

Activity Theory and Interface Design for Autism Treatment: Tracking, Collaborating, and Enriching the Classroom Experience

Courtney Marchese, Quinnipiac University

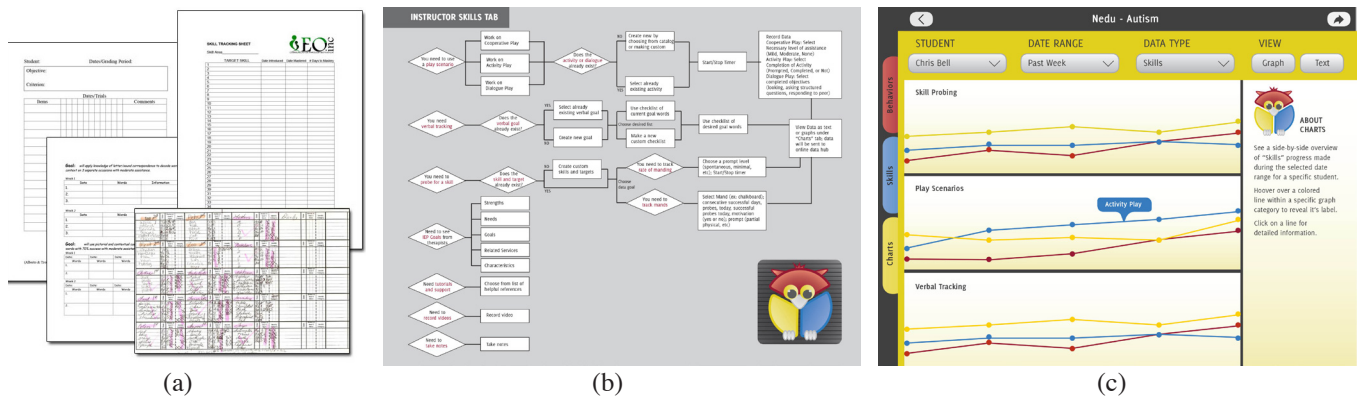


Figure 1: (a) paper data tracking of autistic children, (b) one portion of the extensive flowchart for Nedu, (c) initial ideation of data tracking

1 Introduction

Autism is a growing health issue in today's youth that necessitates careful monitoring and commitment to education. iPads have quickly proven to be a great tool in assisting autistic children through prompting, interactive educational games, and language development. However, the instructors and therapists of autistic children can also significantly benefit from iPads as an interactive tool to more quickly and accurately track student data, and ultimately be able to teach the child in a more individualized and precise way. Activity theory considers an entire working activity system (including teams and organizations) beyond just one user, focusing on consciousness, the relationship between people and things, and the role of artifacts (objects, such as an iPad) in everyday life. By analyzing data collected from instructors of autistic students, we can identify areas of sensorial, emotion, and interactions for maximizing user experience for three distinct collaborative audience segments: teachers, therapists, and students. With that understanding, we can then evaluate, ideate, and describe the functionality of an iPad interface that allows careful data tracking and collaboration to best position an autistic student for academic success.

2 Motivation and Approach

The idea for this app came from a discussion with a special needs teacher in Bronx, New York, who indicated that tracking autistic students with stacks of papers on clipboards is cumbersome and inefficient. Items currently tracked in the classroom by hand include skill mastery, play scenarios, cooperative play, and verbal skills (fig 1a). Between timing and recording, there is little room to collect extra beneficial data that could potentially be revealed if using a well-designed app. Ideally, data notes on behavior frequency, proportion, episodes, duration, latency, inter-response time, intensity, and behavior quality could all be recorded at various times with a customizable iPad app. The data collected on the iPad would then be sent and stored on a secure website for parents, teachers, and doctors to view and analyze. From there, more comprehensive treatment programs could be developed, graphed out data from the short and long term could be printed, and progress could be closely monitored. To successfully execute this complex app requires understanding of theory and thorough planning.

Activity theory suggests that when people interact with an environment, they produce outward mental processes that can later become communicable and useful for social interaction. Any task, or activity, can be broken down into actions that are further subdivided into operations. For design purposes, these categories can provide understanding of the steps necessary for a user to carry out a task. We may assume that an individual can and usually does participate in several simultaneous activities, and that those activities are continuously changing and developing. By analyzing and understanding the everyday activity of autistic children, teachers, and therapists, we can successfully design applications that aid in effective communication and documentation in the classroom. To most seamlessly accomplish this, we can turn to gestural interface technology by combining three key elements - sensory, emotion, and interactions - that must be utilized to their fullest to maximize user experience.

Ultimately, Nedu is an iPad app design concept created carefully from the bottom planes to the top. The word Nedu is based on the Spanish word 'nido', meaning 'nest', which is known as a safe and nurturing, carefully-crafted structure to develop in. The app is designed as a series of data collecting tools to make autism treatment easier and less time-consuming for teachers, therapists, and students. All data is used to generate charts and graphs to better monitor progress and share amongst a team of people seeking to treat autism in an educational environment. With functional goals in mind, we can plan categories and information flow for getting users to successfully complete desired tasks.

The immediate feedback, functionality, and opportunity for collaboration make Nedu an effective classroom tool for tracking autism, and offers promising opportunity for tracking other illnesses and disorders through gestures and interactivity.

References

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