Evaluating Methods for engaging children in healthcare technology design

Authors: Matthew J. Allsop & Raymond J. Holt

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Presented by: Janasri Rega

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Abstract

- This paper evaluates methods for involving children in the design of healthcare technology to improve their engagement in healthcare and health outcomes. Participation of users in the development of healthcare technology improves the quality and safety of the resulting products. Therefore, the author stresses that patient participation in healthcare-related activities will enhance outcomes.
- A framework was created to facilitate the use of methods in designing and developing healthcare technology for the upper limb rehabilitation of patients with cerebral palsy. The research team utilized the assessment framework to compare methodologies for involving children. The study also revealed discrepancies between the four interview methods in terms of robustness, reliability, validity, efficiency, enjoyment, and cost.
- **The goal of the study:** To identify methods for effectively involving children in the design of healthcare technology.

Population Targeted

- The focus of the paper is on methods for evaluating the usability and effectiveness of healthcare technologies for children, with the goal of improving healthcare outcomes for this population.
- To implement methods, a subfield of Human-Computer Interaction (HCI) has been created specifically to investigate 'Child Computer Interaction' (CCI)
- The research took place between 2009 and 2010 in five mainstream primary schools in the UK and they mainly focused on children of age between 7–11 years old.

Literature Background

- Druin et al. (1999), who created a digital library for children using a child-centered design approach, conducted one of the studies cited by the authors. According to the study, involving children in the design process led to the creation of a product that was more engaging and user-friendly for children.

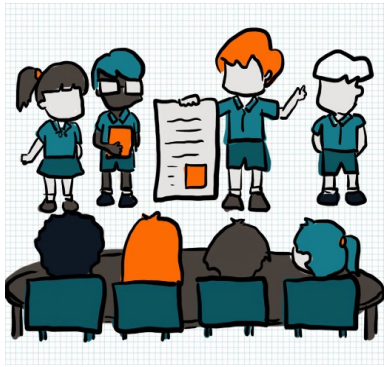
- Using a participatory design approach, Baxter and Courage (2012) created a wearable sensor system for individuals with developmental disabilities. The study discovered that involving children in the design process produced a more acceptable and user-friendly product for the target audience.

- The article also cites Sanders and Stappers (2008), who proposed a co-creation framework emphasizing the importance of involving users, including children, in the design process. The framework incorporates principles such as empathy, creativity, and experimentation and seeks to establish a collaborative environment that promotes the active participation of consumers in the design process.

Research Questions

- What methods are effective in engaging children in healthcare technology design?
- How do different methods impact children's participation and feedback ir the design process?
- What factors should be considered when selecting methods for engaging children in healthcare technology design?

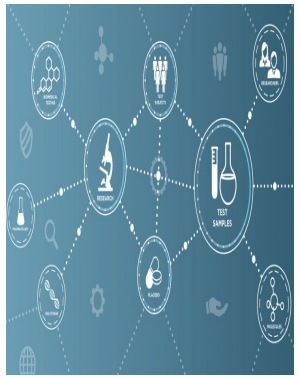
Research Methods used



Group Presentation

Group Task

Participation in interview methods



Post-trial Activities

Analysis of data

Group Task

Rehabilitation Joystick

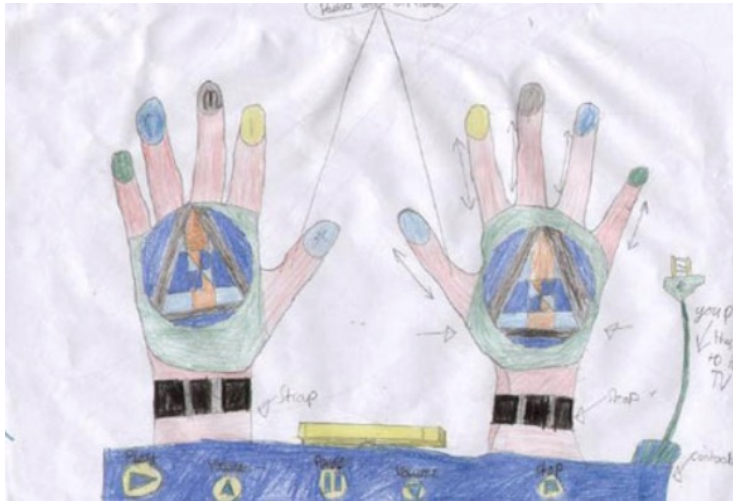
Handwriting Device

- For Group tasks, rehabilitation devices such as a joystick or handwriting device demonstration is done to ensure that the purpose of the device was understood by the children.

- children were asked to create their own designs of a joystick or handwriting device by incorporating their preferred colors, shapes,
materials, and features into color drawings. Props were provided to help children identify
their preferred colors and materials, including col- our charts and texture samples.

Group Task Activities

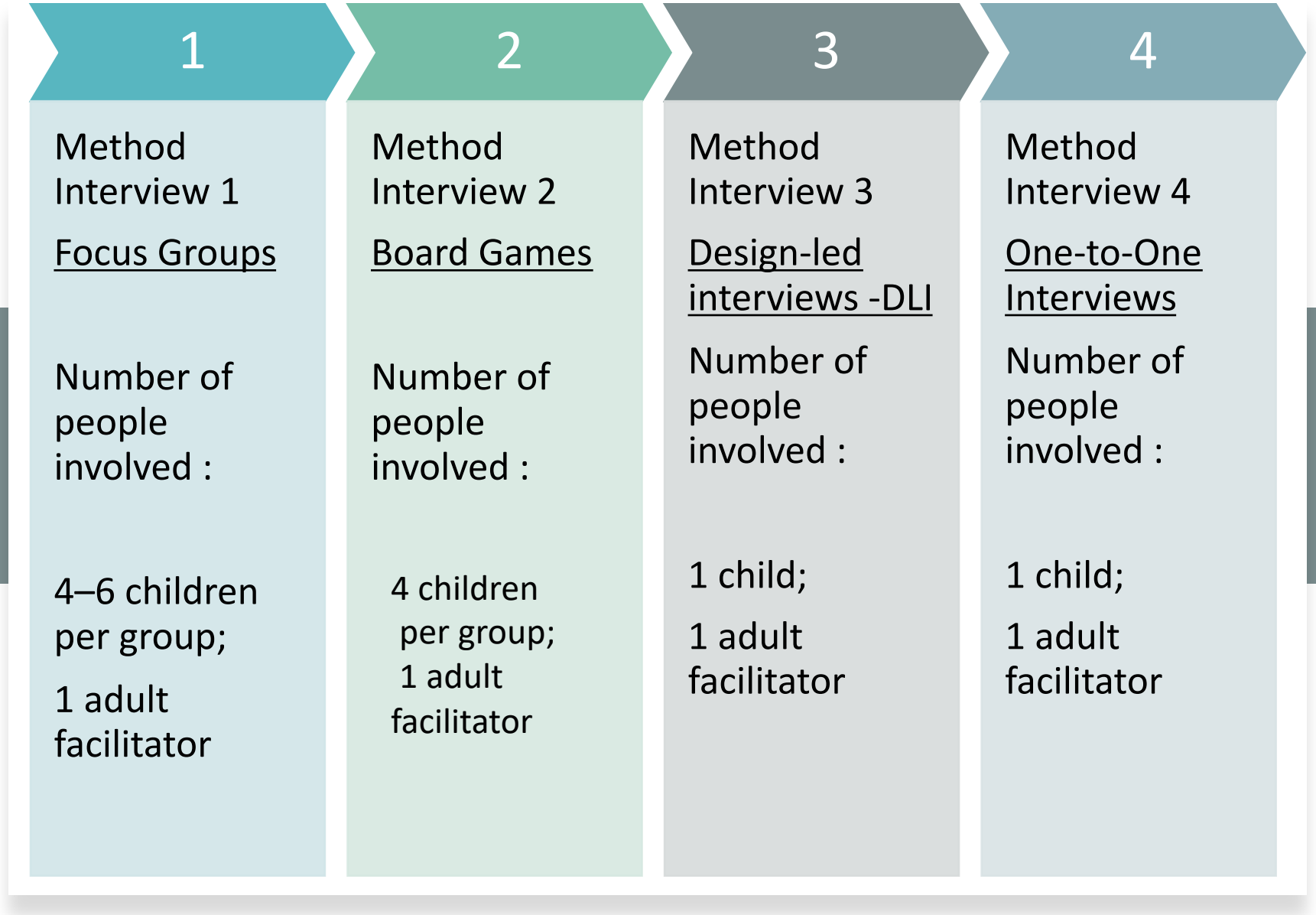
Example of a group task design obtained following a demonstration of the joystick device



Example of a group task design Obtained following a demonstration of the handwriting device

Examples of a low-tech prototype that was developed with a child during a DLI

Participation in interview methods



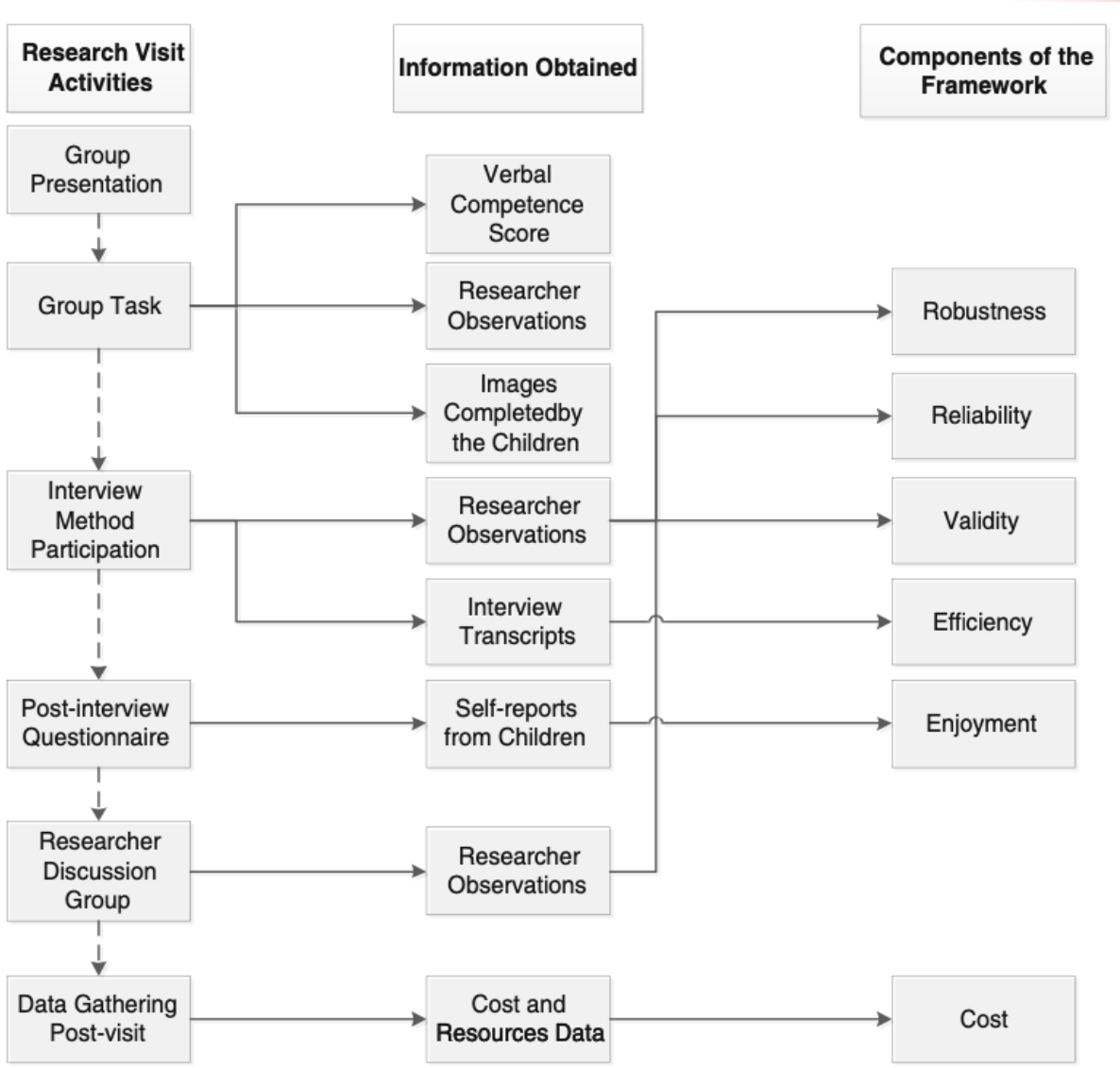
Markopoulos and Bekker framework

- The Markopoulos and Bekker framework is a set of universal criteria that can be used to evaluate the effectiveness of methods used for involving children in the design of healthcare technology.
- The five key characteristics are outlined in the framework for the assessment of a method.
- They are:
  - Robustness
  - Reliability
  - Validity
  - Efficiency
  - Enjoyment

Results Targeted

- The results of the research mainly focused on:

1. Activities and methods conducted by the researchers
2. The Markopoulos and Bekker framework
3. Cost and Time



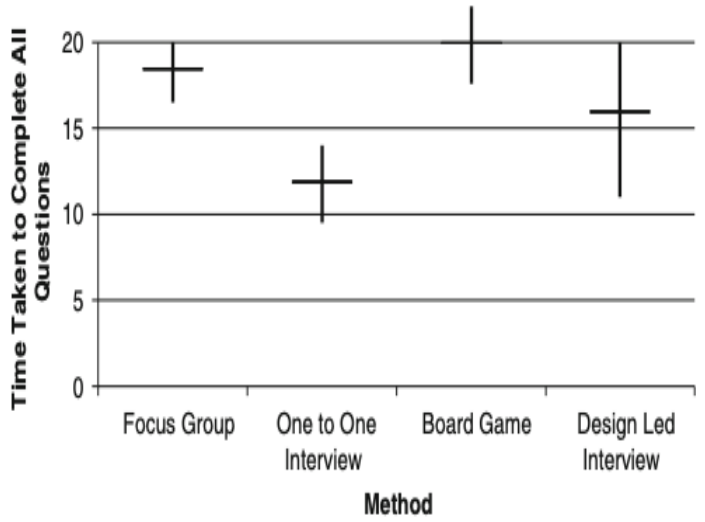
Measures used to perform the process analysis in the method comparison

Results Obtained

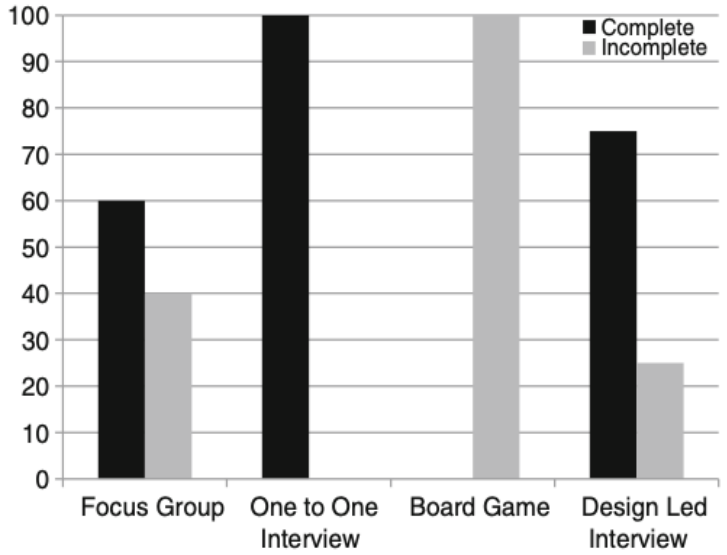
	Focus group	One-to-one interview	Board game	DLI
Number of male participants	30	5	16	5
Number of female participants	33	5	8	5
Total Number of Times Used	15	10	6	10

The distribution of participants across four interview methods and the total number of times each method was performed during the visits used

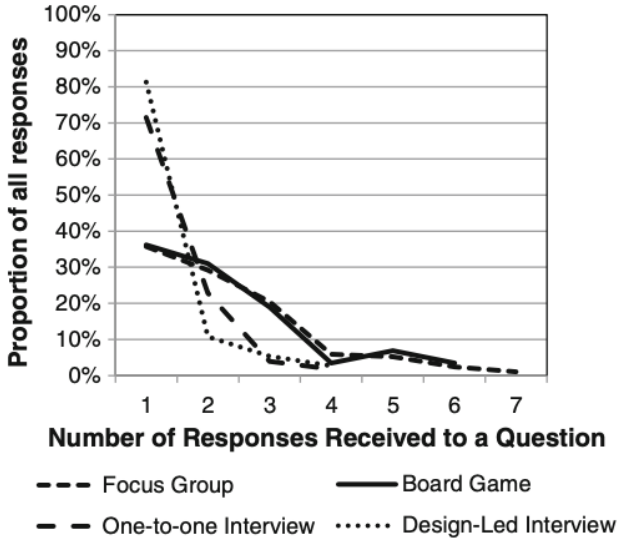
The average time is taken to complete each of the different interview methods



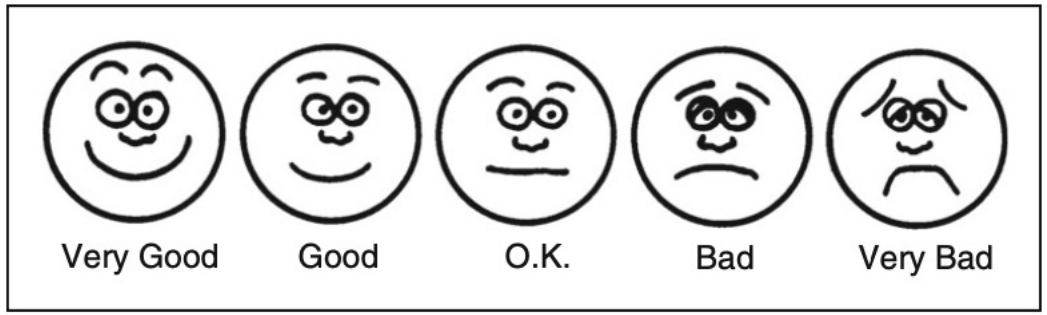
Results Obtained



3. A graph to show the percentage question lists that were completed in the 20-min time limit by each of the methods



4. The graph shows the number of responses gathered from each of the interview methods



Adaptation of the Wong and Baker pain scale used to assess the children's enjoyment of methods, acknowledging the need to further explore its reliability and validity

Strengths

- **Comprehensive review:** The paper provides a comprehensive review of different methods that can be used to engage children in healthcare technology design..
- **Inclusion of case studies:** The paper includes case studies to illustrate the use of different methods in real-world situations. This enhances the credibility of the research and helps readers to better understand the application of the methods
- **Practical implications**: The paper provides practical implications for researchers and designers who want to engage children in the design of healthcare technology. The authors have highlighted the strengths and weaknesses of each method and suggested the situations in which they are most effective.

Weaknesses

- Limited scope: The paper focuses on the design of healthcare technology for children, which limits its scope. The authors have not discussed the use of different methods for engaging other age groups or for designing other types of technology.

- Limited discussion of challenges: The paper briefly discusses the challenges of engaging children in healthcare technology design but does not provide a detailed analysis of these challenges. The authors have not explored the strategies for overcoming these challenges, which limits the usefulness of the paper for designers and researchers.

- A small set of data: The researcher has considered a small set of data for his research work

Discussion points

- Importance of user-centered design.
- Application of the Markopoulos and Bekker framework.
- Addition of new criteria to the framework.
- Applying findings from the framework

Personal Thoughts

- I believe that the study makes a valuable contribution to the field of healthcare technology design and highlights the importance of involving children in the design process.
- However, the focus on a small sample of data size and children with very few types of disabilities are considered which impacts better results
- In addition, while the study identifies several effective methods for engaging children in healthcare technology design, it is not clear how these methods could be scaled up to larger groups or more complex healthcare technologies.
- Overall, I believe that the study provides a valuable starting point for future research on engaging children in healthcare technology design, and that future research should explore ways to scale up the methods identified in the study to larger groups and more complex technologies.

Conclusion

Including children in healthcare technology design, particularly those with physical disabilities, ensures that technologies satisfy their requirements. Future healthcare professionals must incorporate children's needs and viewpoints in healthcare technology creation, but ethical issues must be addressed. This study shows researchers and designers how to incorporate children in the design and emphasizes the relevance of addressing their needs in healthcare technology.

Thank You