

by different issues related to the health of their children; struggles to make the right decision and lessons learned dealing with the problems. Most of the provided examples revolved around: sharing responsibilities with family members and institutions (schools and playschools), holiday traveling and diabetes, GP appointments, pump settings, high or low blood glucose levels, helplessness and tiredness described by parents trying to control diabetes.

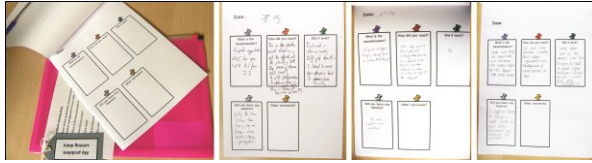


Figure 7: My problem solving diary probe with responses

4. DISTRIBUTION AND REFLECTION

The recruitment of participants for our probes was performed among the parents who were already interviewed and who expressed their interest in continuing with this study. We had seven volunteering families, those parents who have children with diabetes between 8-12 years of age. After four weeks, a total of five boxes were returned. One of the authors met each volunteer to collect the sets and to learn how the materials and objects were used with a short follow up interview. All returned boxes with probes materials (Table 1) were analyzed with the aim to learn more about the young participants.

Table 1: Responses

Activity	Responses
Disposable camera	3
Technology Gadget design	4
Send a Postcard	3
Design Collage/Poster	5
Kids diary	2
Super Hero and a story of his/her power	4
Design your own Recipe book	1
My problem solving diary	4

According to Table 1, the design of a poster/collage about an imaginary world diabetes day is the favorite activity. The design of a Technological Gadget, the development of a Superhero and My problem solving diary were also pretty successful and generated lots of engagement. Children liked to work with materials to build their pieces with accurate features, but they had less interest in keeping diaries and designing their own recipe book. We can explain this lack of enthusiasm in using these materials because in diabetes management parents and children constantly keep a food journal and blood glucose log. Food restriction related to diabetes, the scheduling of meals and children's preferences cause parents constant concern about their children's diet.

This study suggests that applying the DP method is a promising way to collect data from children with chronic illnesses in private settings. Using DP we adapted objects and activities into sets for children who have type 1 diabetes to be appropriate to the children's ages, to be focused on young user's needs (e.g. design your own Recipe Book), shared care with close relatives (e.g. send a postcard), their individuality (e.g. disposable camera) and experiences in self-care management (e.g. kid's diary, super hero and a story of his/her power, technology gadget design and design collage/poster). Our materials were playful and intriguing, provoking a dialogue between designer and users, easy to use, having detailed descriptions and clear instructions, affording user's involvement and participation in the design process. DPs

helped to foster children's imagination and, in some cases, to increase their willingness to describe and discuss the world from their perspective, despite their negative feelings toward the illness.

5. LIMITATIONS AND FUTURE WORK

The collection of the probe materials was a problem; it took a few months to arrange a time to meet parents. We found one limitation related to the amount of activities in the probe set. Eight activities for a month were a little ambitious assuming that parents did not have the time to help and encourage children to use the materials. Our analysis of the DPs results highlighted the success of the idea of a Superhero, which is currently the focus of a series of design workshops for diabetic and healthy children entitled "Superhero is sick". Here children-generated scenarios are explored to fine-tune the language and narratives to be developed in our design. DPs further suggested the integration of game elements as well as the inclusion of references to real famous people who have diabetes.

6. CONCLUSION

In this paper we report on the use of design probes to explore pediatric diabetes management with children between 8 and 12 years of age. The main part of this paper concerns outlining our probes and how the participants used them. The reason for choosing DPs was to gain insights about everyday activities in non-clinically controlled settings (e.g. school, home and other domestic environment) but also and more importantly the subjective and creative responses of the affected children with the hope to develop a perspective, a language and an orientation for our design. The valuable knowledge obtained in this study will be used for the next stage of UCD, to elaborate design ideas for low fidelity prototypes to be tested.

7. ACKNOWLEDGMENTS

This research is financed by the Irish Research Council (IRC).

8. REFERENCES

- [1] Crabtree, A., Hemmings, T., Rodden, T., Cheverst, K., Clarke, K., Dewsbury, G., Hughes, J. and Rouncefield, M. 2003. 'Designing with care: Adapting cultural probes to inform design in sensitive settings'. In *Proceedings of the 2004 Australasian Conference on Computer-Human Interaction (OZCHI2004)*. 4-13.
- [2] Gaver, B., Dunne, T., and Pacenti, E. 1999. 'Cultural Probes'. *Interactions*. 6(1). 21-29.
- [3] Hourcade, J. P. 2007. 'Interaction Design and Children'. *Foundations and Trends in Human-Computer Interaction*. 1(4). 277-392.
- [4] Iversen, O.S. and Nielsen, C. 2003. Using digital cultural probes in design with children. In *Proceedings of the 2003 conference on Interaction design and children (IDC '03)*. ACM, New York, NY, USA, 154-154.
- [5] Mattelmäki, T. 2006. *Design probes*. Helsinki: University of Art and Design.
- [6] Moser, C., Fuchsberger, V. and Tscheligi, M. 2011. 'Using Probes to create Child Personas for Games'. In *Proceedings of the 8th International Conference on Advances in Computer Entertainment Technology*. Lisbon, Portugal. 8-11 Nov. ACM, New York.
- [7] Storni, C. 2013. 'Patients' lay expertise in chronic self-care: a case study in type 1 diabetes'. *Health Expectations*. 1-12.
- [8] Tsvyatkovskaya, D. and Storni, C. 2014. 'Investigating issues related to pediatric diabetes education: problems and barriers'. Accepted for *PervasiveHealth 2014*.
- [9] Wyeth, P. and Diercke, C. 2006. 'Designing cultural probes for children'. In *Proceedings of the 18th Australia conference on Computer-Human Interaction: Design: Activities, Artefacts and Environments (OZCHI '06)*. ACM, New York, NY, USA. 385-388.
- [10] Wallace, J., McCarthy, J., Wright, P. C., & Olivier, P. 2013. 'Making Design Probes Work'. In *Proceedings of the SIGCHI Conference on Human Factors in Computing Systems*. Paris, France. New York: ACM. 3441-3450.