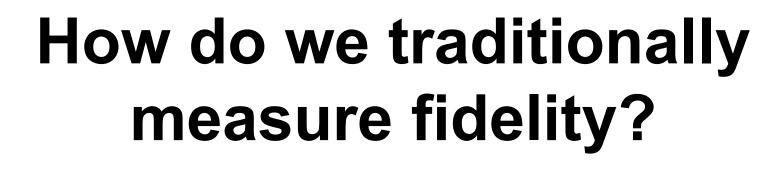
Examining clickstream data to understand implementation of a tablet-based curricular reading adaptation

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Conceptual Model



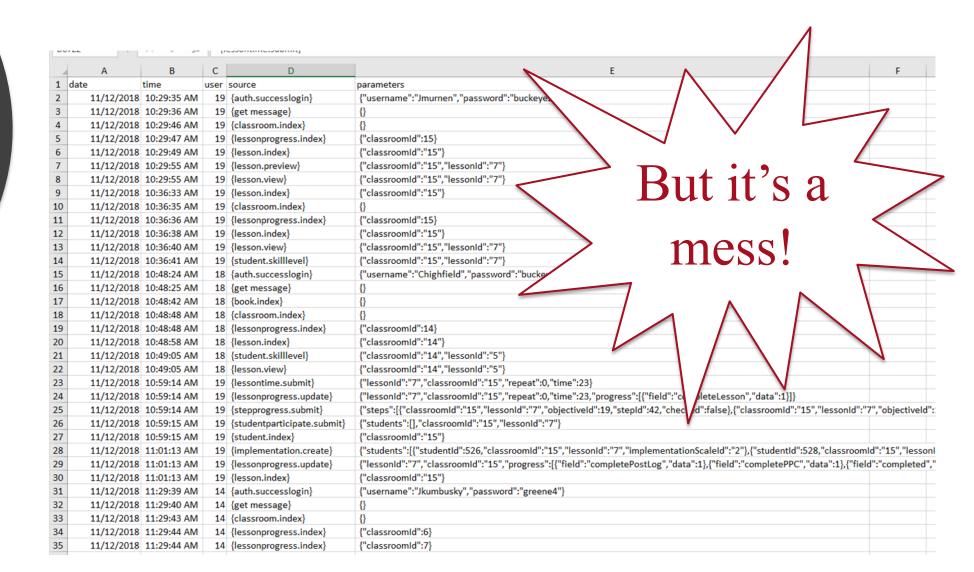
Observations

ns (Solution)

Self reported logs

Instead, can we use clickstream data to measure fidelity?

Clickstream data is automatically generated as a user browses through a website or app.



This Study

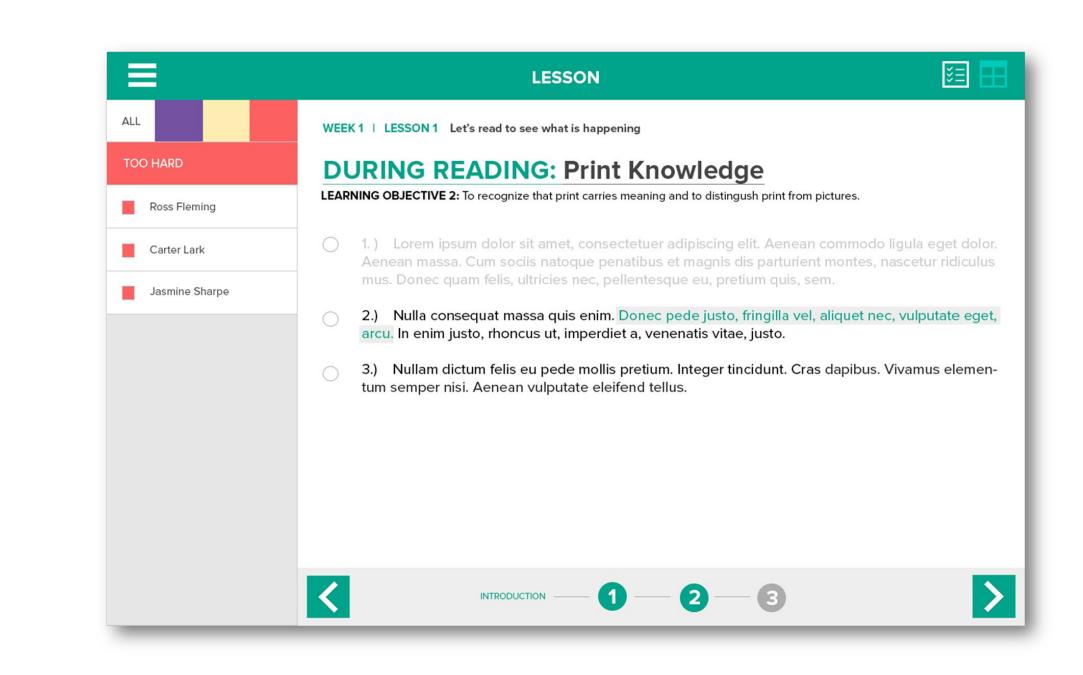
In this study, we focus on how questions of **EXPOSURE** (amount of the intervention received), **ADHERENCE** (delivery of the intervention's essential ingredients), and **QUALITY OF PROGRAM DELIVERY** (how well the implementer delivers the program). These can be addressed through data that is automatically collected by any website or app.

Study: The Read-It-Again Mobile App, a tablet based early reading intervention.

Teacher Facing: Preschool teachers use it to guide their instruction.

Key Components: 60 Lessons, two lessons per week, teachers provide individualized instruction.

Data: 15 Teachers Participated; 60,000 records generated.

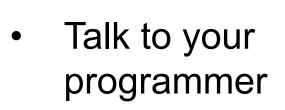


Study Example: Read It Again Mobile

	Fidelity Questions	Clickstream Data	Study Example	Traditional method	Clickstream data	Findings
Exposure	How often are users accessing the app?	Frequency of logins and targeted page views	Are children exposed to all 60 lessons included in the curriculum?	Teacher self-	60 loccone accosed online by	Total lessons
	How long are users spending in the app?	Duration of a session		reported logs.	60 lessons accessed online by the end of the study	Mean Mean
	Are users accessing all pages?	Page view frequencies and probabilities				10
Adherence	Do users access the content as intended?	Time spent on targeted pages	Are lessons delivered one per day?	In class observations	When were lessons clicked on by teachers?	Lesson per day avg 4.33
	Do users access the app on the correct schedule?	Regularity of logins				
	Are users fulfilling all aspects of the intervention content?	Counts of completed events				
Quality of delivery	Are users completing assessment and reports?	Probability and duration of access	Are users visiting key pages that will help them deliver the curriculum with quality	In class observations	Markov Chain probabilities of moving through the app	.02 .03 .03 .52 Begin Lesson Lesson
	Do users follow the intended process?	Probability of following intended path				.03 .22 .26 .95 .39 .89 Class Report Preview Lesson Preview
	Are users able to use the app without error?	Error logs / Help messages				Student Reports

Do it yourself

Develop a plan



Identify which questions you want to answer

Map the intended user path

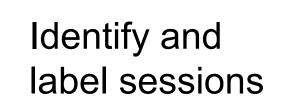
Clean the data

 Select only meaningful steps, clicks, or pages.

 Delete unnecessary characters

Rename columns and pages

Organize and Restructure



elapsed time

Calculate

 Convert to wide format based on session.

Analyze

Now run
meaningful
descriptive
statistics and
Markov-Chain
models

Conclusions

Fidelity: Implementation of this app was much more variable than we anticipated. We would not have known just how variable implementation was without accessing this clickstream data.

Next Steps

- 1. Develop user profile models
- 2. Link usage patterns to student growth
- 3. Replicate analysis plan with different tablet-based intervention.

