

Pre-Analysis Plan

Brief description of the intervention:

The current project evaluates two modalities of Chat2Learn (C2L), a 9-month text-message based program which sends by text message conversational prompts for parents to use with children. The first one is the static modality, where parents receive predetermined conversation prompts. The second one is the AI modality, in which parents will additionally get unlimited AI-powered responses. Both in the static or AI group parents receive the same pre-programmed prompts. The added value of AI is that, if a parent texts back with their child's response, AI will kick in and follow up with a response that matches the child's answer to the question. In the static version, there will either be no response or a pre-programmed follow up.

We intend to evaluate which modality leads to higher retention and engagement from parents. We will implement an RCT where 1000 parents will be randomly assigned to receive one of the modalities.

Model for estimation:

For the analysis, we will use a linear OLS model:

$$Y_i = \beta_0 + \beta_1 AI_i + \varepsilon_i$$

Where Y_i represents the outcome for parent i and AI_i is a binary variable indicating if parent i received the AI modality.

Outcomes:

- 1) Our first outcome will be a binary variable indicating if the parent opted out of the program before it was over.
- 2) Our second outcome will be, out of the 121 days in which the parents will receive a pre-programmed prompt from C2L, the number of days in which the parent sends a message to C2L. This variable will range between 0 and 121; if a parent sends a message on a day when the program did not send one of the pre-programmed prompts, that day will not count for this particular outcome. This will help us assess if receiving the AI modality encourages parents to send messages back when they receive the pre-programmed prompts.
- 3) The third outcome will be the total number of days in which the parent sends a message to C2L, counting both the days when they received and the days when they didn't receive pre-programmed messages. If the AI effect on this outcome is higher than the effect on outcome (2), it will help us understand if the AI modality also encourages parents to text C2L even without the nudge of receiving a prompt.
- 4) Finally, we will analyze the messages that parents send to C2L, such as the word count and the complexity of the message (which will be measured with the help of AI).

These outcomes will also be tested for each month and for each week separately, in order to analyze time-varying effects.

Heterogeneous treatment effects (THE):

We will test heterogeneous treatment effects for four baseline variables: child's gender, language of the program (English vs. Spanish), child's age, and parent's education.