Educational Toys
A blueprint to commercialisation

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Introduction

This report will investigate and evaluate the usability and commercial potential of PreMedPrep. This investigation will help determine a future roadmap for the product whilst contextualising the concept for novice readers. The report is based on a recent product testing study that gave an insight into the product's commercial potential. By analysing and evaluating the data, I was able to make conclusions about the future of the product and rationalise the next steps for the product.

Praxis Insight

Driven by personal ambition, my postgraduate studies became an explorative environment to discover and realise the potential of commercialising products. Setting high expectations and energetic goals, I believed I could take a product to market. The process of commercialisation would further benefit the products I am designing. Additionally, it'll be helpful to me as a designer and the progression of my design skills. Whichever career path I take, undertaking such a task will have long term benefits to my design journey. All new knowledge learnt by researching, learning, and refining my designing skills, will be transferred into my products.

Theoretical to Practical Solution

My design process always starts with a problem or a brief. Throughout my four years of studying Product/Industrial Design, especially during the latter years, I've developed a design method based upon the Double Diamon process. 'The double diamond is a visual representation of the design and innovation process. It's a simple way to describe the steps taken in any design and innovation project, irrespective of methods and tools used" Jonathan Ball (2022).

The process has become more than a 'simple way to describe the steps taken' (Thoring and Müller, 2011, p. 1) instead, a typeface for methodical design thinking. Thoring and Müller describe design thinking as 'a specific method to solve complex (wicked) problems and generate innovative solutions based on a user-centred approach with multi-disciplinary teams' (Thoring and Müller, 2011, p. 1). Likewise, when I approach problems or briefs, I undertake a methodical process of iterative designing and thinking to overcome problems and generate solutions. Designing aside, my way of working still adopts this approach in everyday tasks. More specifically, when researching and working on all elements of product commercialisation, I'm still required to process decisions and find solutions to problems methodically, whether these be design tasks or not.

The two products which embody my developed design methodology are PreMedPrep and Build & Ride, these are the face of my Confirmative Praxis.

PreMedPrep

PreMedPrep is a trading name used to describe a portfolio of consumer products developed under Design Higgins Ltd or (HiggzTM). PreMedPrep stands for Pre-Medical-Preparation, and the name abbreviates the product's true objective, which is to help children prepare for medical procedures.

Included in the PreMedPrep collection, is a product called Eilo the Elephant. This product is a preparation toy aimed at reducing the anxieties and fears children experience in the lead up to blood tests. Using gamification and buddy system techniques to prepare children and their parents beforehand, Eilo the Elephant helps guide children through their blood test and significantly enhance their patient experience.

Build & Ride

Build & Ride is a children's balance bike that engages children with STEM driven learning outcomes, in addition to stability and motoring skills. The product encourages dexterity and provides hands-on practical learning for children, encouraging them to take control of the construction and assembly of the bike. The bike's simple design enables a simple 'slot in' or 'screw on' assembly process. Additionally,

the bike features are designed with exaggerated scale to provide better user ergonomics. The balance bike offers additional learning skills besides just learning to ride a bike.

Both products have undergone a detailed and thorough design process to ensure they are validated with user and functionality considered. This design development includes conducting various known and new techniques, and activities to progress the products. For example, designing the product for manufacture is a vital step of the design process to ensure a product can be commercialised. While designing my product for manufacture, I developed working partnerships with third party design manufacturing specialists to get advice on how to improve my components. Using their advice and the new knowledge I gained, I translated this into my products to further enhance the manufacturability of the product.

When commercialising a product, all product areas must be considered. Commercialising involves up-taking new design practices and alternatives to product design. Graphical and illustrative designing have become skills I've refined and evolved whilst designing and constructing product literature for my products. These have been in the form of children's storybooks and product instructions, including a range of digital character illustrations, product line drawings, and storytelling.

Finally, product testing and usability evaluations on the PreMedPrep product are significant processes undertaken within my praxis. Testing and evaluating a product involved collaborating and liaising with in-field practitioners and patients to contextualise the problem solution and the product. Completing the testing and evaluations required an enormous amount of planning and research. To ensure the testing will yield results which can either, further develop the product or consolidate and validate the product. Using a mixed-method approach of interviews, focus groups, and in-field tests allowed me to analyse the product in relation to the product specification critically.

The next section of the report will focus on Elio the Elephant, PreMedPrep. This part will display, analyse, and conclude the testing I have undertaken and will hopefully prove there is potential for commercial success with Eilo the Elephant

Product Usability Testing

Is there a place for this product?

Yes, there is a space for this product in the market, I can state this which confidence, due to the evidence I have to support this statement. Discovering the answer to this question required exposing the product to experts and users. Over the past year and a half, I have been conducting in-depth user-centred research into the product's usability. This research phase began when I obtained a collaboration with the Accelerate Wales scheme at ATiC. Collaborating with ATiC has allowed me to access industry contacts and connect with local paediatric practitioners, both fundamental in conducting a successful usability study. The body of research and testing in this report was undertaken in stages to yield the best possible results. Throughout, the goal has always been to understand how users interact and operate the product to achieve specific goals.
To begin this research investigation, I conducted practitioner interviews and focus groups to contextualise the problem solution using expert knowledge within the field.

Stage one – Practitioner Interviews

Stage one was the initial stage of research and testing, which provided plenty of feedback. The purpose was to evaluate the current product prototypes alongside practitioners to understand the challenges faced concerning taking blood samples from children. This stage offered insights into how to improve the product, to overcome challenges, and provide more effective and satisfying user experiences, further reducing anxiety in children.

Researching began by creating an interview session plan, the session needed to be articulated to extract all the information necessary to develop the product further. I designed a testing session that ran in three sections: Storytelling, Product Demonstration and Brainstorming. These sections would provide a thorough insight and capture the behavioural and subjective responses of the end-user. The feedback from clinicians would be implemented into the product to improve aesthetic, functionality, and usability. To see the session plan in more detail please view Appendix A.

The Results?

During this stage, I completed four successful interviews with clinicians, from, Play Therapists to Paediatric Psychologists. For clarity, this stage was solely to gain professional feedback on the prototypes and better understanding of any faults.

Storytelling Conclusions

From the start, it was clear that there was a mutual agreement amongst all that there was a problem at hand. One clinician stated, 'lots of children are naturally frightened of it' (Higgins, 2022. A), referring to children having their bloods taken. They further discussed how 'some children have to be held down, as they require meds' (UX Interview), this first-hand experience confirms that the original problem I identified is a real issue. The practitioner's comments gave me confidence that my design direction and developed prototypes would be well received in the next stage, during the product demo stage of the interview.
Most clinicians had a similar process of explaining blood tests to children. They insisted on giving plenty of 'information and knowledge about the procedure before they had to experience it. It can start days before or may go on for several months if the child is particularly difficult.' (Higgins, 2022. A). In reference to Eilo, it was a relief to see that my design decisions were being confirmed and the direction I

took the product in succeed. My product provides small doses of information which help build a visual picture. Consequently, when one clinician discussed how she executes 'quite basic things such as talking about veins and blood and how they work, make them understand it's *'this much'*, *'a teaspoon'* (Higgins, 2022. A) it further confirmed that providing information is an essential step when administering a blood sample.

Practitioners stated in their interview that they generally utilise play and toys to help prepare children for procedures. Not necessary procedure-specific toys, if at all, but the use of 'toys and other things, curated to the particular child.' (Higgins, 2022. A) Therefore, this an additional conclusion drawn from the interviews that there is a place for my product within this field. They are in need of a specific toy, and Eilo is a producer – specific toy, fitting this criteria. As the clinicians spoke of their experiences further, I gained confirmation regarding my theoretical design thinking. I researched the topic well and what surrounds it, but a designer, is not a professional clinician and don't specialise in specific medical professions. Therefore, you can only rely on your sound judgement, alongside solid research to decide what the right thing to design.

Product Demo/Brainstorming Conclusions

This section of the session merged and became one. It felt natural to ask participants for feedback and ideas whilst interacting and showing the product. It became the most important section as I could identify what would and wouldn't work in a medical environment.
Four main areas arose in the conversations, I felt that these held the highest priority and importance, I believed they are the focal point of the new product development stage.

1. *The Action of Inserting the Needle*
   Suggestions were made to improve this interaction by increasing the length of the syringe tube or the location of where you insert it. This would allow for a better and more accessible view of the liquid draining.

2. *Needle Insert Location*
   Based on the previous feedback, it was clear the needle location needed adjusting. Not only did clinicians suggest it could insinuate the wrong impression, but it also could restrict the patient's interactions.

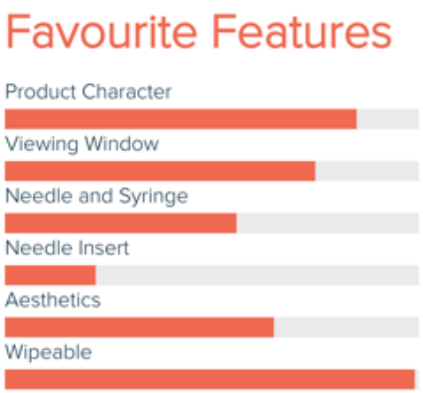
3. *Syringe Design*
   Clinicians suggested that the syringe lacked realistic details and would be beneficial if the syringe looked like the syringes they used within their practice.

4. *Lack of Storytelling about Character*
   During the interviews, almost all participants suggested that it would be good to have 'a range of tools or accompanying material (digital app or book) that can help build the character and story into the procedure process' (Higgins, 2022. A)

Please refer to 'PreMedPrep User Interview Report' to see all feedback and developmental areas (Appendix A).

Figure 1 below shows a visual scoring overview of the product features and functions, which the participants in the focus groups analysed. Each graph represents a different participant and shows noticeable correlations between feature ratings. For example, in two separate interviews, both participants rated the needle insert considerably low. This is a clear indication that this feature needs improvement to ensure it would receive a better rating next time it is evaluated.

Participant 1



Participant 2



Fig 1. Adam Higgins, 2022. User Interviews Report [Usability Scoring].

Stage Two – In-field Product Testing

The purpose of the second stage of research and testing was, firstly, to evaluate and discover if new design improvements had been effective. Secondly, to understand product performance and usability in a medical setting. Participants were asked to measure the product's usability by completing an evaluative questionnaire with a patient. The testing was organised within a realistic medical environment to replicate real-life scenarios. This would allow for more accurate results and yield a better product analysis. The data received from the testing would help contextualise and understand the product related to its user, environment, and functionality.

To conduct this type of testing, participants were required to carry out the testing themselves. This was due to the constraints of medical environments at the time. Therefore, I had to create a plan for participants to follow, which is also intuitive to conduct. The test was separated into three main areas which would measure the products; Effectiveness, Efficiency and Satisfaction. Each metric would evaluate different areas of the product but together would make up a comprehensive analysis to prove if the product is successful or not. This stage would also give an insight into how the product performs in it's chosen environment and user. The product was still in its developmental phase at this stage. This means that this testing will provide additional opportunities to identify any bugs or issues which could affect its function or performance.

Conducting in-field testing proved difficult in getting participants to come forward to take part. Due to the potential complications involved in testing a prototype, I believe people hesitated in taking part as well as ongoing COVID 19 implications. Despite this, I obtained a testing partnership with Tŷ Hafan'sChildren Hospice. This involved having two of my prototypes within their facilities and being used by three paediatric medical practitioners. I believe this was sufficient in gaining enough feedback and practitioners to present a fair and reliable test. Many children have a permanent residence within the hospice and often require routine blood samples. In addition to this, they make home visits to a handful of patients to collect blood samples and get new patients who arrive at the hospice for blood sampling. Tŷ Hafan was an ideal environment for receiving product feedback and would test the product to its maximum potential as a leading healthcare charity for children.

Testing Method

Participants (practitioners) were asked to use the products with the patients (children) throughout the stages of completing a blood test. They were asked to follow and complete the tasks listed below.

1. Introduce the product to the patient
2. Allow children to use the product and interact with all design elements and accompanying material.
3. Use the storybook with the product to explain the blood sampling process. (Adopt the product into your current methodology of work)
4. Administer blood test
5. Complete section 4 of the questionnaire with the patient
6. Complete section 1-3 of questionnaire.

Goals

The primary goal of undertaking usability tests was to measure the extent of which Eilo the Elephant, can be used by specified users to achieve defined goals with effectiveness, efficiency, and satisfaction in a specified context.

1. **Identify Bugs & Issues with the product.**
   Understanding how the product performs within its chosen environment. At the same time, identifying any potential issues or faults that could affect the product's function or performance.

2. **Test product concept with target audience.**
   Testing the product with its intended target audience will provide insight to further define and confirm an appropriate target age range.

3. **Reveal friction points and confusing experiences.**
   Having a testing period will allow for an additional product development stage. During this time, we will be able to adjust and tweak the design based on and issues recorded by participants.

4. **Measure the products Effectiveness.**
   How effective is the product in providing a better overall medical experience for patients? Understanding how well or how much the product can improve blood tests

5. **Measure the products Efficiency**
   Understanding if the product helps reduce procedure times or can the product impact procedure times in a good way?

6. **Measure the satisfaction of target audience.**
   Aim to understand the user's impression and thoughts of the overall product. Satisfaction covers several product areas so it will be measured in many usability metrics.

The results?

In reference to the testing goals, I set out to measure how effective and efficient the product is while also measuring user satisfaction. This section of the report aims to break down each area and provide an analysis of each.

By analysing the results, it is integral to state that there was 10 participants in total, with ages ranging between 6 and 14 years old. Both Tŷ Hafan Clinicians and child patients took part.

Effectiveness

Was the product successful in producing the desired result? When referring to a desired result, it relates to, if the product was valuable and effective at preparing, supporting, and executing the blood test? Was it good at providing elements of new knowledge and learning? In short, did the product live up to its product specification?

A simple way of measuring the effectiveness metric would be the patient completion rate. Figure 2 shows 90% of participants completed their procedure with the use of the product, this is a key observation to note. The high uptake rate suggests that there are apparent anxiety related issues with the procedure. If there weren't issues with the procedure, children and practitioners wouldn't feel the need to use the test product in that scenario. Although Figure 3 shows high uptake, it doesn't necessarily mean it was effective 90% of the time. However, 80% of patients stated they would prefer to use the product in their next blood test procedure. This supports the idea that the product had a positive impact on the process and has successfully provided support in specific elements of blood sampling.



Fig 2. Adam Higgins, 2022. *PreMedPrep In-Field Usability Testing Report* [Graph 1a].

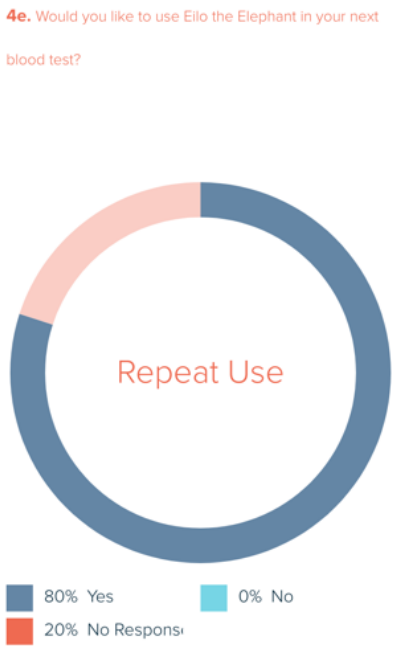


Fig 3. Adam Higgins, 2022. *PreMedPrep In-Field Usability Testing Report* [Graph 4e].

In further analysing the effectiveness, I was presented with comprehensive insight into how effective the product was. Participants were instructed to evaluate how the product provided understanding, whilst alleviating worries and misconceptions. These core elements form the psychological, emotional, and cognitive support structures of the product.



Fig 4. Adam Higgins, 2022. *PreMedPrep In-Field Usability Testing Report* [Graph 3a].

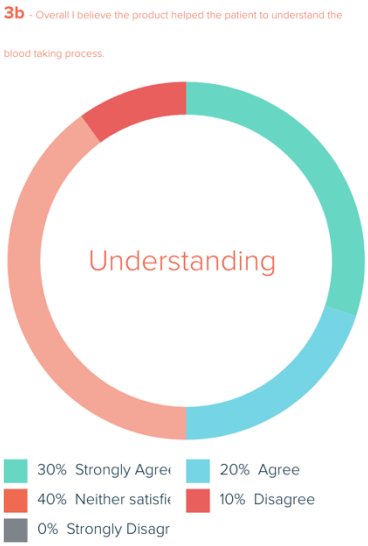


Fig 5. Adam Higgins, 2022. *PreMedPrep In-Field Usability Testing Report* [Graph 3b].



Fig 6. Adam Higgins, 2022. *PreMedPrep In-Field Usability Testing Report* [Graph 3c].

Figures 4, 5 and 6 indicate mixed responses and created difficulty in defining a specific trends. The most prominent trend sees all three elements have a contrast in opinions and, in places, a 50/50 split. It's essential to consider the context when analysing subject metrics like the above, these elements are based on patients' feelings and emotions, which are subjective to each individual opinion and depends on their personal view of blood tests.

For example, given the context of the testing environment, Tŷ Hafan is a hospice that treat children with 'life-limiting conditions' (Tŷ Hafan, 2022). Some children live with serious illnesses that may hinder their ability to interact, learn, or focus. This alone could be the reasoning for such varied and mixed responses. However, this isn't a negative, 6/10 of children said the product helped alleviate worries and half the patients deemed the product gave a better understanding of the procedure. In future testing methods, I believe it would be beneficial to conduct a broader sample study to yield larger sets of data, and this will present the opportunity to pick out trends.

When analysing the questionnaire data, it has been beneficial in defining a specified user group. It appears the product could be more useful for users who have never had a blood test before.
For example, most patients within Tŷ Hafan's children's hospice would have already had a blood test before using the product. This means that they could already have their own opinions of blood tests, have developed knowledge of the procedure, or their worries may have been eased. Their experience suggests why 70% of patients said the product didn't alleviate any misconceptions. It's possible that the 70% of patients already had potential misconceptions cleared up. To confirm this, I believe the testing would need to be completed with larger sample sizes and a wider range of participants. For example, conducting the testing with general patients with little or no experience with blood tests may see stronger trends to support these metrics more positively.

Efficiency

Measuring the efficiency of the product was crucial to understanding if the product could impact or improve blood test procedure times. Procedures times can affect day to day activities of medical environments and create a knock-on effect. From a commercial and product marketing prospect, if the product can help improve the issue, it could increase the product's chance of success and become more attractive to potential buyers or investors.

To measure the efficiency of the product, it's important to compare procedure times of blood tests with the use of the product, with blood tests without the use of the product. However, due to the constraints of the practitioners' jobs and the immense pressure of medical environments, I felt it was too demanding to ask practitioners to undertake such a detailed testing study. As a compromise, practitioners were required to record data only when using the product with a patient.

Firstly, figure 7 below for procedure times using the product, demonstrates that it took 2 minutes 54 seconds to complete the blood test procedure. This is a reasonable length of time for the procedure, given the explanation and preparation required before the procedure takes place.

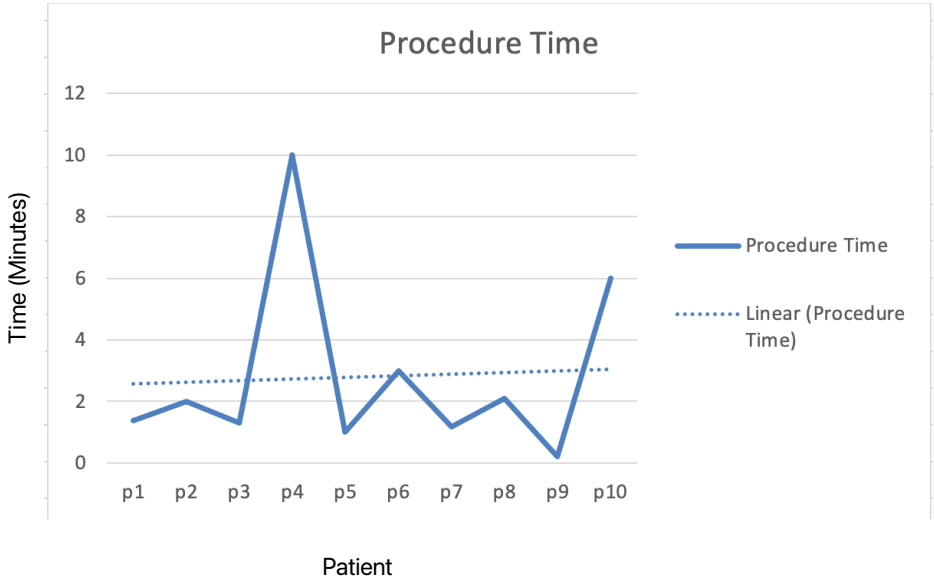


Fig 7. Adam Higgins, 2022. *(Graph From) In-Field Testing Questonnaire Results.xlsx* [Graph]

To further understand if this average procedure time is acceptable or reasonable, as part of the evaluation questionnaire, participants were asked the following questions in figure 8 and 9.

Medical professionals at Tŷ Hafan conduct blood tests regularly with repeat patients, therefore they are in a position to compare blood tests lengths with and without Eilo. Figure 8 shows that only 30% of patients had a faster, more efficient procedure with Eilo compared to normal conditions. This suggests the product may lack the ability to reduce procedure times, by 100%. Although it may seem like a negative result, it is not because, context and sample size must be considered. Before testing this product, it was always clear that it would not speed up every child's blood test. However, the fact that it has helped some patients is a tribute to the original design rationale.

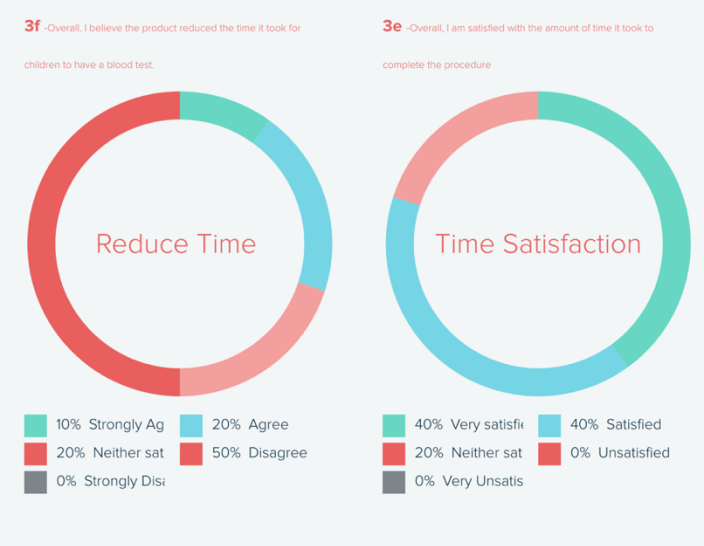


Fig 8. Adam Higgins, 2022. *PreMedPrep In-Field Usability Testing Report* [Graph 3f].

Fig 9. Adam Higgins, 2022. *PreMedPrep In-Field Usability Testing Report* [Graph 3e].

Admittingly, 30% is a low percentage. However, I believe that the 30% can still make a difference and contribute positively to the overall procedure and waiting times.
Figure 8 additionally shows the subjective nature of individuals. This ideology has been discussed beforehand; the suggestion that every individual is different. Some patients may need extra time learning about the procedure or time to become more comfortable with the procedure process. Despite the above, Figure 9 represents an alternative element, user satisfaction. 80% of participants (clinicians) were overall satisfied with the time it took to complete the procedure. This high level of satisfaction could be from the practitioners seeing improvements or differences within the procedure process, and specifically, some areas of the process may have been quicker and clearer.

Satisfaction

The aim of measuring the user's satisfaction was to gain an insight into the clinicians' impressions and the overall fulfilment of how well the product met their needs. The satisfaction metric has been split into several usability metrics to get a detailed understanding of the different areas of the product. During the testing, participants were required to answer questions using a Likert Scale to give insight into their satisfaction. The image titled 'Usability Breakdown' outlines the different usability metrics of satisfaction that were tested.

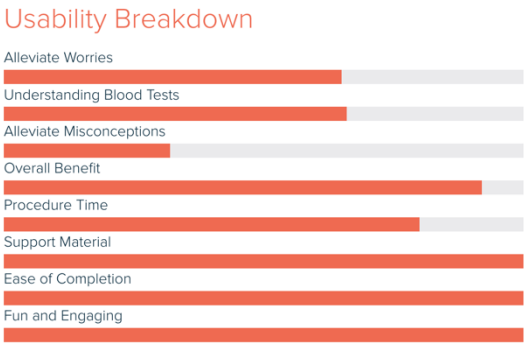


Fig 10. Adam Higgins, 2022. *PreMedPrep In-Field Usability Testing Report* [Usability Scoring].

Figure 11 and 12 are representative of the support structure the product offers. The product aims to harvest better experiences during a blood test. The product has been successful, with 90% of participants (clinicians) believing the patients (children) benefited from using the product. To further support this, when asking patients (children) directly if they would want to use the product in their next blood test, 80% said yes; this can be seen in figure 3 below. This indicates that the product had a positive impact on the patients practically and emotionally. The 80% repeat use demonstrates its longevity and usability potential.



Fig 11. Adam Higgins, 2022. *PreMedPrep In-Field Usability Testing Report* [Graph 3d]

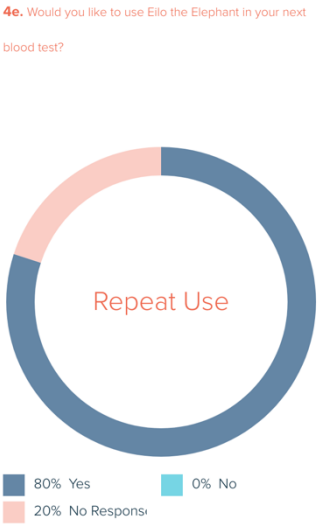


Fig 3. Adam Higgins, 2022. *PreMedPrep In-Field Usability Testing Report* [Graph 4e]



Fig 12. Adam Higgins, 2022. *PreMedPrep In-Field Usability Testing Report* [Graph 3g].

The storybook was a new addition developed for this testing, it was created to support and accompany the initial product. The book aimed to give an alternative but complementary way of learning about blood tests. There is clear evidence that the book is a positive addition, and a great way to deliver information and knowledge about the procedure. This is further supported by several statements written in comments section of the questionnaire. Which stated, “Fun Story”, “Loved the story” and “liked the book”. (Higgins, 2022)

Alongside it’s usability, the product’s fun and engaging aspect is equally as important. For better user to product experience, it was noted in the Stage One interviews that the product had to be fun and informative. Figure 13 shows that 100% of patients had an engaging and fun experience with the product. It is also important to note, that older children were just as engaged as younger patients. This suggesting the product appeals to a wide variety of ages. Also, it is confirmation that there is an accurate balance of fun and seriousness designed into the product. Users welcomed the product's playful language and its fun interactive features. This corelates with my original design thinking and research, of incorporating playful and fun elements, and its importance to children’s medical procedures.



Fig 13. Adam Higgins, 2022. *PreMedPrep In-Field Usability Testing Report* [Graph 3i].

Conclusions

To conclude the testing study, I will draw upon what I have discussed already whilst bringing in further supportive data from the evaluation questionnaires. Soliciting objective feedback by third parties has been hugely beneficial for the product. I believe in undertaking product usability testing in two stages: interviews and in-field testing. Doing this, has allowed me to maximise the user's feedback before putting the product in front of users in realistic settings. It has avoided a further product development stage as most issues and bugs were found in Stage One.

The overall reaction to the product is positive, and there is evidence in this small sample study that the product has helped children during the procedure process. 100% of the patients stated the product helped them in the procedure. Additionally, 100% of the practitioners believed the product benefited the patients and the overall procedure experience. PreMedPrep's primary goal was to improve experiences and creating better procedure processes. This goal has been achieved, it is encouraging to see the product attain high ratings in several product areas.

The product's fun and interactive elements, alongside playful language that were used to explain the process was successful, as 100% of practitioners believed the product was fun and engaging for patients. The comments by participants about the product being fun and engaging, stated; 'she loved it and enjoyed using the product, wants her own and should be in all hospitals', 'liked the visual blood', 'enjoyed the process of the product, used it as a way of feeling more comfortable'.

It was important to record and measure the procedure times with and without Eilo. It was included in the study, in the hope of discovering that the product could help reduce patients' procedure times. What can be concluded is there was no correlation between procedure times and product function/features. For example, the two most extended procedure times were Patient 5 (10 Minutes) and patient 10 (6 Minutes). For Patient 5, it was recorded that the product didn't help the patient understand the blood taking process. Whereas for Patient 10, the product did help them understand the procedure better. In Patient 5's scenario, you'd expect the time to be longer due to their lack of understanding and the possible need to repeat the explanation of the procedure. However, patient 10 benefited from Eilo, the product served it's purposed but still didn't reduce the procedure time. In conclusion, this is down to each patient's emotional and cognitive nature. Their experience with the product is reliant and influenced by many external factors, that I cannot control. This described outcome can be seen in other metrics.

This study has been fundamental in defining a specific user age range. In addition, as gaining insight into understanding what type of user could benefit most from the product. Before testing the products, I had defined the product as suitable for individuals aged 4 – 10. More specifically, children in need of medical attention who are typically nervous, scared or confused about procedures. Completing a testing study in a place like, Tŷ Hafan Children's hospice gave many opportunities to test the defined users. The testing successfully had ten patients aged 6 – 14 years old take part. Although some of the patients were slightly outside the age range, it allowed me to understand and consider whether the product could be useful and suitable for a wider age range.

The study has shown two main conclusions in relation to user profiles. Firstly, patients who have cognitive impairment or learning disabilities didn't appear to fully connect with the learning areas of the product at times. Based on the data recorded, they saw the product for its aesthetic and its 'toy like' nature rather than something which could educationally help during their procedure. This demonstrates it's multifunctionality.
Secondly, I believe the patient's age should not determine whether they can use the product or not. I'm glad the practitioners in control of testing the product did not restrict users aged 11+ from using the product. I believe the product can be used by children of different ages groups and should be decided by the clinician overseeing the use of the product. When asked, 'What did you like about the product?' the children aged 13+ in the testing responded with similar comments, 'Everything, I need one' and 'she

wants her own'. It suggests there's an interest for the product amongst an older age group that wasn't initially anticipated.
To summarise, each patient had a slightly different experience with Eilo, regardless of age and cognitive level, there are elements of the product that are beneficial to all.

Future Roadmap

What's next for this product?
I have continuously asked myself this question throughout my studies.
At every checkpoint, there has been something new to conduct and achieve. As I begin to rationalise the testing study, I seek no further validation of the product. Within the past eight months, I believe I have proved that the original concept, the theoretical thinking, the product prototype, and the design for manufacture all function, and are suitable for market release.

In reflection, it was the right decision to undertake the testing in the accomplished stages. It allowed for a detailed and thorough test without unnecessary product development stages. The whole testing process exposed the realistic industry testing methodology, which will help myself with future testing for other products. Furthermore, the testing has given the validation the product needed. As an individual trying to commercialise PreMedPrep, I can use the validation for future discussion with potential investors, licensers, and consumers. Additionally, as I have yielded promising results from the testing, it indicates that the testing method works and have given me a 'model plan' to use with alternative products.

It would be beneficial if Eilo the Elephant could undergo further in-field testing. Although it's not essential, I believe another sample study would give the opportunity to solidify some answers surrounding the product and provide extra data to make a further comprehensive analysis.

One important step to execute before the product is released onto the market legally is product conformity and safety standard testing. These are essential parts of releasing a product to the market. In my opinion, the decision to not undertake this step yet has been the correct decision as I felt the product was still undergoing development and the potential for, change was possible. Additionally, I thought it was logical to not financially commit until I had conclusive answers on whether the product operates or not. As an individual or *start-up*, it has been essential to prioritise tasks based on their cost and timescale.

Therefore, the next logical thing to conduct is product conformity and safety standard testing. Currently, the only rational and affordable method to market is through obtaining licencing agreements or beginning a kickstarted funding campaign. Throughout this journey, this part of the commercialisation process has been the hardest. Given the complexity of the product it is difficult to launch the product onto the market. Considering these examples; the manufacturing process, the number of components in the product, and the safety procedure the product has to tackle. Despite these challenges, I aim to continue with the initial ambitious and explorative aims from this project. I hope to work towards finding solutions.

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Higgins, A.H (2022) *PreMedPrep User Interviews Report*. Cardiff: Higgz Design Ltd

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Appendices

Appendix A -) PreMedPrep User Interviews Report



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Results
Product Developmental Areas

Session Setup, Plan & Goals

Sessions are designed to extract information from specialist users and target audiences to help contribute to the further development of PreMedPrep. Sessions were planned to be conducted in the UX Lab-based SA1, Technium 1, Swansea. Due to Covid-19 the session were adapted to an online delivery if need be. A Plan was created for any interviewer to follow and conduct by themselves. The sessions were designed and split into three sections, Storytelling, A Product Demonstration and Brainstorming/Feedback.

1. Storytelling

Understanding the story of what happens when a child has a blood test. Ask each participant to give their insight and experiences.

2. Product Demonstration

Give participants a product overview handout. A run-through of product features and functions explaining how they work and design reasoning behind them.

**Watch the short 2-minute video https://youtu.be/DcVKzSURHxk*

Allow for each participant to interact with the product themselves this could lead to the final feedback session. (Product could be passed around as we discuss and brainstorm about the product)

3. Brainstorming &Feedback

Reflecting and evaluating product prototypes and how it fits and complements the practitioner's experience and expertise.

A crucial section of the interview will extract both positive and constructive feedback. If participants are struggling to provide detailed feedback, probe the participants with topical questions

User Interview

Ty Hafan Children's Hospice

Interviewer: Adam Higgins, Tim Stokes
Participant(s): Lynne Phelps, Sarah Lee
Date:

User Details

User Type: Free
User Role: Play Specialist & Play Therapist
Department: Medical Practitioners

User Background

Leading paediatric palliative care charities and offers care to children and support their families, throughout Wales. "We offer comfort, care and support to life-limited children, young people and their families in the hospice, in the community and in their home so they can make the most of the time they have left together."

Session Overview

Users were introduced to the product in a controlled and relaxed UX Lab. The session was led by Design Higgins Ltd and an innovation fellow from ATIC.
Users were introduced to the problem solution, and we began by having a short storytelling session where we discussed the problem at hand and furthered our understanding of the problem.

Users were introduced to product prototypes where they had the chance to get hands-on with the product. Keeping it relaxed, we began discussions about the product, its function, features and usability.

Finally, users were asked to finish off with a formative product review. Defining areas of the product which they felt needed addressing or improving.
The session's objective was to gain feedback on the prototypes so Design Higgins Ltd could further develop the product.

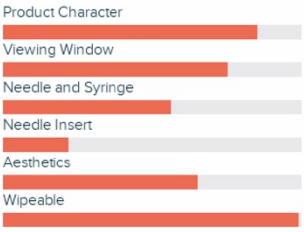
Highlights and Storytelling

- "Insists she never lies or fabricates too much. Truth is so important."
- "Sarah improvises with her young patients, adapting techniques, stories... anything to help translate and infer what they need to know and make them feel at ease."
- "The most important thing is providing them with the knowledge of any procedure or space before they have to experience it. It can start days before or may go on for several months if the child is particularly difficult."
- "Lynne is more imaginative play and using play to get the children to talk about their experiences and emotions.
- "Often involve taking a play kit around to children. This includes toys and other things to use - curated to the particular child.
- "Both use real instruments and hospital equipment to explore procedures, how things work, make them a common place to young people - dispelling any misconceptions and allowing them to feel ownership/powerful over them."

Participant Feedback

Participants were asked to reflect on the product prototypes and suggest feedback on how the product could be improved and what else could be done to improve a child's procedure experience further. As medical practitioners, their thoughts and opinions are respected, and their specialist feedback can further enhance the product.

Favourite Features



Suggestions

- Viewing Window Location
- Needle Insert Location - Could be misinterpreted as a needle going into a bum.
- Syringe missing a plunger - which would be a good indicator of a needle and process.
- Transferring blood along the clear tube would be useful (but not essential everything can be explained and given context)
- Could cover screw holes to help infection control - maybe also not to confuse them as injection points.
- Worksheet suggesting activities for the young person to do or perform. eg. a checklist with doctors tasks / A doctors clipboard?
- Also, more stories and storytelling surrounding the characters and explaining the procedure.
- Perhaps a range of tools or accompanying material (digital app) that can help build him into their working practice.

User Interview

Bethan Phillips- NHS Wales

Interviewer: Adam Higgins, Tim Stokes
Participant(s): Bethan Phillips
Date:

User Details

User Type: Free
User Role: Play Specialist & Psychologist
Department: Nhs, Medical Practitioners @ Cwm Taf, Bridgend, Llantrisant, Merthyr.

User Background

Psychology in paediatrics is all about working with children who have chronic or long-standing illnesses. Deals with various illnesses and procedures across the board. I have a heavy focus on emotional well-being and mental health.

Session Overview

Users were introduced to the product in a controlled and relaxed UX Lab. The session was led by Design Higgins Ltd and an innovation fellow from ATIC.
Users were introduced to the problem solution, and we began by having a short storytelling session where we discussed the problem at hand and furthered our understanding of the problem.

Users were introduced to product prototypes where they had the chance to get hands-on with the product. Keeping it relaxed, we began discussions about the product, its function, features and usability.

Finally, users were asked to finish off with a formative product review. Defining areas of the product which they felt needed addressing or improving.

The session's objective was to gain feedback on the prototypes so Design Higgins Ltd could further develop the product.

Highlights and Storytelling

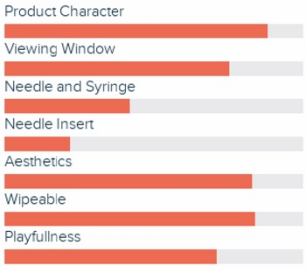
"Lots of children are naturally frightened of it."
"Some have to be held down, as they need the meds."
"Bloods was quite a common referral while specialised in CF."
"Quite basic things such as talking about veins and blood and how they work. Make them understand that its this much 'a teaspoon."
"Has a box of the butterfly needles and equipment and show and do a bit of play, show them what it's about."
"Have them understand it because then they're like 'is that it?'"

"Age range of 3/4 to early teens (primary age group)"
"I would have thought so, if this type of thing was on the ward available to them, they would use them."
"Realistic nature helps, but you still need to have that playful element, which is what these bring."
"Scope for the story on an app or animation or they have a sticker with Eilo, saying they just had their bloods done. Creating a package."

Participant Feedback

Participants were asked to reflect on the product prototypes and suggest feedback on how the product could be improved and what else could be done to improve a child's procedure experience further. As medical practitioners, their thoughts and opinions are respected, and their specialist feedback can further enhance the product.

Favourite Features



Suggestions

- Needle Insert Location - Could be misinterpreted as a needle going into a bum.
- Worksheet suggesting activities for the young person to do or perform. eg. a checklist with doctor's tasks / A doctors clipboard?
- Also, more stories and storytelling surrounding the characters and explaining the procedure.
- Perhaps a range of tools or accompanying material (digital app) that can help build him into their working practice.
- Being used bedside, not in the middle of a procedure. It could definitely be used in the lead-up and before the procedure.
- Revisit the realistic nature side of the product.
- The diameter of the needle may be too big.

Results

As a result of conducting the interview focus groups in the UX Lab located in ATiC, all interviews utilised the 360-degree recording devices in the room. This enabled the analysis of the interviews much quicker and more effective. The recording software also produces a transcript that can be easily deciphered to extract key points and information.

After a complete analysis of all interviews and focus groups, the results were categorised into different sections:

- Product Concept
- The Good
- The Improvements



Breakdown



Product Concept

100%

of participants **understood the core** premise and overall concept of this product.

100%

of participants **enjoyed** the concept and the overall experience of using the product.

50%

of participants said they would **trail the product** within their field and with children.

75%

of participants said the product **needed improvements** before being suitable for market release.

THE GOOD

The overall feeling from the interviews with clinicians was positive. The majority of positive comments were made in relation to the product concept, the design reasoning and the product prototypes. It was apparent the product was something these clinicians recognised they needed.

"This product offers both a way to learn about blood tests as well as support children emotionally. The toy would be a great tool to use within our hospice."

THE IMPROVEMENTS

The interview sessions provide an abundance of feedback that would contribute to the improvement of the product. There were lots of suggestions regarding additional tools and materials to accompany the product, as well as specific design tweaks that could further improve the usability and experience of the product.

"Perhaps a range of tools or accompanying material (learning book) can help build a character into their working practice."

Recommendations & Action Items

GENERAL

- The product should undergo a detailed feature analysis and clarify aspects of the product which need changing or improving. As suggested by the target audience.
- New accompanying product material should be developed due to the target audience's suggestions.

Specific Design Recommendations

Inserting Needle

Problem: As the user attempted to insert the needle, it was difficult to watch the liquid draining at the front of the product due to the length of the needle tube. The length restricted the user.

- When attempting to complete this task, participants tried but struggled to stretch the tube. Consider modifying the length of the tube to improve usability.
- This feature of the product was somewhat confusing for participants. Consider reorganising the structure of the product features to improve usability further.

Needle Insert Location

Problem: Almost every participant recognised the location of the needle insert could add to the abundance of misconceptions associated with blood tests.

- When attempting to complete this particular task, participants thought it gives children the wrong impression of where an actual needle is inserted into our bodies. Consider modifying and relocating the feature on the product to improve the realisticness and allow for better procedure understanding.
- This feature of the product was especially confusing for participants. Consider designing product decals that can provide bodily semantics and further aid in explaining the blood taking process.

Syringe Design

Problem: Several suggestions for improving the realisticness of this specific piece of equipment. There was a lack of a plunger feature on the syringe.

- When attempting to complete this task, participants failed to relate to the type of syringe used. Consider modifying this component to improve understanding of what the component is in relation to the procedure.
- This feature of the product was confusing for participants. Consider researching the current equipment used within children's blood test procedures and designing something which better represents the syringe.

Example

- When attempting to complete this certain task, participants did this instead. Consider adding, removing or modifying this feature to improve usability.
- This feature of the product was especially confusing for participants. Consider reorganising the structure of the product to explain this process further.
- Participants enjoyed this aspect of the product. Consider highlighting this product feature.

Disclaimer

Several factors may have affected the results of the usability test. It's important to remember that people bring their own experiences and biases into a test without realising, these might colour their impressions.

1. The sample size may not be representative of all people that may use the product.
2. While moderation began with a set agenda, questions and tasks administered varied from participant to participant.
3. Human error and misinterpretations of qualitative feedback affected the results to slight but varying degrees.

Appendix

Documentation

- Full interview transcripts can be requested from Design Higgins Ltd
- A revised product specification can be requested from Design Higgins Ltd

Media

- Product Demo - https://youtu.be/DcVKzSURHxk
- https://www.premedprep.co.uk/

Thank you!

Design Higgins Ltd
higgz™
PreMedPrep™

Cardiff
https://www.premedprep.co.uk/
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Appendix B - PreMedPrep In-Field Usability Testing Report.

Higgz - PreMedPrep

Product Usability Testing Report

This Usability Testing Report is a crucial document that gives a deeper understanding of the product audience's needs and frustrations. The report outlines and demonstrates the outcome of the usability testing of Eilo the Elephant. The product has undergone realistic environment testing amongst its potential users, which will assist with taking this product to market. The evidence within this report indicates the commercial potential of the product.

Project Lead: Adam Higgins
UX Researcher: Adam Higgins, Tim Stokes
Research Analyst: Adam Higgins
Testing Moderator: Design Higgins Ltd

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Methodology
- Outreach & Screening
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Executive Summary

This project started as a collaborative research project between PreMedPrep and ATiC. It began with evaluating product prototypes with paediatric medical practitioners in the ATiC User Experience Lab. This collaboration aimed to evaluate and understand the challenges faced by practitioners who must take blood samples from children. These insights could then be used to develop the product further, meet challenges, provide more effective and satisfying user experiences, and reduce anxiety in children.

The collaboration was vital in providing industry contacts and connecting with paediatric practitioners, which would allow PreMedPrep to do further testing within the field and amongst patients. After the initial evaluation phase, the products were developed based on practitioners' insights and feedback.

The second phase evaluation aimed to test the product's usability and evaluate if new design improvements had been effective. This testing stage was conducted in a medical setting to gain more realistic and reliable results.

The testing method was designed to be carried out by the practitioners taking part remotely and unmoderated. Participants were provided with all the relevant material and resources to make it intuitive to conduct. Participants were given tasks to complete with the product and patient, alongside an evaluative questionnaire after every product use. This methodology is explained in more detail later in the report.

Ty Hafan Practioner said,

"It has been a pleasure in exploring the PreMedPrep product and the children were very engaged with Eilo. Having products like this available in a child-friendly manner supports children who are regularly in and out of hospitals and are a much-needed tool!"

Methods of Testing:

- Face to Face Interview Groups with Clinicians
- Product Demonstrations
- Formative Feedback Sessions
- Infield User Testing
- Evaluative Questionnaire Reports

Usability Metrics

- Ease of completion
- User satisfaction
- Time Satisfaction
- Material Resources

The practitioner's patients who used this product in the testing were aged 6-14 years old. An average age of 10. All testing was conducted in person within a medical environment.

This research report includes the details of how I conducted my research, the results I found, and a brief list of recommended changes."

Goals

The goal of undertaking usability tests was to measure the extent to which Eilo the Elephant, the Medical Preparation Toy, can be used by specified users to achieve set goals with effectiveness, efficiency and satisfaction in a specified context.

Identify bugs & issues with the product.

Understand how the product performs within its chosen environment. While identifying any potential bugs or issues which could affect its function or performance.

Test product concept with the target audience.

Testing the product with its intended target audience will provide critical insight to define and confirm the appropriate target audience.

Reveal friction points and confusing experiences.

Having a testing period will allow for an additional product development stage to adjust the design and improve it based on any issues faced. These problems can be seen before the market release.

Methodology

Outreach & Screening

PreMedPrep was a project overseen by Design Higgins Ltd. The project became collaborative once it became part of the Accelerate Wales Scheme under assistance from ATiC, Assistive Technology Innovation Centre). As part of this collaboration, PreMedPrep utilised ATiC's industry partners to screen participants for the usability study.

Channels Used:

- Industry Collaborations
- Social media
- Industry Partners
- Pediatric Medical Contacts
-

Screening Criteria:

- Medical Background or Association.
- Access to children in need of blood tests.
- Access to Play Specialists or Therapists.

Testing Setup, Moderation & Post-Test Questions

Phase two testing involved in-feild moderated and unmoderated testing. Due to the constraints of healthcare settings at the time, I was unable to be present during the testing. This resulted in some parts being moderated by myself and some unmoderated and conducted by practitioners. Contact between myself and the participants was frequent and therefore still allowed for in-depth results. The testing followed an assessment based tasks which were evaluated by the participant.

1. Introduction

Participants were given two product prototypes to use within their children's hospice and amongst children in need of a blood test. Participants were given a testing package which included a Beta Testing Agreement, Testing Instructions and Testing Questionnaires. All the documents provided the details and 'know how' to be fully competent when completing the testing. Moderators were instructed to introduce the product to patients before having their blood tests, this was to achieve the best possible impact. Moderators then filled out a questionnaire and would talk to the children about the product, noting down their responses.

2. Tasks

Participants were asked to complete the following:

- Introduce Product to Patients.
- Allow children to use the product.
- Use the storybook alongside the product to build a story.
- Administer blood tests.
- Complete section 4 of the questionnaire with the patient.
- Complete sections 1-3 of the questionnaire.

1. Post-Test Questions

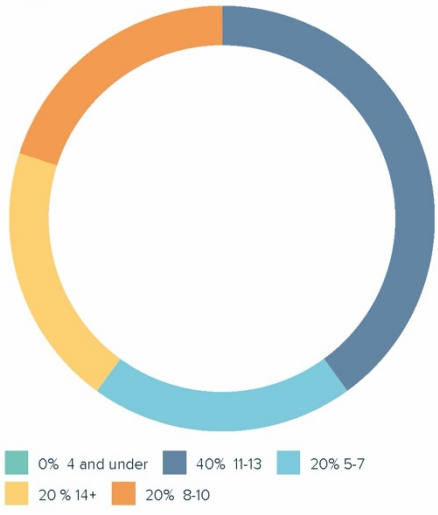
Participants were asked questions after the test to understand how they felt about the product overall. This was in addition to the questions they were asked in the patient questionnaire.

- How would you describe this product to someone?
- Did patients understand the core premise and overall concept of the product?
- How much do you think patients benefited from the product?
- Would you continue using this product?
- Would you recommend this product to a friend or colleague?

Participant Profiles

The participants of this testing study were split into two users. User 1 would be the adult participant (Medical Practitioner or Moderator). These users would be controlling the research and overseeing the testing. User 2 would be the patients who were used to test the product. These users fell under an age distribution between 6 and 14, this age range was ideal as the product is intended for young children.

Age Distribution



	Age	Gender
Participant 1	9	Female
Participant 2	12	Male
Participant 3	6	Femal
Participant 4	11	Female
Participant 5	14	Male
Participant 6	10	Female
Participant 7	6	Male
Participant 8	13	Female
Participant 9	14	Male
Participant 10	11	Female



Results

The results of this testing usability study will now be presented in 4 areas:

- Overall Concept
- Efficiency
- Effectiveness
- Satisfaction





Overall Concept

90%

of participants believed the product to **benefit** the procedure process and their experience.

100%

of participants thought the product wa**s engaging** and **fun** to use.

90%

of participants successfully **completed their blood test** with the use of the product.

2minutes 54 Seconds

Participants completed their procedure within an average time of 2 minutes and 54 seconds.

THE GOOD

"I would like one! I could have it in my collection of medical supplies and it would look good in my room! "

THE BAD

"Due to the child's cognitive impairment, the child had little understanding of the story and the example procedure."

Efficiency

Introduction

Measuring efficiency was crucial to understanding if the product could impact or benefit procedure times. Participants were asked to time how long it took for the patient to complete the procedure after using the product.

154 Seconds Average

Participants completed their procedure within an **average time** of 154 seconds.

Time-Based Efficiency

0.64 task/sec
100% overall efficiency

Analysis

Measuring the efficiency of the time taken to complete a blood test procedure has given insight into blood test procedure times and if there is a relation between procedure times and procedure times, using the product. Without data on procedure times of blood tests under normal conditions, I am limited to analysing if there is any relationship. However, looking at question 3e below, It's clear the majority of participants (practitioners) were satisfied with the time it took to complete procedures. A possible reason for this satisfaction may come from participants seeing differences or improvements in the procedure process while using the product. However, we can't suggest the product reduced procedure times overall as question 3f shows that the product lacks the ability to reduce overall procedure times.

Additionally, 50% of participants disagreed that the product reduced the total procedure time. These metrics are an indication that procedure times can be subjective to each individual patient but also demonstrates the complexity of blood tests. For some patients, the product may help reduce the overall time whereas some patients may need that extra time with the product to benefit emotionally and cognitively.

3f -Overall, I believe the product reduced the time it took for children to have a blood test.



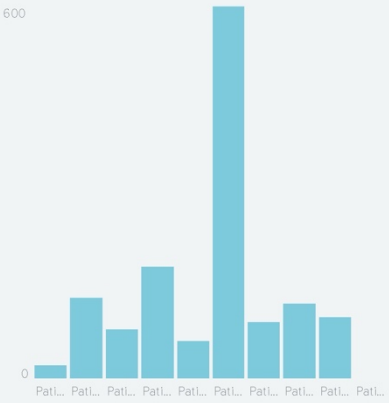
10% Strongly Agree
20% Agree
20% Neither satisfied nor dissatisfied
50% Disagree
0% Strongly Disagree

3e -Overall, I am satisfied with the amount of time it took to complete the procedure



40% Very satisfied
40% Satisfied
20% Neither satisfied nor dissatisfied
0% Unsatisfied
0% Very Unsatisfied

The time taken to complete a blood test by a patient, with the use of the product. (seconds)



Effectiveness

Introduction

Measuring the effectiveness was key to understanding if the product is effective in aiding the blood test procedure. This metric would answer the question, "Does the product positively impact and improve patients' healthcare experience."

90%

of participants **successfully completed** their blood test with the use of the product.

Analysis

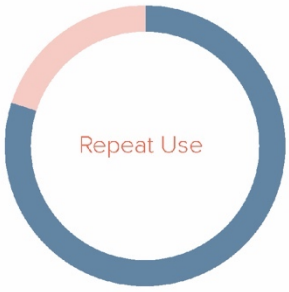
The results show a high product uptake and willingness to use the product alongside their procedure. It suggests the patients were happy to complete their procedure using the supplied test product but does not indicate the reasons why people chose to use the product. It's important to highlight that high uptake is evidence that there is clearly an issue within the blood taking process where children would prefer to use a tool/toy/resource to help them through their procedure. This data helps support the product in a commercial sense and provides evidence that there is a use for this product, and if released to the market, there are customers who would like to use this. Question 4e further supports this statement, with 8 out of 10 patients saying they would like to use Eilo the Elephant in their following blood test procedure. Relating to the product's effectiveness, I believe the product has been effective in providing patients with the specific support they needed. It also has shown signs of improving the patient and parental experience.

1. Did the patient complete the procedure with the use of the product?



90% Completed
10% Didn't Complete

4e. Would you like to use Eilo the Elephant in your next blood test? *Asked to Patient*



80% Yes
0% No
20% No Response

Satisfaction

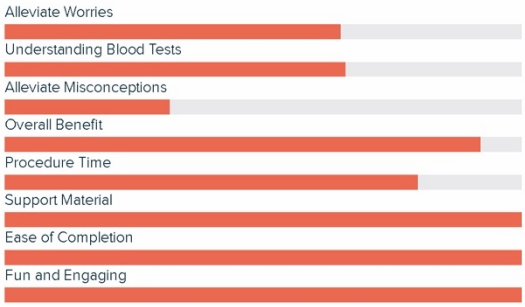
Introduction

Satisfaction measures the user's impression of the overall ease of use of the product being tested. The satisfaction has been split into several usability metrics, which can be seen on the right. After the participant had completed a procedure with a patient, they were required to fill out a questionnaire to measure how the procedure went. The questions would typically take the form of Likert scale ratings, and their goal is to provide insight into satisfaction difficulty as seen from the participants' perspective.

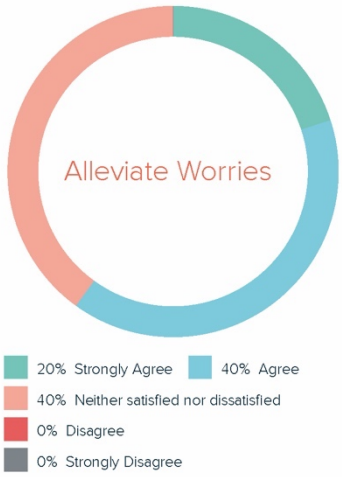
Analysis

The metrics used in this questionnaire provided a comprehensive insight into how the product performed in several areas. Testing its core concept and how well it does at providing patients with its intended support structure. Reflecting on the satisfaction metrics as a whole. and the below graphs, the overall reaction seems optimistic. The graphs use a common colour scheme which helps to indicate the positive and negative responses. The green and blue represent positive and the red and grey represent negative.

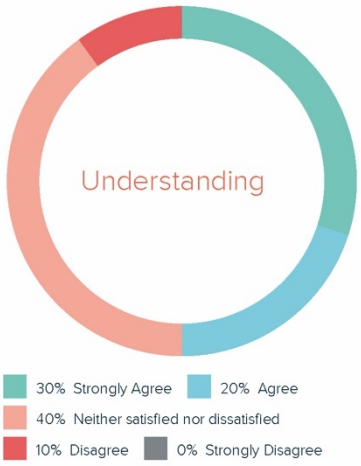
Usability Breakdown



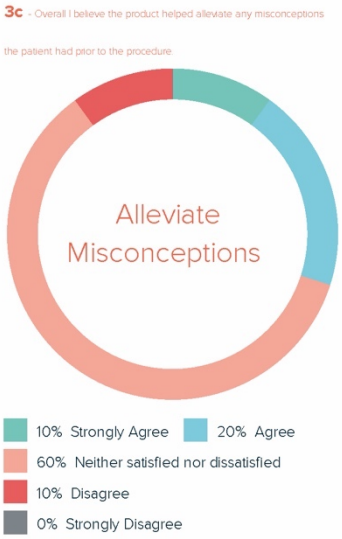
3a - Overall I believe the product helped the patient alleviate any worries they had



3b - Overall I believe the product helped the patient to understand the blood taking process



3c - Overall I believe the product helped alleviate any misconceptions the patient had prior to the procedure



Analysis - Emotion and Cognitive Driven Metrics

The three above metrics are representative of the emotional and cognitive support the product offers. The product aims to emotionally support patients by alleviating worries and misconceptions. Replicating the procedure process on the elephant gives a chance for patients to understand what is involved and hopefully ease their fears. The graphs indicate mixed responses, favouring more positive reactions than negative ones. With no real trend to pick out, it suggests that each patient had a different experience and was subjective to how well their procedure went, their personality, or even their emotional/cognitive level. However, the results show some the product did its job, and patients had a better experience as a result. The environmental context has to be considered within this analysis, Ty Hafans Hospice primarily deals with 'life-limited' children. These types of children are not your average children going for blood tests, they may live life with severe illnesses, which could impact their ability to interact and use the product as intended. This alone could be the reasoning as to why we have a mixed response for these metrics. We would see stronger trends to support these metrics with larger sample sizes and a more comprehensive range of participants with varying emotional and cognitive levels.

3d - Overall believe the product to be of benefit to the child and the overall procedure experience.



40% Strongly Agree
50% Agree
10% Neither satisfied nor dissatisfied
0% Disagree
0% Strongly Disagree

3e -Overall I am satisfied with the amount of time it took to complete the procedure.



40% Very satisfied
40% Satisfied
20% Neither satisfied nor dissatisfied
0% Unsatisfied
0% Very Unsatisfied

3g - Overall I am satisfied with the support material and resources when completing the procedure.



80% Very satisfied
20% Satisfied
0% Neither satisfied nor dissatisfied
0% Unsatisfied
0% Very Unsatisfied

Analysis - Procedure Overview

The above metrics are a small insight into some of the problem areas which patients experience in normal conditions. The product has performed well within these metrics as the blue and green colours show a vast amount of positive responses. 90% of participants believed the product to have benefited the child/patient and the overall experience. This is clear that there is potentially a place for this product on the market and evidence that medical practitioners believe the product could help patients during and prior to having a blood test. This is a strong statistic that could help market and convince future users that the product is worth buying into

Procedure times are a popular subject when it comes to health and hospitals. This problem area was investigated to understand if the product can help reduce procedure times? Or improve that area in any way. Prior to the testing, there were concerns about the product infringing on the existing procedure times and adding more time to the overall length. Graph 3e indicates that participants (practitioners) were happy with the length of procedure times, with only 20% of these neither satisfied nor dissatisfied. This suggests that the product compliments the process well, or it could be efficient at explaining the process due to its visual storytelling. The high satisfaction on procedure times suggests the product improves elements such as unnecessary confusion, the need for any distraction and repetition. This results in the possibility of either a quicker procedure time or a smoother and more efficient process.

Support material is an important metric and is crucial to understanding how well the storybook and product literature compliments the product as well as the procedure. Graph 3g implies that all participants, patients and practitioners were satisfied with the supplied support material. The storybook has been a good addition to the product, providing a complementary way to deliver key information and knowledge about the procedure. This conclusion can be supported by several comments made in the 'Comments Section' of the questionnaire. Stating "Fun Story" "Loved the Story" "Liked the Book".

3h - Overall I am satisfied with the ease of completing the procedure.



50% Very satisfied
50% Satisfied
0% Neither satisfied nor dissatisfied
0% Unsatisfied
0% Very Unsatisfied

3i - Overall I believe the product was engaging and fun for patients to use.



70% Strongly Agree
30% Agree
0% Neither satisfied nor dissatisfied
0% Disagree
0% Strongly Disagree

Analysis - Engaging and Fun

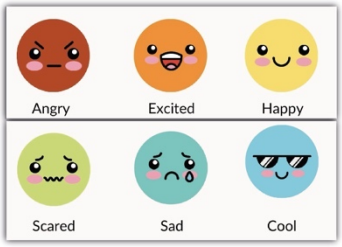
This metric has equal importance as the metrics already discussed. This metric, in particular, gives insight into how well the product performs at providing an enjoyable experience. As blood tests are not a pleasant experience, it was vital to provide users with an element of fun that can positively distract them from their fears and help them feel more in control of the situation. 100% of participants believed the product provided a fun and engaging experience, all participants warmly welcomed the product's interactive, playful language and confirmed the use of play/fun can improve the medical experience of patients. The results from this metric are also tribute to my original design thinking and reasoning, validating my research into 'play in hospitals'.

Patient Feedback

Introduction

Section 4 of the evaluation questionnaires was for the patients to complete. The questions asked in this section were directed at a younger audience and were there to gauge their response to the product.

Section 4a and 4b asked children how they were feeling before the blood test and, after the blood test, after using the testing product. This question gave an insight into the product's impact on the child's emotional feelings.



Results

Before the blood test, only 30% of patients had a positive feeling, 60% had a negative feeling toward the test, and 10% didn't respond. When referring to 'positive' or 'negative' feelings, this is in relation to the face emotions located on the right-hand side of the document. Angry, sad and scared fall under 'negative' and excited, happy and cool fall under 'positive'.

After patients completed their procedure using the product, they were asked to mark down how they felt again. 80% of patients felt 'positive' and only 10% negative this time.

There is a clear difference and change in emotions compared to the before and after. As the product was the changing factor, it is likely the product has caused the change in emotions and has positively improved their feelings towards the procedure.

It's important to note there could be bais within these results. As patients are asked this question after their blood test is complete, the increase in positive feelings could result from the 'procedure being over'. Without context to the data, it's hard to determine what specifically increased the positive feelings amongst the patients. But the product is displaying strong signs to suggest it has impacted their feelings.

4c.

While the majority of this report has analysed results based on practitioners' viewpoints. Section 4 aimed to capture the views of the patients. When asked if the product was helpful, 80% of patients believed it helped them in their blood tests. Overall this indicates the product performed well in all usability metrics.

4c. Did Eilo the Elephant help you (the patient) in the blood test?



Bugs & Issues

During the testing period, participants were asked to record any issues they encountered. This included technical electrical issues, functional issues and component issues. Before handing over the products for the testing, prototypes were examined and photographed to make comparisons after the testing was complete.

Issue 1

Blood Syringe Leaking - The participant was required to get in touch to request the syringe component be fixed.

Description of Issue

The liquid was leaking from the entry point, where the liquid was inserted during production. It appears the hole 'entry point' had not been securely glued.

Solution

The participant was given a replacement and extra syringes to carry o with the testing. This issue would not be present in the realistic manufacturing of the component.



Issue 2

Needle Snapped

Description of Issue

The elongated end of the needle snapped where the needle joined the base. Possible reasoning for this may result from the material used to make it.

Solution

The design has been edited to add supportive ribs where the needle joins the base (see image). However, when the component is manufactured in its intended material, it will have considerably more strength.



Issue 3

The button located inside the needle insert fell out of place.

Description of Issue

This button is located inside the needle insert and activates the movement of liquid when pushed. This is one of the main functions of the product and is crucial. So when patients were inserting their needles, nothing was happening.

Solution

To fix this problem, the button is now secured in its place with the addition of an adhesive.

Issue 4

Stickers peeling up/off

Description of Issue

Stickers are peeling up/off in the corners. There appears to not be enough adhesive applied.

Solution

The stickers would not be required for the manufactured product. They would be replaced with pad printing. However, for prototype purposes, the stickers will need to be applied with a stronger adhesive.

Recommendations & Action Items

GENERAL

- The product should undergo a final feature and component analysis to identify any potential changes based on the feedback given in the questionnaire responses.
- Use the usability satisfaction metrics to develop a refined user profile.
- Participants enjoyed the storybook aspect of the product. Consider highlighting this product feature and creating an independent product to sell.

FURTHER TESTING

- Consider conducting further in-field testing to gain more insight and validation of the product. Consider conducting the testing with a larger sample size to give more data to draw trends and conclude the product with a more comprehensive analysis.
- Consider targeting a wider range of patients, first-time patients and repeat patients. This would allow for an insightful comparison of how each type of patient would behave and interact with the product.
- Consider adjusting the testing method to include a section where practitioners would be required to conduct tests under normal procedure conditions. A comparison could then be made between a blood test with the testing product and a blood test without the testing product. It would clearly indicate if the product can improve blood test procedures.

Disclaimer

Several factors may have affected the results of the usability test. It's important to remember that people bring their own experiences and biases into a test without realising they might colour their impressions. List out some of the factors you encountered with brief explanations in this section.

1. The sample size may not be representative of all people that may use the product.
2. While moderation began with a set agenda, questions and tasks administered varied from participant to participant.
3. Human error and misinterpretations of qualitative feedback affected the results to slight but varying degrees.
4. A series of common product bugs and errors occurred (listed in the section above).

Appendix

Documentation

- Patient questionnaire responses can be retrieved from the Confirmative Praxis OneDrive submission folder.
- Testing methods and planning documents can be retrieved from the Confirmative Praxis OneDrive submission folder.

Notable Quotes

- "Having products like this available in a child-friendly manner supports children who are regularly in and out of hospitals and are a much-needed tool!"
- "She loved it and enjoyed using the product, wants her own Eilo and should be in all hospitals"
- "I would like one, to have as a collection of medical supplies and it will look good in my room."

Thank you!

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