

## Background & Motivation

Developmental disability (DD) is a condition that results in intellectual functioning significantly below average. Many people with DD even have trouble learning basic life skills such as reading numbers and counting money. Currently existed tools to help these people were designed for younger children and thus others are not interested in using them. As a result, those people are still heavily relying on one-to-one tutorial sessions with care-givers, which is inefficient and time consuming.

## Objectives

- help people of all ages to learn basic skills
- provide reviews on numbers, uppercase and lowercase letters, shapes, colors, etc
- facilitate the process of administering an individual's progress

## Methods

We worked with Imagine!<sup>1</sup> to design a system that is most helpful to their clients, including the type of reviews, limiting distraction, adding reinforcers, recording client performance.

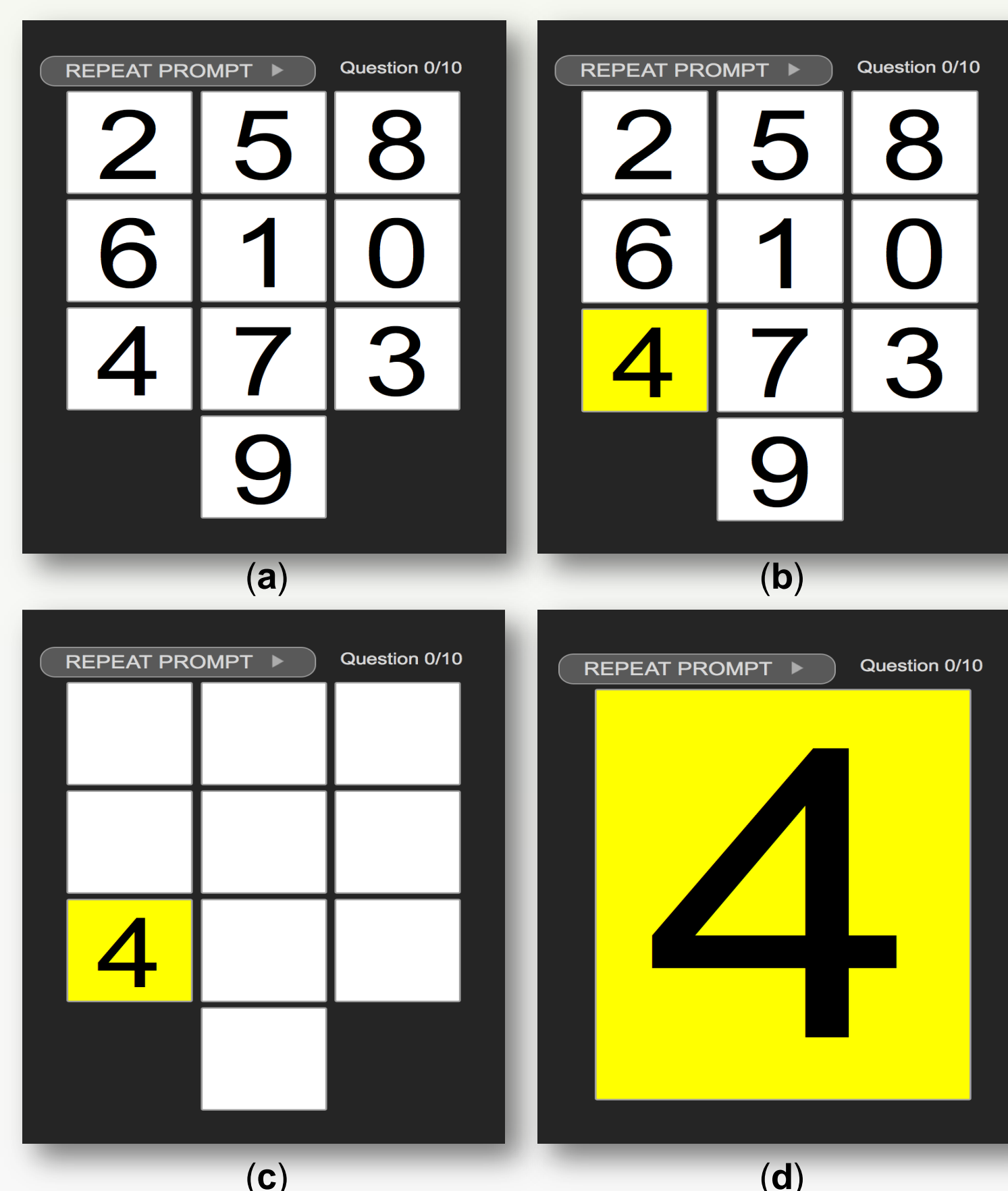


Figure 1. Number Review Screens: (a) Screen 1, (b) Screen 2-one incorrect response or timeout on Screen 1, (c) Screen 3-two incorrect responses or timeout on Screen 2, and (d) Screen 4-three incorrect responses or timeout on Screen 3.

## High-Fidelity Prototype

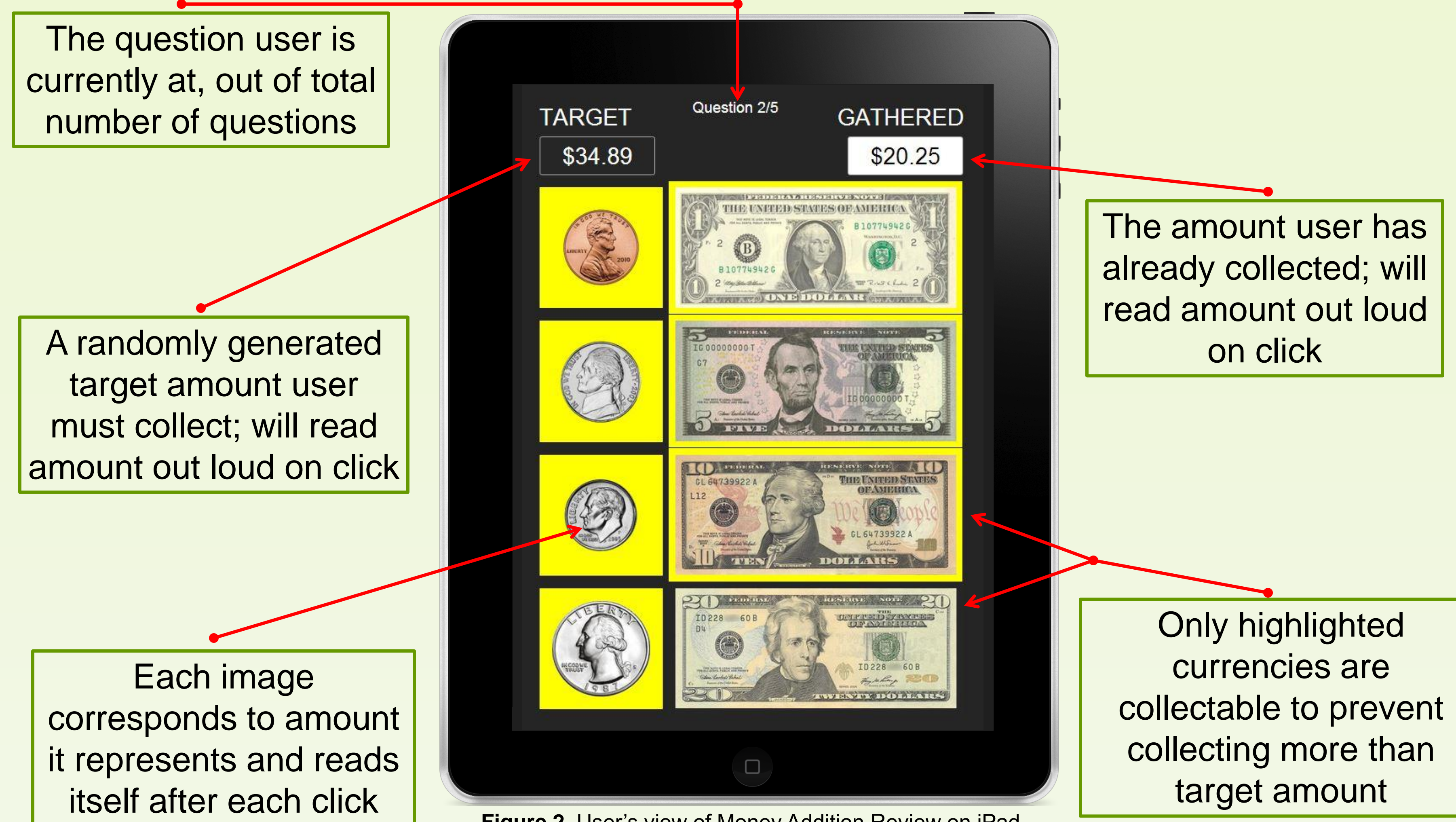


Figure 2. User's view of Money Addition Review on iPad

## Iterative Design

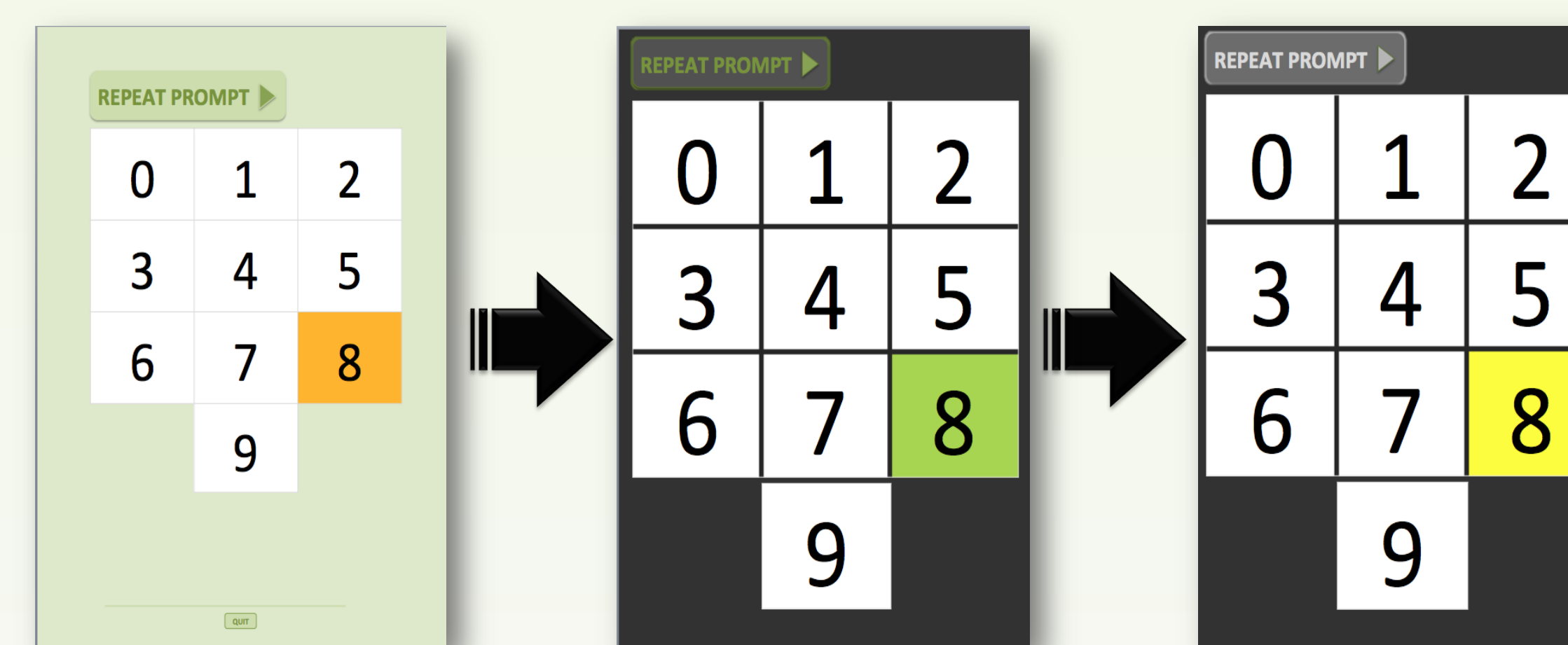


Figure 3. Changes in Numbers Review

Figure 3 demonstrates the transition of numbers review from its beginning stage, then change on the overall layout, and eventually the most contrasting colors. We learned that users can distinguish better between yellow and black.

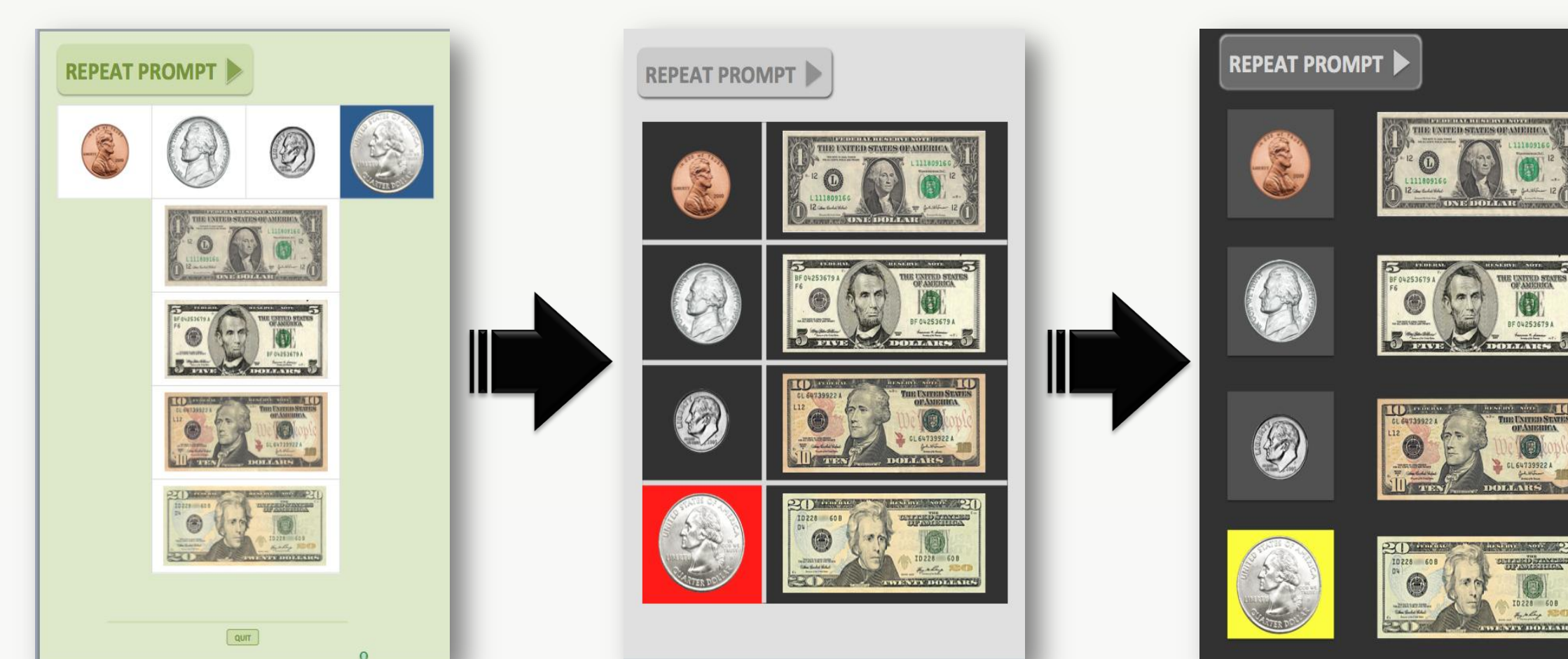


Figure 4. Changes in Money Review

Just like we mentioned above, Figure 4 also showed the changes we made to money review upon receiving feedback from our care-provider organization, Imagine!. Even increasing the gap between images can improve our results.

## Results & Conclusion

The five review applications were well received by users in the study. Users who normally use flash cards to do similar reviews reported that using these applications on an iPad was more enjoyable<sup>3</sup>. They all agreed that the questions and choices were clear and easy to understand.

Our study revealed promising results for the application and showcased the necessity for such application. By providing a simplistic interface with entertaining reinforcers, adults of various ages can learn and practice daily fundamentals much more quickly and more enjoyable<sup>3</sup>.

Session Information	
Review	Number Review
Session Start	2014-08-04 16:17:20
Session End	2014-08-04 16:18:37
Duration	0 hours, 1 minutes and 17 secs

Question	User's Answer	Screen Number
1	1	0
6	6	0
3	3	0

Figure 5. User's view of Result screen

## Future Work

- study current applications that provide similar services
- finish the system and incorporate findings from preliminary studies
- conduct long-term user study with a complete system

## Acknowledgement

1. We would like to thank the Imagine! organization for helping us in the design and testing of our system. Also thanks to all of the participants involved in this project, our advisor Sri Kurniawan, and Surf-IT.
2. This material is based upon work supported by the National Science Foundation Graduate Research Fellowship under Grants No. 1054984 and No. DGE-1339067.
3. L. Buschmann, L. Morales, S. Kurniawan, "Online Review System for People with Developmental Disabilities", *ACM ASSETS*, 2014. (Accepted)