

HANDBOOK: USER TESTING IN PRACTICE

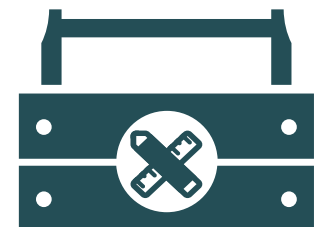


Aalto University
Design Factory



INDEX | USER TESTING IN PRACTICE

1	INTRODUCTION	3
	Context	3
	Purpose	4
2	THE TOOLS	5
	Pre-testing set	6
	During testing set	9
	After testing set	11
	Expansion pack	13
3	THE TOOLKIT USE CASE SCENARIOS	15
	2-hour workshop scenario	16
	2 sessions in a course	17
	Self-directed use in a project context	18
4	THE INDUSTRY CASE	19
	The narrative case from EpiHeart	20
	The template examples from EpiHeart	25



CONTEXT

Why was this toolkit developed?

Understanding how people interact with a product or service is essential to improving its usability, relevance, and overall experience. User testing is one way to access this understanding. It allows development teams to observe how users engage with an idea, identify points of confusion, and collect feedback that can inform design decisions.

Despite its value, user testing is often postponed until later stages of development, when changes are more difficult or costly to make. This toolkit was created to support both students and professionals in integrating user testing earlier and more regularly throughout the design and development process. It breaks the process into manageable steps and provides practical tools that can be applied without needing prior expertise in user research.

The aim is to make user testing a more approachable and routine part of design work, rather than a final-stage activity.

STRUCTURE

How is this handbook structured?

This handbook is divided into four main sections:

- 1 Part 1 introduces the **purpose** of the toolkit, its intended users, and when it should be used.
- 2 Part 2 presents the **tools**, organised into three sets corresponding to different stages of user testing: before, during, and after. It also explores the expansion pack with optional tools and resources to use if you do not already have a product idea.
- 3 Part 3 provides **practical use-case scenarios** that demonstrate how the tools can be applied in different learning contexts. Since the toolkit is broad and detailed, it allows for different combinations of templates depending on the time and scope available.
- 4 Part 4 presents an **industry case** from Finland, illustrating how a medical startup has approached user testing in practice.

PURPOSE

For whom is this tool?

The toolkit is intended for:



Students involved in product development or innovation-related projects



Educators supporting student teams in learning about user-centred methods



Professionals and early-stage teams working on new concepts or prototypes

The toolkit can be used by people with varying levels of experience, with a multidisciplinary group, and adapted to different testing contexts. It is structured to help clarify the focus of testing, prepare sessions, observe and engage with users, and analyse findings.

When to use this toolkit?

This toolkit can be used at different stages of the product development process. It is especially useful in the early phases when ideas are still being developed, and changes are easier to make. To use the tools effectively, there should already be something tangible to test, even if it is a low-fidelity prototype or an unfinished version.

Recommended use situations:

- The team wants to understand how users interact with a solution
- There are open questions or uncertainties about the ideas
- Different options are being considered, and feedback is needed to decide between them
- Usability issues, unclear features, or unexpected behaviours may be present
- The team is preparing to make design decisions and wants to base them on user input

2 THE TOOLS

The tools are organised into three main sets based on when they are typically used in the user testing process:

A PRE-TESTING

B DURING TESTING

C AFTER TESTING

An additional

! EXPANSION PACK

Includes **fictional user profiles, company briefs, and role-play cards**. These can be used to create scenarios in cases

where participants do not have an ongoing project, allowing them to engage meaningfully with the tools through simulated situations.

The toolkit is designed to be flexible. The tools do not need to be used in a fixed sequence or as a complete set. They can be selected and combined based on the goals of the session, the time available, and the level of experience of the participants. Educators may choose to use a small number of tools in a short session or spread the full set across several weeks of teaching. Similarly, professionals can adapt the tools to different stages of product development or to fit the resources of their team.

Each tool is introduced with a short description of its purpose and practical guidance for use.

The pre-testing tools are designed to support preparation before a user testing session. They help teams define what they want to learn, who should be involved, and how the session should be organised. Consider the following, when preparing your session:

Is a prototype needed at this stage?

Participants do not need a finished prototype at this stage, but they should have a clear idea of the solution and what they aim to test later. If there is no ongoing project, we recommend using the expansion pack, which includes fictional company briefs, user profiles, and matching product examples to support the exercise.

How should teams be organised?

We recommend doing these activities in pairs or small teams. This allows for discussion and comparison of ideas.

How much time should be allocated?

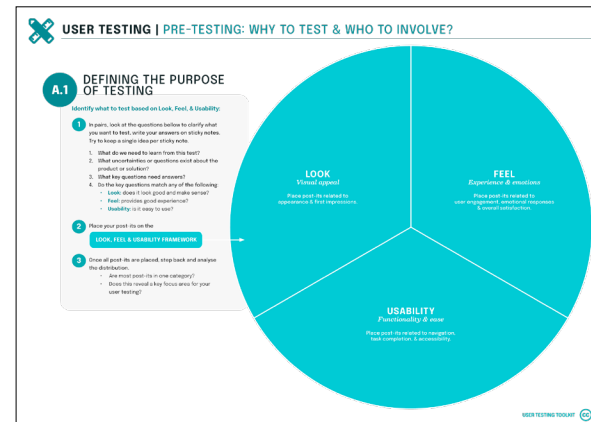
The tools can be used individually or in sequence, depending on how much time is available for the session. See the recommended times per tool on the right side:

TOOL		MIN	MAX
A.1	DEFINING THE PURPOSE OF TESTING Time to reflect on key questions and map them onto the Look, Feel & Usability framework.	15 min	30 min
A.2	SELECTING THE RIGHT TEST PARTICIPANTS Quick to introduce, but more time may be needed for deeper discussion and prioritisation.	15 min	25 min
A.3	ESTABLISHING A TESTING APPROACH Can be completed efficiently if testing goals are clear. Additional time may be needed if teams want to explore the methods in more detail. This activity can be done independently between sessions.	10 min	20 min
A.4 A.5	PLANNING SESSION LOGISTICS / MAPPING THE TESTING FLOW Covers both the practical logistics and structure of the session. Time depends on how much has already been decided and how detailed the plan needs to be. These activities can be done independently between sessions.	20 min	40 min

A THE TOOLS | PRE-TESTING SET

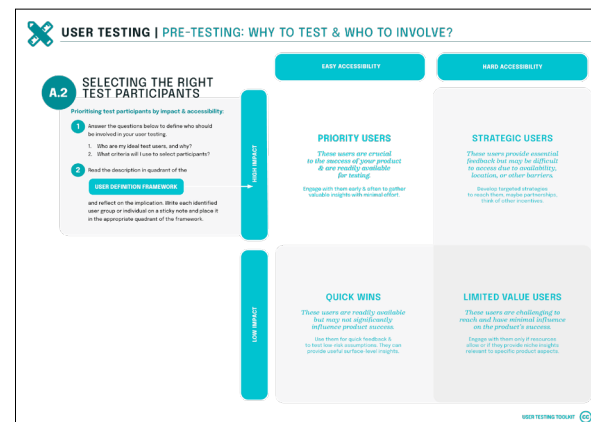
A.1 DEFINING THE PURPOSE OF TESTING

This tool helps participants clarify the focus of their user test. It introduces the Look, Feel, and Usability framework to guide reflection on the visual, experiential, and functional aspects of the product they are testing. Teams define what questions they need answered from the users and identify which aspects of the user testing are most important to investigate.



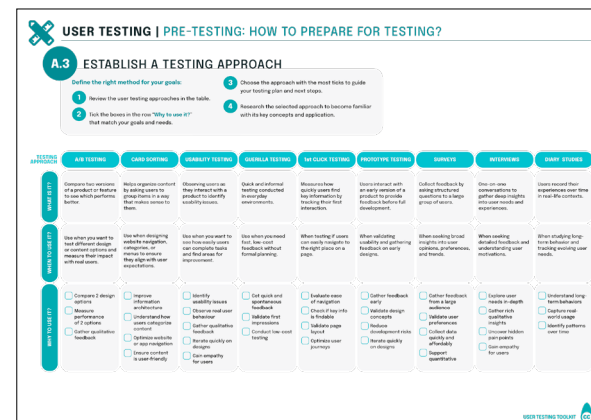
A.2 SELECTING THE RIGHT TEST PARTICIPANTS

This tool supports decisions about who to involve in the test. Participants consider different types of users and organise them on a matrix that compares their relevance (impact) and ease of access. This helps prioritise which users should be investigated first and understand where to focus efforts.



A.3 ESTABLISHING A TESTING APPROACH

This tool introduces a range of testing methods (such as interviews, surveys, or prototype testing) and provides a table to compare when and why each method might be used. Participants select the approach that best fits their goals, based on the amount of ticks in the "why to use it" section row.




A.4 PLANNING SESSION LOGISTICS

This tool helps participants organise the practical details of the testing session, including where and when it will happen, who is involved, and how data will be collected. It supports coordination and helps avoid common planning issues.

A.5 MAPPING THE TESTING FLOW

This tool allows participants to define the structure of their testing session step by step. They outline key moments and assign time for each part. This helps ensure the session runs smoothly and that important steps are not missed.


USER TESTING | PRE-TESTING: HOW TO PREPARE FOR TESTING?

A.4 PLANNING SESSION LOGISTICS

Organise the user testing session:

- Read the questions in the 2 sections:
 - Setup and team
 - Tools and data collection
- Choose the approach with the most ticks to guide your testing plan and next steps.
- Research the selected approach to become familiar with its key concepts and application.

SETUP & TEAM RESPONSIBILITIES

Where & when will the testing take place?
Who is involved in the testing & what are their responsibilities?
Discuss & make notes.

TOOLS & DATA COLLECTION

What materials or equipment do you need for the testing?
How will you document it or record the data?
Discuss & make notes.

A.5 MAPPING THE TESTING FLOW

Outline the testing session & key moments:

- Identify the key steps of your testing procedure and write each step on the template below. For each step, describe its purpose and the time you plan to allocate.
- Use the example below as a reference:
 - Step 1: Welcome (5-10 min)
 - Step 2: Pre-test interview (5-10 min)
 - Step 3: Testing time (10-40 min)
 - Step 4: Post-test interview (10-20 min)
 - Step 5: Debrief (5-10 min)

Write your notes here.

STEP 1


STEP 2

STEP 3

STEP 4

STEP 5

STEP 6

USER TESTING TOOLKIT
 

B THE TOOLS | DURING TESTING SET

The during-testing set is designed to support students while they are conducting a user testing session. It provides one template with simple guidance to help them start and close the session smoothly, and remain attentive while observing and interacting with users.

Is a prototype needed at this stage?

A prototype is not needed for this session, as the focus is on analysing insights. However, these insights should come from a previous user testing session that involved a prototype.

How should teams be organised?

We recommend doing these activities in pairs or small teams. This allows participants to compare observations and discuss different interpretations.

How should the session be structured?

These tools are designed to be used in sequence but can also be applied selectively depending on time and focus. Tools C.1 and C.2 support analysis and reflection, while C.3 and C.4 move toward prioritisation and planning.

How much time should be allocated?

The three parts of the template should be completed as part of a single-user testing session. See the suggested time allocation below:

STEPS IN THE TOOL		MIN	MAX
B.1	PREPARING TO START USER TESTING	3 min	6 min
B.2	OBSERVING & ENGAGING DURING TESTING	5 min	25 min
B.3	CLOSING THE TESTING SESSION	3 min	6 min

NOTHING TO TEST?

Explore the imaginary case briefs designed to be paired with real household items for user testing in page 13.

B THE TOOLS | DURING TESTING SET

This template guides students through the three key moments of a user testing session, and encourages students to adapt the questions and observations to their specific prototype and testing scenario.

B.1 PREPARING TO START USER TESTING

A short checklist helps teams welcome the participant, explain the purpose of the test, and request consent if needed. This ensures users feel comfortable and understand that there are no right or wrong answers.

B.2 OBSERVING & ENGAGING DURING TESTING

The main body of the template focuses on observing both spoken and nonverbal feedback. Prompts help students identify signs of confusion, frustration, or joy and ask relevant questions related to usability, emotional reactions, and future improvements.

B.3 CLOSING THE TESTING SESSION

A final checklist supports students in ending the session. It includes thanking the participant, asking for final thoughts, sharing the next steps, and checking if they're open to being contacted again.

USER TESTING | DURING TESTING: WHAT TO OBSERVE?

B.1 PREPARING TO START USER TESTING

Follow a preparation checklist for a smooth start:

Before giving the product to the user, take a few key steps to ensure a smooth testing session. Check each box as you complete the steps:

- ☐ Explain the purpose of the test
- ☐ Ensure users feel comfortable and understand there are no right or wrong answers
- ☐ Take a moment to ask if the users have any question

! In the beginning of the testing you should also ask for consent if applicable.

B.2 OBSERVING & ENGAGING DURING TESTING

NON-SPOKEN INSIGHTS

Observe behaviours when the user is testing the product:

- During the test, with what are users struggling the most?
- How do users naturally interact with the prototype? E.g. confused, curious, excited, etc.
- What unexpected actions do they take?
- Can you identify moments of hesitation, confusion or frustration? What causes that feeling?
- Can you identify moments of joy or surprise? What causes that feeling?

SPOKEN INSIGHTS

Ask the right questions during the testing:

GENERAL EXPERIENCE

- What was your first impression of the product?
- Was anything confusing or unexpected?

USABILITY

- How easy or difficult was it to complete the task? Why?
- Did you hesitate at any point? What caused it?

EMOTIONAL REACTIONS

- How did using this product make you feel?
- Did you feel in control while using it? Why or why not?

FUTURE IMPROVEMENTS

- What would you change in the product?
- Would you recommend this product? Why or why not? And if yes to whom?

Please note that these are general questions to get you going, tailor these to your prototype & testing scenario.

B.3 CLOSING THE TESTING SESSION

Express gratitude & conclude the session:

Remember, this user test wouldn't be possible without the user's time and participation. Keep this in mind when wrapping up. Check each box as you complete the steps.

- ☐ Ask if the user has additional thoughts
- ☐ Thank participant

! At the end of testing, briefly share general next steps to highlight the value of the user insights. If possible, ask if they're open to future contact.

USER TESTING TOOLKIT

C

THE TOOLS | AFTER TESTING SET

The after-testing tools are designed to help participants make sense of the insights gathered during user testing. They support teams in identifying patterns, translating insights into improvement ideas, and planning what to do next. Consider the following when preparing your session:

Is a prototype needed at this stage?

Participants do not need a finished prototype at this stage, but they should have a clear idea of the solution and what they aim to test later. If there is no ongoing project, we recommend using the expansion pack, which includes fictional company briefs, user profiles, and matching product examples to support the exercise.

How should teams be organised?

We recommend doing these activities in pairs or small teams. This allows for discussion and comparison of ideas.

How much time should be allocated?

The tools can be used individually or in sequence, depending on how much time is available for the session. See the suggested time allocation below:

TOOL		MIN	MAX
C.1	ORGANISING & MAPPING FINDINGS Helps teams review and group user insights to identify patterns or themes.	15 min	30 min
C.2	TRANSLATING INSIGHTS INTO OPPORTUNITIES Encourages reflection on what the findings mean and what could be improved.	10 min	20 min
C.3 C.4	IMPLEMENTING USER INSIGHTS DEFINING NEXT STEPS Combines prioritising ideas with planning concrete actions. These activities can be done independently between sessions.	20 min	40 min

C THE TOOLS | AFTER TESTING SET

C.1 ORGANISING & MAPPING FINDINGS

This tool supports participants in reviewing their user testing notes and identifying patterns across different responses. It uses a visual framework (Connected Circles) to group similar insights and make relationships between them visible. This helps clarify which findings are most relevant and where to focus attention.

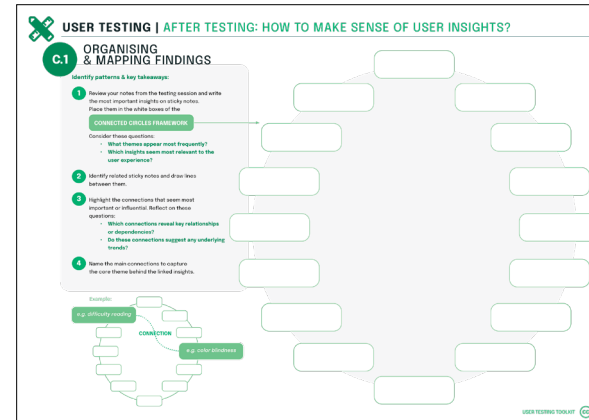
C.2 TRANSLATING INSIGHTS INTO OPPORTUNITIES

Building on the patterns or findings identified in C.1, this tool invites participants to reflect on what those findings imply for their product or concept. It guides them to propose possible improvements or areas for further development by using sticky notes to link key insights with corresponding ideas for practical changes in the product.

C.3 IMPLEMENTING USER INSIGHTS

C.4 DEFINING NEXT STEPS

This tool supports teams in deciding which insights to act on and how. Participants first evaluate ideas using an impact-effort matrix, helping them focus on improvements that offer the most value with reasonable effort. They then define the next steps by assigning responsibilities, identifying what progress would look like, and setting success criteria for future development.



USER TESTING | AFTER TESTING: HOW TO MAKE SENSE OF USER INSIGHTS?

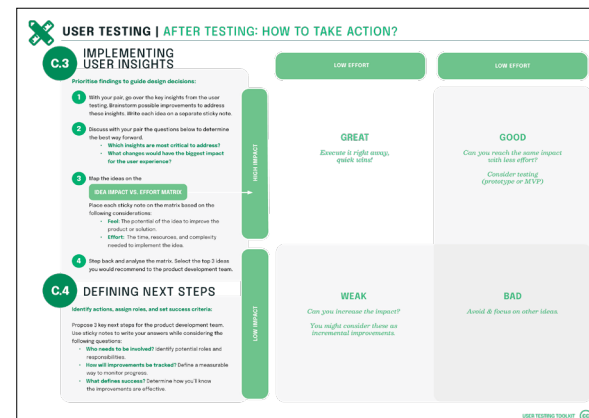
C.2 TRANSLATING INSIGHTS INTO OPPORTUNITIES

1 Reflect on user feedback to generate ideas

- Read the questions below and reflect on the themes you've identified:
 - What do these findings mean for the product?
 - Which connections could serve as potential improvement goals?
- Write your answers on sticky notes, focusing on the key takeaways and possible next steps.
- Place the sticky notes here in the corresponding sections to structure your reflections.

MEANING OF FINDINGS	POTENTIAL IMPROVEMENT POINTS
Place your sticky notes here	Place your sticky notes here

USER TESTING TOOLKIT





THE TOOLS | EXPANSION PACK

The expansion pack is a complementary resource to the main user testing toolkit. It is intended to support situations where participants do not have an ongoing project, or when it is more appropriate to first introduce the methods through a simulated scenario. The materials in the expansion pack allow participants to simulate the full user testing process. This approach helps them focus on learning and becoming comfortable with the methods, without needing to implement them immediately in their own work. Consider the following when preparing your session:

What is it for?

The expansion pack is not a standalone tool, but a complement to the main toolkit. It supports learning by allowing participants to practise the methods when no real project is available or as a first step before applying them in a real context.

How is it used?

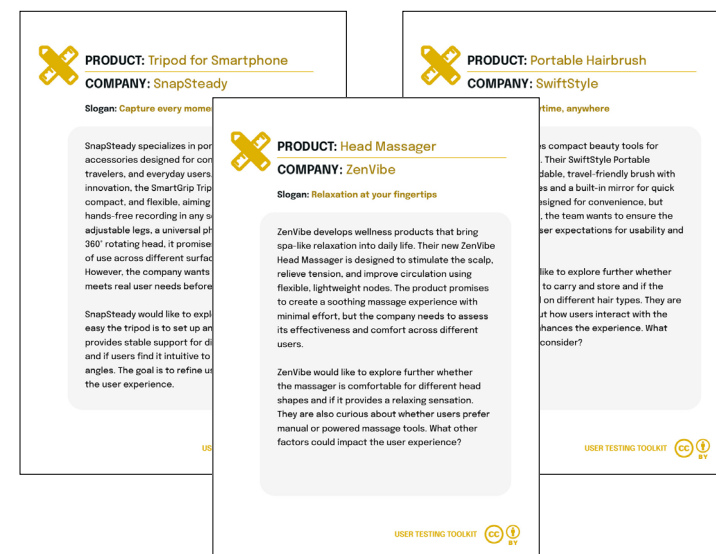
Each team is assigned one or more user profiles and a fictional company brief with a corresponding product. The physical product is not included in the pack and should be provided by the educator. These materials serve as the foundation for applying the pre-testing, during-testing, and after-testing tools.

How should teams be organised?

We recommend working in pairs. Participants are assigned roles using the role-play cards, facilitator/observer, and participant/user, to structure the session and allow each person to experience different parts of the user testing process.

COMPANY BRIEFS

Short fictional descriptions of companies and products, with explicit user testing goals. These briefs were designed to be paired with simple household items, allowing educators to use generic, readily available products (such as vegetable peelers, citrus squeezers, or tape dispensers) for hands-on user testing activities. Assign one brief per team to serve as the product context for applying the toolkit.

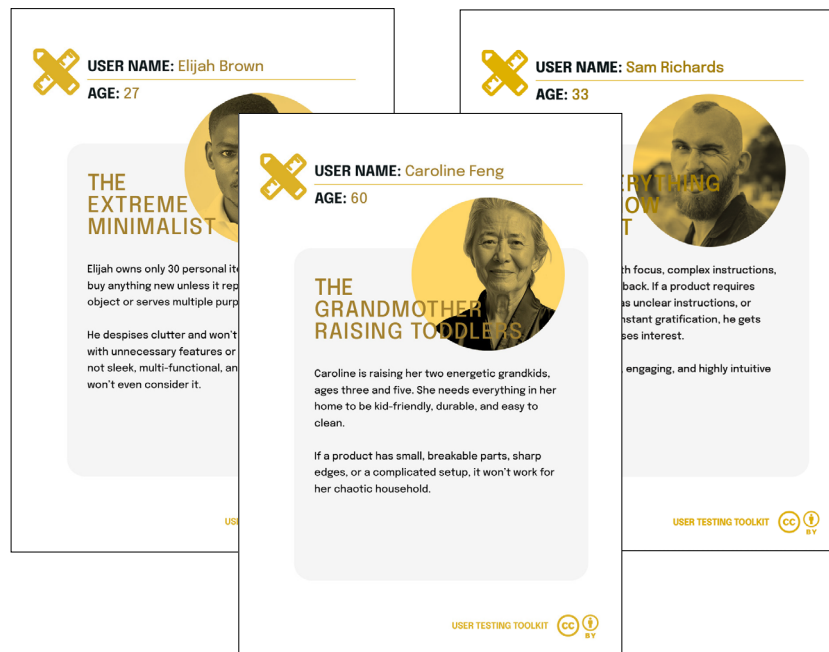




THE TOOLS | EXPANSION PACK

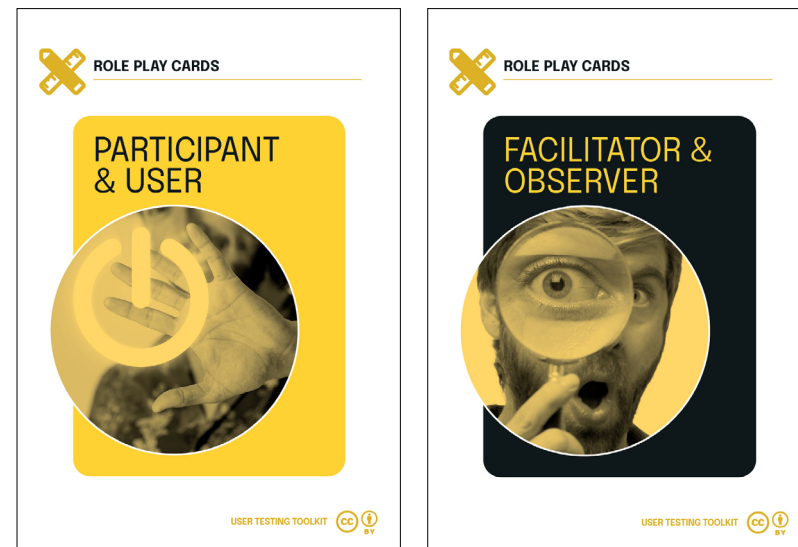
USER PROFILES

A set of fictional personas that represent a range of users with diverse needs, such as limited mobility, sensory sensitivity, or specific lifestyles. Used to frame the perspective of the user being tested. Assign one or two per team.



ROLE PLAY CARDS

Cards that assign team members specific roles, facilitator/observer, or participant/user, are used to structure the testing session through role play. This approach helps participants step into different perspectives and introduces a gamified element to the activity.



3 THE TOOLKIT USE CASE SCENARIOS

These examples illustrate how the user testing toolkit can be applied in different learning and project contexts. Each scenario outlines a possible journey, including which tools are used, how much time to allocate, and how the session or process is structured.

The tools should be used as they are but can be selected and combined depending on time and purpose.

3.1 SCENARIO | 2-HOUR WORKSHOP

This scenario involves a facilitated workshop designed to introduce participants to user testing methods. It is intended for situations where participants do not have an ongoing project and instead work with a simulated scenario. This session could take place in a classroom/training environment and uses the Expansion Pack, which provides user profiles, company briefs, and physical products to simulate a complete user testing experience.

Educators provide company briefs, user profiles, role play cards, and physical products that match the brief.

OUTLINE & TOOLKIT SET	TOOLS	DURATION
Introduction: Why is user testing important?	-	10 min
PRE-TESTING SET	A.1 DEFINING THE PURPOSE OF TESTING	20 min
PRE-TESTING SET	A.2 SELECTING THE RIGHT TEST PARTICIPANTS	15 min
DURING TESTING SET	B.1 USER TESTING FACILITATION / B.2 USING EXPANSION B.3 PACK MATERIALS	25 min
AFTER TESTING SET	C.1 ORGANISING & MAPPING FINDINGS	20 min
AFTER TESTING SET	C.3 PRIORITISING & PLANNING NEXT STEPS	15 min
Reflection & wrap-up	-	5 min

3.2 SCENARIO | 2 SESSIONS IN A COURSE

The 1st session (90 min):

Planning and preparing the test

OUTLINE & TOOLKIT SET	TOOLS	DURATION
Introduction: Why is user testing important?	-	10 min
PRE-TESTING SET	A.1 DEFINING THE PURPOSE OF TESTING	20 min
PRE-TESTING SET	A.2 SELECTING THE RIGHT TEST PARTICIPANTS	20 min
PRE-TESTING SET	A.3 ESTABLISHING A TESTING APPROACH	15 min
PRE-TESTING SET	A.4 PLANNING SESSION LOGISTICS + MAPPING THE TESTING FLOW	20 min
	A.5	
Reflection & wrap-up	-	5 min

Between sessions, participants conduct their user testing session.

The 2nd session (90 min):

Analysing and acting on insights

OUTLINE & TOOLKIT SET	TOOLS	DURATION
Introduction: How do you transform user insights into actionable practices??	-	15 min
AFTER TESTING SET	C.1 ORGANISING & MAPPING FINDINGS	25 min
AFTER TESTING SET	C.2 TRANSLATING INSIGHTS INTO OPPORTUNITIES	15 min
AFTER TESTING SET	C.3 PRIORITISING & PLANNING NEXT STEPS	15 min
Reflection & wrap-up	-	10 min

This scenario takes place within a course focused on product development, design, or innovation, where time is specifically allocated for user testing. The aim is to support students in planning, conducting, and analysing a user test within the context of their own project. The process is organised into two structured classroom sessions, with additional work completed independently between sessions.

This scenario involves a student team or professional group integrating user testing into an ongoing project. The goal is to use the toolkit independently to test and iterate on a real prototype as part of their regular development process. The work is project-based and follows a flexible schedule, allowing

teams to apply the tools as needed throughout different phases of the project.

This pathway is suited to teams working with real user access and evolving prototypes. The toolkit supports structure and reflection throughout.

OUTLINE & TOOLKIT SET	TOOLS	RECOMMENDATIONS
PRE-TESTING SET	A.1 DEFINING THE PURPOSE OF TESTING A.2 SELECTING THE RIGHT TEST PARTICIPANTS A.3 ESTABLISHING A TESTING APPROACH A.4 PLANNING SESSION LOGISTICS A.5 MAPPING THE TESTING FLOW	Used to define goals, identify users, plan logistics, and design the test. Can be completed over one or more days.
DURING TESTING SET	B.1 PREPARING TO START USER TESTING B.2 OBSERVING & ENGAGING DURING TESTING B.3 CLOSING THE TESTING SESSION	Teams are responsible for recruiting their own users. They can use the tools to structure the session, identify questions to ask, and look for cues related to non-verbal insights during observation.
AFTER TESTING SET	C.1 ORGANISING & MAPPING FINDINGS C.3 TRANSLATING INSIGHTS INTO OPPORTUNITIES C.3 IMPLEMENTING USER INSIGHTS C.4 DEFINING NEXT STEPS	Used to structure sense-making and prioritisation of next steps. May involve follow-up discussions or design iterations.

4

THE INDUSTRY CASE

This section provides a practical example of how user testing can be applied in an industry context. It features a case study from EpiHeart, a Finnish medical startup, to illustrate how user insights can guide product development decisions in real-world settings.

To complement the case narrative, the EpiHeart team completed selected templates from the User Testing Toolkit as part of a reflective exercise. These filled-out templates are included in this section as concrete examples of how the tools can be used in practice.

THE CASE | EPIHEART

WHY EPIHEART WAS FOUNDED?

Standardizing a new heart treatment

This treatment was developed through research at the University of Helsinki and Helsinki University Hospital, building on decades of work in cardiac cell therapies. It aimed to repair areas of the heart damaged by ischemia (restricted blood flow), typically caused by myocardial infarction (heart attack). After a heart attack, oxygen deprivation leads to scarring in the heart muscle, reducing its ability to function. While procedures like coronary artery bypass grafting (CABG) restore blood flow, they do not treat the existing scar tissue.

During CABG surgery, researchers removed a small piece of the atrial appendage (a non-essential, pouch-like part of the heart), processed it into micrografts (small tissue fragments), and placed them on a cell-free matrix patch (a scaffold that supports tissue repair). The patch was secured using a fibrin sealant (a biological glue) and applied to the scarred area of the heart at the end of surgery.

Initial studies, including a first-in-human trial with six patients, showed promising results: reduced scarring and thickening of the heart's ventricular wall. However, the process relied on lab equipment and was difficult to standardize. To enable wider clinical use and further studies, the startup EpiHeart was founded. The team began developing dedicated tools to simplify the procedure in the operating room. Despite hospital access restrictions during the pandemic in 2020, development began based on protocols from the original research team.

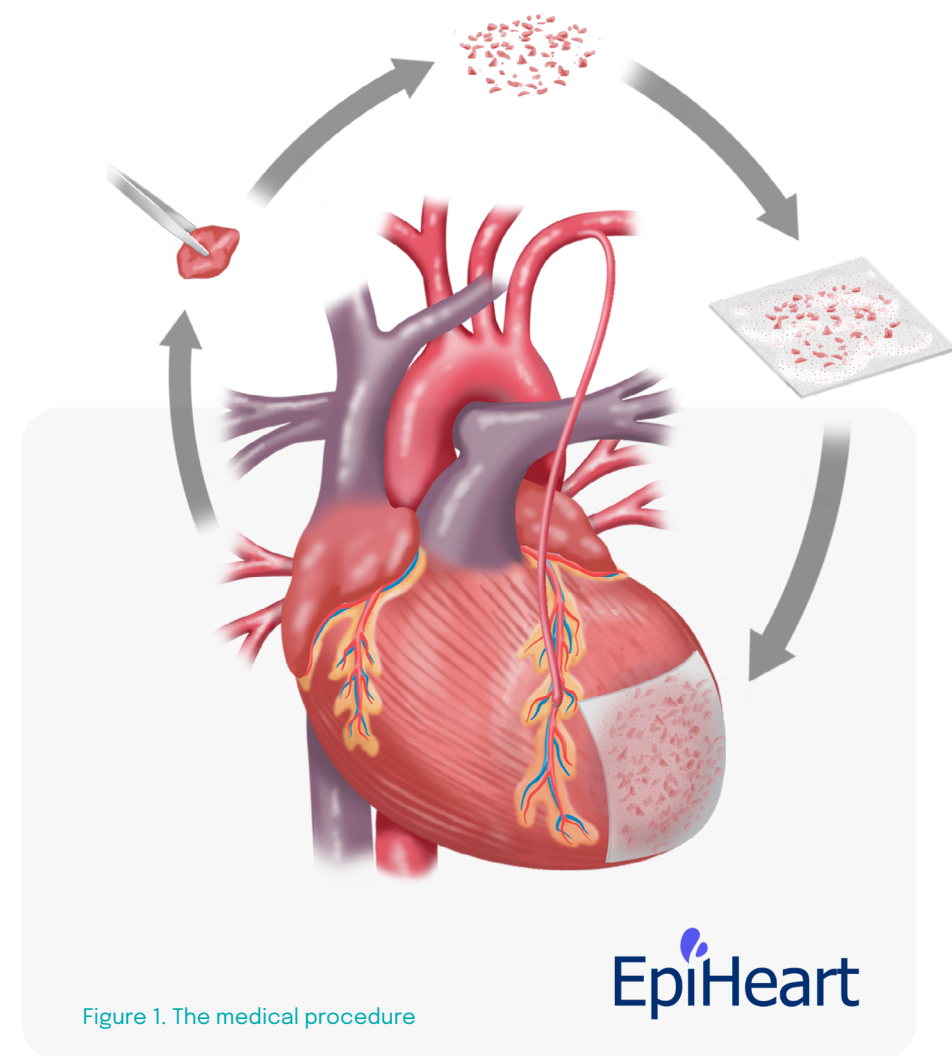


Figure 1. The medical procedure

UNDERSTANDING THE NEED

From protocol to a solution



Figure 2. Initial medical procedure setup

The original treatment protocol, developed during the early research phase, was complex and not designed for surgical environments. It involved many improvised tools, for instance, even a dental drill was used, and required several lab-grade items to be sterilised before entering the operating room. This made the setup burdensome and not well-suited for clinical use. Early user testing was conducted using the existing tools used in the treatment. To better understand the procedure and its practical challenges, the team organised a simulated workshop with the same nurses who had performed the original treatment.

At this stage, the team realised that although surgeons were critically involved in the treatment, removing a small heart tissue sample and placing the patch at the end, their role in the full process was limited. In contrast, the nurses were the ones performing most of the steps in preparing and processing the tissue. This led the team to place nurses as the primary users to consider in the design process.

The simulated workshop was held in an office environment due to COVID-related restrictions and became a critical learning moment. The EpiHeart team observed and recorded the process while asking questions in real-time, gaining first-hand insights into the workflow, pain points, and sterility constraints of surgical practice, such as preparing individually packed materials a day in advance or maintaining the tissue at the correct temperature with makeshift tools like dry ice. Two nurses participated, allowing for a comparison of perspectives and a broader understanding of their needs.

Being located next to Helsinki University Hospital gave the team unique access to the only nurses who had previously performed the procedure in an operating room. Their insights were considered essential, particularly in the early stages. At the same time, the team was also able to involve new research nurses who were expected to carry out the procedure in upcoming clinical studies. This provided valuable foresight, as the team knew exactly who the future users of the product would be, allowing them to collect feedback directly from those individuals and adapt the design accordingly.

This early user testing helped uncover what features were essential, which ones were optional, and what practical limitations the operating room imposed, such as who could handle specific materials and how the equipment could be positioned. Although it was not possible to observe the procedure on real patients at that time, the combination of observation, video analysis, and feedback from the nurses laid the foundation for future product design, highlighting the main areas of development as having a clear workflow and reducing the preparation time for the surgery. The insights gained from these sessions helped EpiHeart team to simplify and adapt the procedure into a scalable surgical solution.

FROM USER INSIGHTS TO PRODUCT DEVELOPMENT

From protocol to a solution

These early interactions with nurses directly informed the design of the first device. For example, temperature control emerged as a key challenge, especially because existing cooling systems were not suited for the sterile environment. The team proposed a novel solution: a cooling unit placed under the sterile cover of the operating table, creating a chilled area without breaking sterility. Nurses confirmed this was feasible, even though they hadn't used such a setup before.



Figure 3. Cooling plate prototype

The first prototype was rough, described as a bent aluminium sheet and a basic frame, built to quickly test whether the idea could physically fit on standard hospital tables. User testing began at this very early stage, not with a finished product, but with simple mock-ups designed to explore feasibility. This initial feedback helped validate the concept and shape the next iterations. As development progressed, feedback from nurses continued to influence design decisions. One key change was the redirection of airflow, originally

designed to blow downward, nurses raised concerns about stirring up dust from the floor. As a result, the design was modified to blow air horizontally beneath the table. The team also began prototyping additional features like a visual boundary for the cooled area to make the workflow more intuitive.

Continuous user testing with nurses, allowed the team to refine the product at every stage. Multiple prototypes were developed in parallel, each exploring different aspects of the solution: thickness and stability of plastic covers, positioning and protection of components, and cooling functionality. Early versions were vacuum-formed and tested for size, thickness and fit on different operating tables. Feedback ranged from concerns about flimsy parts and exposed edges to preferences for locking structures that would prevent components from shifting during surgery.

Later prototypes incorporated practical additions such as built-in holders for tools and centrifuge tubes, as well as clear guidance for workflow steps to support memorability and reduce setup complexity. A sterile-compatible centrifuge holder was also introduced, based on a concept tested with nurses using 3D-printed parts. With each cycle, the team adjusted designs based on real-world feedback, balancing usability, manufacturability, and surgical constraints.

THE CASE | EPIHEART



Figure 4.
Tissue handling prototype



The process culminated in a pilot test in an operating room in Germany, where the full setup was used in a real surgical environment. This final stage allowed the team to evaluate the product's performance under actual conditions, gaining valuable confirmation that the design functioned effectively in practice. This iterative prototyping and user testing approach enabled rapid learning and adaptation, leading to a final version that was not only easier to use but also ready for sterilization and integration into operating room procedures.

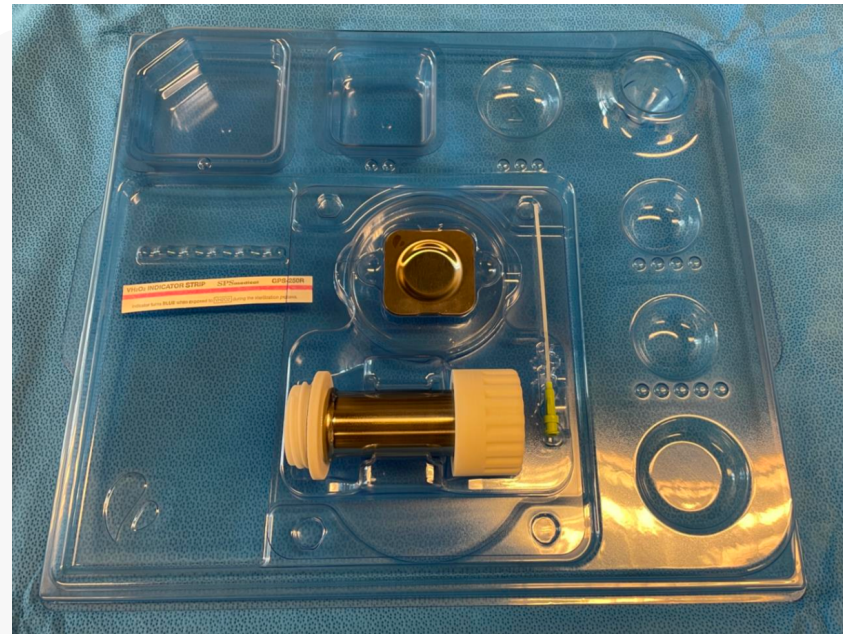


Figure 5. Final product

REFLECTIONS FROM INDUSTRY

Turning user testing into meaningful design

Looking back, the EpiHeart team highlighted several key lessons for making user testing meaningful and effective in real-world product development. First, they emphasized the importance of creating a comfortable and respectful testing environment. Building trust with users, in this case, surgical nurses, was essential. Simple gestures, such as offering coffee and asking humble, open-ended questions, helped encourage honest feedback and fostered collaborative relationships. As the team noted, “It pays back to be nice to people”. Engaging users early, even before a fully developed product exists, proved critical. The team stressed that simulating the intended use environment as closely as possible helped uncover practical challenges early on. While engineers benefit from early feedback, clinicians often expect more mature solutions, especially in regulated settings. This tension is common in medical product development and requires clear communication and expectation management.

The team also emphasised the value of good documentation throughout the testing process. Even when working in small teams, recording sessions and writing down insights helped ensure important details weren’t lost over time. They reflected that relying on memory alone isn’t sustainable, especially in longer or more iterative projects.

Finally, regulatory frameworks, such as ISO 13485 for medical devices, provided a structured process that reinforced good development practices: start by identifying user needs, translate those into design requirements, and continuously verify and validate with users. While documentation can feel burdensome, the team noted that this

structure can be useful for any field, helping teams stay focused on real user needs and systematically track design decisions. The team also advised prioritizing depth over breadth in user engagement. Instead of aiming to accommodate every possible opinion, they found more value in focusing on a clearly defined user group and designing with their needs in mind. As one team member put it, “It’s better to make one user happy than to design something broad that satisfies no one fully”. These reflections reinforce a simple but powerful takeaway: effective user testing is not about the number of tests, but the quality of relationships, clarity of purpose, and how well insights are integrated into the design process.

Applying the user testing toolkit

In the following pages, you’ll find example templates filled out by the EpiHeart team as part of a reflective exercise during a research interview. These templates complement the case narrative and provide concrete examples of how the User Testing Toolkit can be applied in practice.

Pro tip: For better readability, we recommend printing the templates in A3 format.



A.1

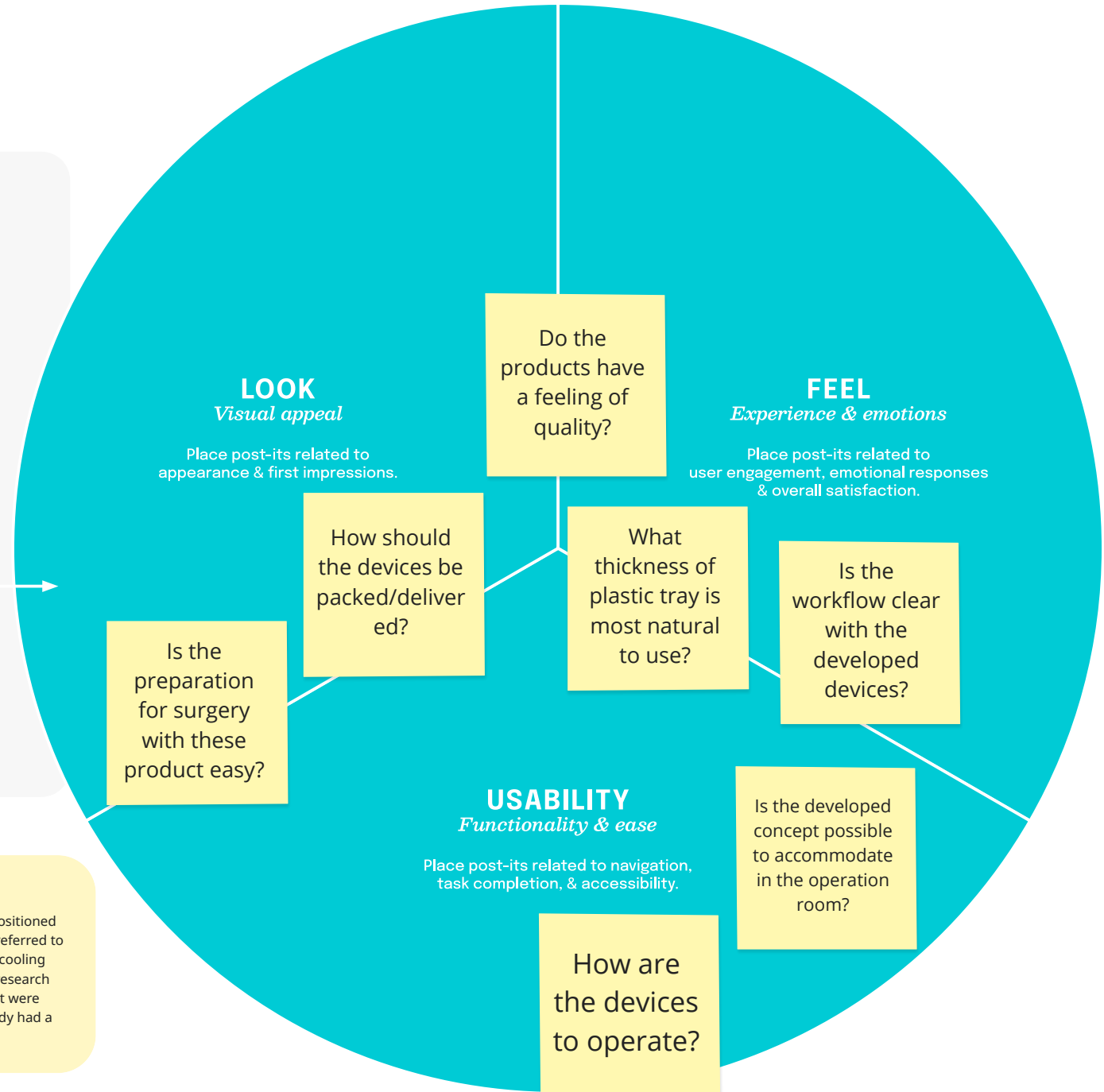
DEFINING THE PURPOSE OF TESTING

Identify what to test based on Look, Feel, & Usability:

- 1 In pairs, look at the questions bellow to clarify what you want to test, write your answers on sticky notes. Try to keep a single idea per sticky note.
 1. What do we need to learn from this test?
 2. What uncertainties or questions exist about the product or solution?
 3. What key questions need answers?
 4. Do the key questions match any of the following:
 - **Look:** does it look good and make sense?
 - **Feel:** provides good experience?
 - **Usability:** is it easy to use?
- 2 Place your post-its on the
LOOK, FEEL & USABILITY FRAMEWORK
- 3 Once all post-its are placed, step back and analyse the distribution.
 - Are most post-its in one category?
 - Does this reveal a key focus area for your user testing?

Context from Epiheart:

This template was developed as a reflective activity, where the company positioned itself at that point in time as part of a reflective exercise. The user testing referred to in this example relates to the stage when EpiHeart had manufactured the cooling plate prototype and the white plastic "tray" prototypes, and took them to research nurses for testing. The template was filled out considering the aspects that were taken into account before the testing. At that moment, the company already had a new concept for the operating room and the first prototypes in place.





USER TESTING | PRE-TESTING: WHY TO TEST & WHO TO INVOLVE?

A.2

SELECTING THE RIGHT TEST PARTICIPANTS

Prioritising test participants by impact & accessibility:

- 1 Answer the questions below to define who should be involved in your user testing.
 1. Who are my ideal test users, and why?
 2. What criteria will I use to select participants?

- 2 Read the description in quadrant of the

USER DEFINITION FRAMEWORK

and reflect on the implication. Write each identified user group or individual on a sticky note and place it in the appropriate quadrant of the framework.

Context from Epiheart:

This template was developed as a reflective activity, where the company positioned itself at that point in time as part of a reflective exercise. The user testing referred to in this example relates to the stage when EpiHeart had manufactured the cooling plate prototype and the white plastic "tray" prototypes, and took them to research nurses for testing. The template was filled out considering the aspects that were taken into account before the testing. At that moment, the company already had a new concept for the operating room and the first prototypes in place.

HIGH IMPACT

LOW IMPACT

EASY ACCESSIBILITY

HARD ACCESSIBILITY

PRIORITY USERS

Research nurses with experience of earlier generation of devices

Finnish operation room nurses

STRATEGIC USERS

These users provide feedback but may be difficult to access due to location, or other factors.

Develop targeted strategies to reach them, maybe by thinking of other incentives.

International research nurses

Surgeons

QUICK WINS

These users are readily available but may not significantly influence product success.

Use them for quick feedback & to test low-risk assumptions. They can provide useful surface-level insights.

LIMITED VALUE USERS

These users are challenging to reach and have minimal influence on product's success.

Distributor representatives

Engage them only if resources allow. They can provide niche insights on specific product aspects.



USER TESTING | AFTER TESTING: HOW TO TAKE ACTION?

C.3

IMPLEMENTING USER INSIGHTS

Prioritise findings to guide design decisions:

- 1 With your pair, go over the key insights from the user testing. Brainstorm possible improvements to address these insights. Write each idea on a separate sticky note.
- 2 Discuss with your pair the questions below to determine the best way forward.
 - Which insights are most critical to address?
 - What changes would have the biggest impact for the user experience?
- 3 Map the ideas on the
IDEA IMPACT VS. EFFORT MATRIX
Place each sticky note on the matrix based on the following considerations:
 - **Feel:** The potential of the idea to improve the product or solution.
 - **Effort:** The time, resources, and complexity needed to implement the idea.
- 4 Step back and analyse the matrix. Select the top 3 ideas you would recommend to the product development team.

The tray must be more stable on the cooling plate

The tray should house other components as well, eg. centrifuge tube

The cups have to be repositioned to ensure sterility and redesigned for added stability

HIGH IMPACT

LOW IMPACT

LOW EFFORT

The tray must be more stable on the cooling plate

GREAT

Execute it right away, quick wins!

The cups have to be repositioned to ensure sterility and redesigned for added stability

LOW EFFORT

The tray should house other components as well, eg. centrifuge tube

GOOD

Can you reach the same impact with less effort?

Consider testing (prototype or MVP)

The tray must be approx. 1mm thick

Products have to be easy to open as a sterile nurse

White colour would be optimal for the tray to see the operated tissue

WEAK

Can you increase the impact?

You might consider these as incremental improvements.

Numbering of the tray cups should be more visible

BAD

Avoid & focus on other ideas.

The sterile product kit should include also all other necessary equipment (syringes, needles etc)

Context from Epiheart:

After the user testing sessions, where research nurses interacted with early prototypes to give feedback, the concept was found to be feasible, but some improvements were needed. The tray had to stay more securely on the cooling plate, and the cups required redesign for better stability and sterility. Two individual sessions were held with nurses who had previously used older lab equipment for the same treatment. The treatment steps were acted out, and the nurses gave feedback throughout the process. This template was used to reflect on the company's learnings and design decisions at that stage.

CONTENT

Sara Santos Figueiredo
Vikki Eriksson
Tua Björklund

GRAPHICS

Anna Kuukka

ACADEMIC COLLABORATORS

This toolkit was developed in collaboration with our partners from Cali Design Factory (Pontificia Universidad Javeriana Cali, Colombia) and iCubo (Universidad del Desarrollo, Chile), both members of the Design Factory Global Network.



INDUSTRY COLLABORATORS

This toolkit includes an industry case developed in collaboration with Epiheart. We're grateful for their openness and support in sharing their experience.

ACKNOWLEDGEMENTS

This toolkit was developed with the support of the Aalto Design Factory community at Aalto University.

QUESTIONS

Don't hesitate to get in touch with us!
designfactory.aalto.fi



Aalto University
Design Factory

