Facilitating data collection for activity logging

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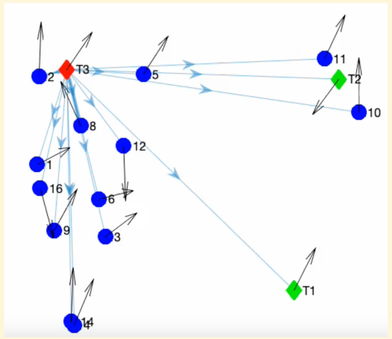
Background

The DM lab uses automated measurement tools like LENA recorders and RFID tags to study vocalizations and interaction in preschool and early preschool classrooms for children with and without disabilities. The RFID tags record the position of the students, while the LENA recorders collect audio. Furthermore, there are in-person data collectors that track the activities that the students participate in. Using this data, the researchers study how independent variables affect the development of language, communication, and function in the students.

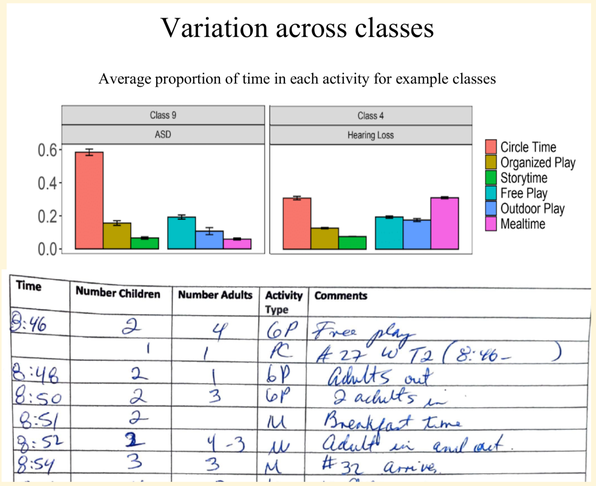


Participants

138 2.5-5 year olds (59 girls) enrolled in 13 inclusive preschool classrooms
Disability or Delay (DD) group: n=80, had an IEP
22 with autism spectrum disorder
22 with developmental delay
36 with hearing loss
Typically developing (TD) group: n=58, no IEP
3 class types:
ASD intervention (LEAP): 4 classes
Multiple Exceptionalities: 4 classes
Oral language intervention: 5 classes

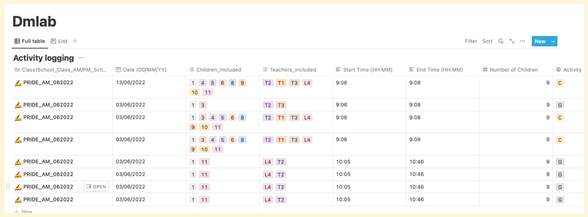
How activity logging informs research

Dr. Lynn Perry studied how in time in structured and unstructured activities vary across classes and within classes with disability type. She also studied how time spent in structured activities relate to children's language abilities.
By having the context of the activities, we are able to notice correlations between activity types and development of language.
Dr. Perry realized that more time in structured activities was correlated with higher communication with the teachers. This communication can help children develop their language skills.
Some conclusions from this data are:
Children with disabilities and delays spend less time in structured activities than their typically developing peers in the same class
Time in structured activity associated with expressive language for children with typical development



The Problem

As shown in the image, the process of collecting data was done manually. This led to several pain points. After the data was collected, it needs to be manually inputted into an excel file. Manually keeping track of all activities and actions can also become difficult to keep track of. During my user interviews in the development process, the observers noted how sometimes it would get complicated to keep track of exactly what time 3 separate activities are happening. They would have to repeatedly check their watch and look away from the room to write things down. Manually inputting the data into an excel sheet was also extraneous.

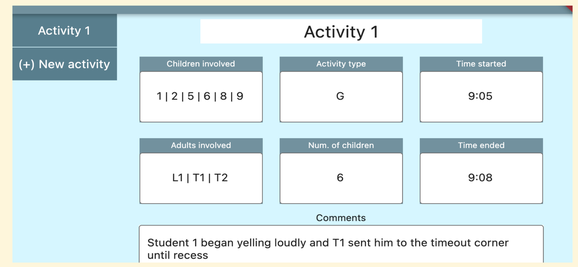


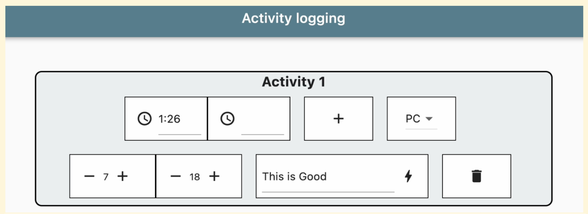
The Solution

Inputting the activities into a webpage like the one above would solve the issue of transferring the data, but it would be highly unpleasant for observers and inefficient. As a result, I was tasked with creating an application that allows for highly efficient logging of data that can be exported into a digital file. This app needed to include automatic time stamping, quick comments, a checkbox with the participants, activity types, and more features. We also decided on using iPads given their versatility in the classroom.

Development Process

After receiving feedback from team members on my prototype, it became apparent that it would be necessary for me to create an application. For the initial weeks, I spent most of my time learning app development. I took a bootcamp online about Flutter, Google's development kit for app dev. This is a timeline of development:





The development process was typically: testing, improvement, debug, feedback, repeat.

Future:

The app should be more generalizable so that it can be applied to after my departure. Incremental changes will also inevitably lead to a higher quality service.

Acknowledgments:

I would like to give credit to Dr. Lynn Perry for her research along with Dr. Vitale and Prof. Messinger for their guidance and maintenance of this study. This also wouldn't be possible without Burton Rosenberg and App Brewery.