modules or hackathons should be aligned with educational outcomes and objectives

While monetary rewards, trophies, and certificates are standard, consider also offering mentorship opportunities, further training, resources for project development, or showcasing their work to a broader audience. Additionally, academic incentives like extra credits, course exemptions, or recognitions such as 'Digital Service-Learner of the Year' can be effective.

One beneficial strategy following a Hackathon, is to track the progression of the winning concepts. Consider arranging one-on-one sessions with a start-up specialist or community service leader. These sessions would provide participants with advice on how to advance their idea and nurture it into fruition. A Hackathon presents a chance for creative cross-pollination in a communal endeavour to think innovatively about the targeted issue or problem. Therefore, rewards could also be accredited training courses aimed at enhancing the participants' skills, such as fostering out-of-the-box thinking or scaling their ideas.

Other potential prizes could be vouchers or discounts for relevant devices or novelty items produced by some of the Hackathon stakeholders/sponsors. Another prospect could be one off or recurring specialist consultation and project support meetings with an expert from academia or the business sector.In Denmark, we discovered an exceptional instance of a reward that effectively enticed participants. This was observed in the "Google x Techfugees Denmark Hack for Social Inclusion" organised by Techrefugees Denmark. The winning team was offered a one-year incubation at the IT University of Copenhagen to further their concept, serving as a compelling attraction for participants (Techfugees, 2020).

In conclusion, the use of incentives and awards in a hackathon can significantly contribute to its success, fostering a competitive environment that drives innovation, collaboration, and learning.

Overview of the qualitative case studies

07

№	CASE STUDY TITLE	COUNTRY	DATE	DURATION	GENDER	AGE	POSITION I.E. STUDENT, LECTURER, PROGRAMME COORDINATOR	ON-SITE/ ONLINE	LANGUAGE OF INTERVIEW
1	EDIT- An educational Video-Challenge Hackathon Project	Germany	5th June 2023	47 min	f	n.a	Lecturer	Online	German
2	"EDhack Las Naves", Valencia	Spain	22th May 2023	40 minutes	M	n.a	Education technician at FUHEM. Trainer in SDG and Transformative Ed. Coordinator of the WILLKA international cooperation project.	onsite	Spanish
3	Hackathon for a Center for Learning and Teaching	Germany	28th April 2023	42 minutes	f	n.a	Deputy Head of a Department for Teaching and Digitalization, Organizer of the hackathon	Online	German
4	Virtual hackathon organised by Conesult	Swedan	23rd May 2023	45 minutes	f	n.a	Student	Online	English
5	"Hacking education" Project, Estonia	Estonia	5th May 2023	53 minutes	f	n.a	Project manager of Science Centre AHHAA Foundation	Online	English
6	Cultural Social Innovation EU Hackathon	Ireland	26th May 2023	20 minutes	M	31	Programme Coordinator/Project Specialist	Online	English

ANNEX: References

Chapter 1

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ANNEX - Chapter 2

Annex 1

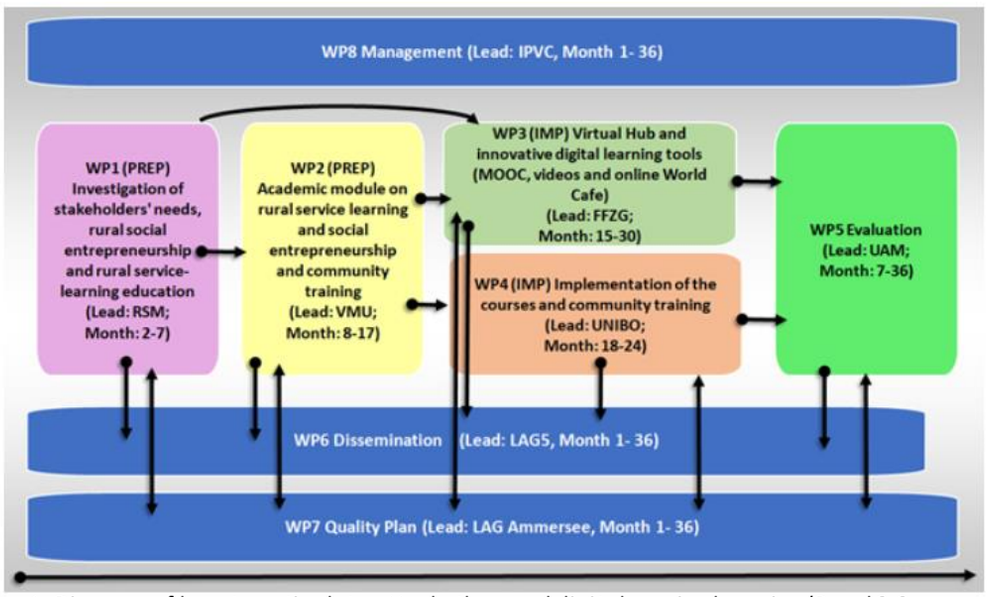


Figure 1: Diagram of how to articulate a Hackathon and digital service-learning (Rural 3.0 consortium Service-Learning for the rural development. Partners. https://rural.ffzg.unizg.hr/impact/)

Annex 2

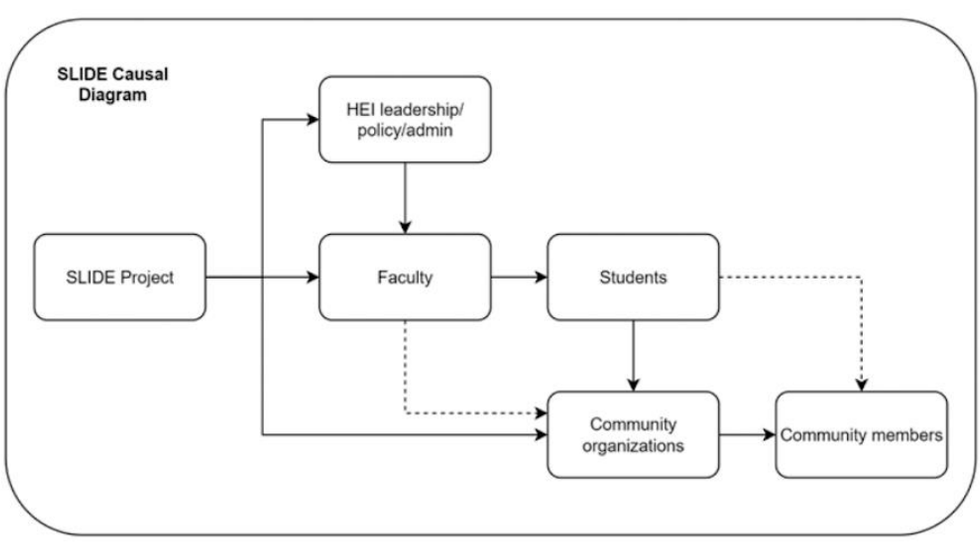


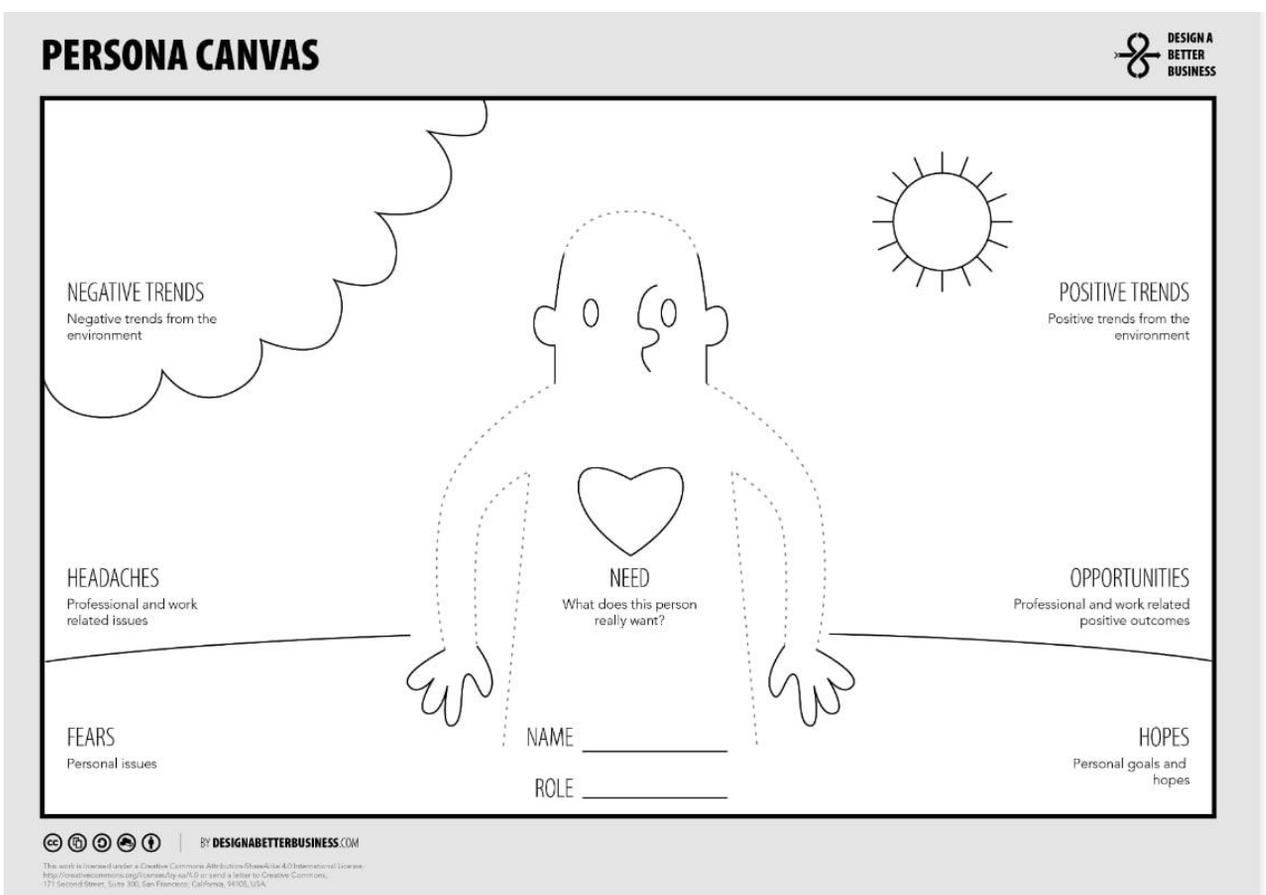
Figure 2: Order of participation in the SLIDE project (Cinque et al. 2022).

ANNEX - Chapter 4

Annex 3

Challenge	
W-Questions	
1 Who?	
2 What?	
3 When?	
4 Where?	
5 Why?	
6 How?	

Annex 4



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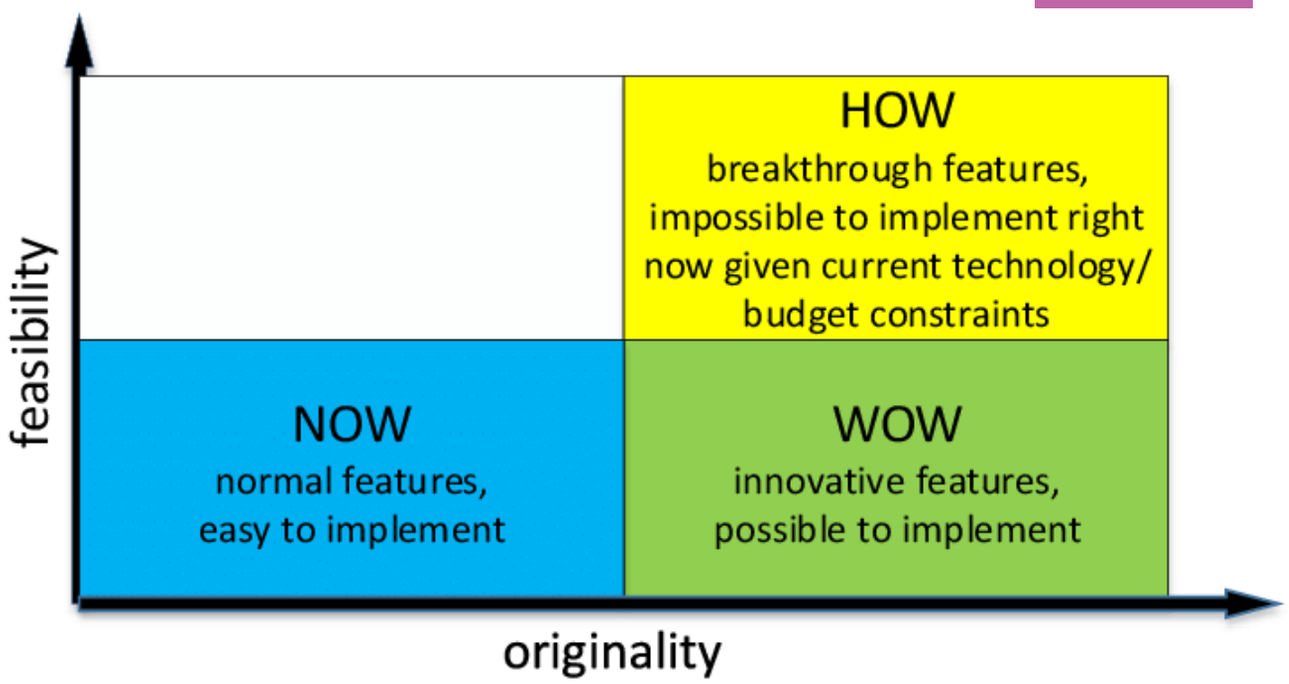
ANNEX - Chapter 4

Annex 5



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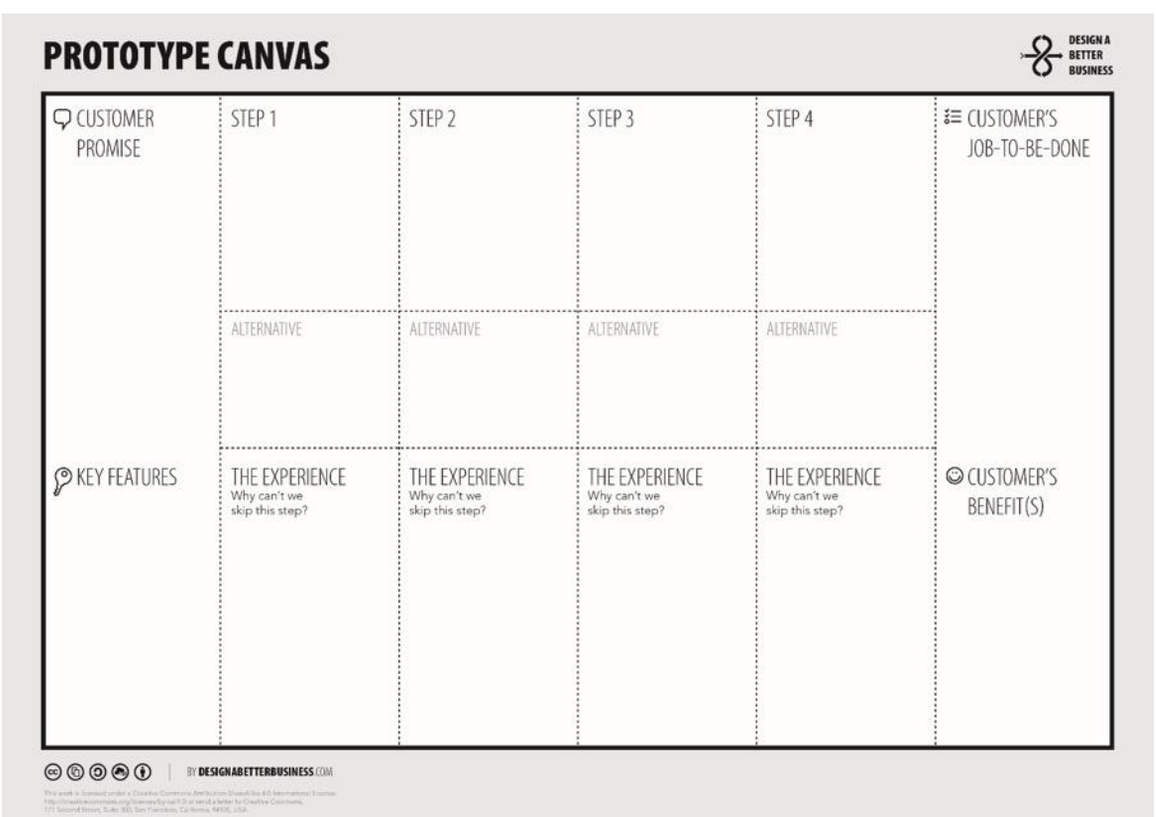

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