

Case Study 1: MERU

Organisation overview

MERU is a medium-sized charity that designs and manufactures specialised equipment for children and young people with disabilities. Based in Surrey, the charity supports children and young people aged under-25 who live in London or the South East of England. MERU has 12 permanent staff and approximately 40 volunteers. It has in-house design engineers, design studios and workshops for producing prototypes and manufacturing custom-made devices. The main sources of income are annual grants and fund-raising activities. MERU has three main areas of activity:

1. Custom-made products

MERU's custom made service exists for people who can't find what they need anywhere on the market. Design engineers custom-design and manufacture new and complex products to address a wide range of needs – from communication and leisure to bathing and safety. Examples of custom-made products include a foot-free device to activate the sustain pedal on a piano and an alternative remote control for a remote controlled car.

2. Ready-made products

MERU recently began providing ready-made products because of repeat requests for similar products. Ready-made products include devices to provide stability and support (e.g. an attachment providing stability for children using school chairs), a travel chair, a powered indoor wheelchair for 1 to 5 year olds (Bugzi), power chair accessories and holding and positioning products (e.g. a detachable pull for fiddly zips).

3. Advice service

Given the limited resources MERU has to custom make products, they need to be sure that a solution doesn't already exist on the market. MERU therefore has an in-house physiotherapist and advice phone line to provide help and advice to anyone who is struggling to find a suitable project to meet a child or young person's needs.

Beneficiary involvement in service design and product development

There are currently no formal mechanisms for involving beneficiaries in **service design** although their views and ideas do inform service improvements, particularly in ready-made products. For example, after responding to a request from parents for a seat providing postural support for disabled children on airplanes, MERU developed a seating aid (TravelChair). The organisation then collaborated with Queen Elizabeth's Foundation for Disabled People (QEF) to introduce a new service 'Tryb4ufly' so that beneficiaries can try the seating aid before deciding whether to purchase it.



Figure 1: TravelChair – a seating aid for moderate to severely disabled children

All **custom-made products** are a result of a co-design process between a design engineer and beneficiaries. A process of matching a suitable design engineer with a project starts at a project referral committee. A design engineer who has the requisite skills and expertise will be involved in assessing the referral. If the referral is approved, the design engineer will start working with the beneficiary on the design of the product.

The **co-creation of the design brief** is crucial to the quality of the product. In some cases, brainstorming and props are used for problem defining and ideas creation stages though usually it involves discussions between the designer and the beneficiary and or their parent/carer about the requirements of the product:

'This is a piano pedal controller... The girl who requested it wanted to a device that enables her to control the sustaining pedal. When we asked how she wanted to control the device, the engineer noticed that she didn't move her head that much while she plays. So she

decided that she wanted the switch to be placed on her glasses, so it is controlled by tipping her head back.'

Co-creating the design brief is also important to ensure that unrealistic requirements or expectations on the part of the beneficiary are identified and tackled:

'...One girl wanted clutches that are adjustable and light. To make it adjustable, materials have to be added to make it strong enough to bear the weight. Because of additional materials, at the end, the product was considered too heavy for her. Some requirements are not feasible. It is important to find this out from the beginning.'

The involvement of healthcare professionals at the **project development stage** is also important:

'...an engineer might have to decide where to place a switch to operate a computer for a child who cannot sit up straight. If we place it where the child could easily bend down and operate it, it will result in him sitting in a wrong posture. However, if we put the switch in another place, he might not be able to operate it as easily, but it will encourage him to sit up straight. We are not qualified to make this judgement: we must listen to the child's healthcare professionals.'

If beneficiaries do not have any severe cognitive impairment, they will be involved in all key stages in the co-design process: defining problems, creating the brief, developing design concepts, selecting concepts, finalising details and testing the product. To ensure the product meets all the requirements in the design specs, at the **post-project stage**, the product will be assessed by another design engineer.

Challenges in the co-design process

Communication challenges between design engineer and beneficiary can make it difficult to adequately co-design a product and ensure it meets the needs of the beneficiary in the best possible way. This challenge can be due to cognitive impairments or a lack of confidence in the beneficiary. One design

engineer said that addressing this challenge requires *'listening to [beneficiaries] and avoid any preconceptions'*.

Managing conflicting opinions between people who are involved in the beneficiary's care is another challenge for designers, which highlights the importance of designers having both technical and communicative skills.

The co-design process requires a lot of staff time. This means MERU can only deliver a certain number of products per year and means they have a long waiting list. Staff time is the most expensive cost for MERU; most machines and materials are donated by local businesses or bought at discounted prices.



Figure 2: MERU's workshop space

Overcoming challenges

The CEO suggested that having technicians working alongside engineers could free up engineers from basic jobs, e.g. painting, to concentrate on more demanding tasks, e.g. fine-tuning a controller. This might enable a design engineer to carry out more projects at a time or finish the project quicker and be a cheaper option because technicians cost less to employ than design engineers.

Recruiting beneficiaries with an interest in the creative experience or the co-design process, and who have enough time to be involved is another important factor in a successful co-design process.

Working closely with other charities offering similar services in other regions is another way to improve services e.g. [Bath Institute of Medical Engineering](#), [Remap](#) and [Demand](#). CEOs and design engineers from these four organisations meet up at least three times a year to share new ideas and good practices.