

**Supplementary Materials for “BoundarEase: Fostering  
Constructive Community Engagement to Inform More  
Equitable Student Assignment Policies”**

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## S1 Formative Study Interview Plan

Goal	Interview Guide
<p>Introduction</p> <p>5 minutes</p>	<p>Thank you for taking time out of your day to talk to us.</p> <p>Introduce each other (interviewers should go first and model example) Name, location, role</p>
<p>Ask for consent to record</p> <p>2 minutes</p>	<p>First we wanted to ask for your permission to record this conversation. Just as a disclaimer: we won't share names or audio. We will reference the recording when designing a new community engagement platform for student assignment changes. We are a third party and aren't working for &lt;the school district&gt;. As a result, we plan to report aggregated findings to our partners at &lt;the school district&gt;. Would you like to remain anonymous in those aggregated findings? Also, when sharing our findings with the public, your responses will be anonymized by default. Do you have any questions or concerns or requests? Are you okay with us recording this conversation?</p> <p>If not, then one of us will take notes</p>
Start recording	
<p>Background questions</p> <p>Ask some broader questions to get a sense of where participants are coming from. Setting up context for our analysis</p> <p>10 minutes</p>	<p>We wanted to start by asking some background questions.</p> <p>[Background question] How long have you been a parent at &lt;the school district&gt;? Which elementary school(s) did your children attend?</p> <p>[Background question] Have you participated in previous engagement opportunities regarding the relief high school? If so, how did you engage?</p> <p>[Reason for being in &lt;the school district&gt;] Out of the various school options - &lt;the school district's&gt; neighborhood schools, &lt;the school district's&gt; magnet programs, charter, and private schools - why did you choose to send your child/ children to &lt;their school name&gt;?</p> <p>[Importance of attendance boundaries] How much have attendance boundaries influenced choices you made about your family and child's/ children's education?</p> <p>[Grapevine communication] Do you interact with other parents when making choices about your child/ children's education? Or when changes could impact your child/ children's education? If so, what do those interactions look like? (prompt to ask about type of communication [e.g. social media, forum, app, in-person at the school, in-person with a neighbor], and frequency of interactions)</p> <p>[Optional, ask if participants don't provide many details for the previous</p>

	<p>question] Let's expand on your answer by thinking about a few scenarios.</p> <ul style="list-style-type: none"> <li>• Do you interact with other parents when deciding which school to send your child/ children? If so, how? If not, how might you do that?</li> <li>• Do you interact with other parents when the principal at your child's/ children's school changes? If so, how? If not, how might you do that?</li> <li>• Do you interact with other parents when &lt;the school district&gt; proposes rezoning your neighborhood to another school? If so, how? If not, how might you do that?</li> </ul>
<p>Getting feedback on the current &lt;the school district&gt; community engagement platform</p> <p>20 minutes</p>	<p>Now we will be looking at a map interface, which &lt;the school district&gt; created around the relief high school. <b>We want to hear your thoughts on some of the boundary scenarios, but our main goal is to understand how you interact with the platform to find ways of improving it in the future.</b></p> <p>Just before you look at the map, do you feel like you have a good sense of where your current school attendance boundaries are?</p> <p>The current community engagement platform: &lt;a link&gt;</p> <p>Give participants access to the map interface and ask them to share their screen, so we can see what actions they take.</p> <p>What area do you live in? Do you know where &lt;their school name&gt; is located?</p> <p>Ask participants to choose a scenario to talk about (just for feedback purposes).</p> <p>This map interface has three possible scenarios: Red A, Brown A, and Brown C. I'm not sure which scenario, if any, would be picked. Purely for feedback purposes on how you use the platform, which of the three scenarios do you want to talk about? If you don't have a preference, then maybe we can talk about the Brown A layer.</p> <p>What do you think about the &lt;insert scenario they pick&gt; scenario? Feel free to explore the map as you think about it/ explain your reasoning.</p> <p>Perfect! I was wondering how likely you would accept this scenario?</p> <p>How likely do you think your fellow parents at &lt;their school name&gt; would accept this scenario? Why?</p> <p>If participants are very devoted to staying at a particular school, probably don't need to ask this</p> <p>Are there certain areas or neighborhoods where you would not feel excited to send your child/ children to school? ..... [if they identify</p>

	<p>one/some, ask why]</p> <p>Ask the following for participants who didn't click on the SES map layer or mention SES earlier on in the conversation:</p> <p>Great! I noticed that you didn't click on the 2020SES map layer, which shows socioeconomic status information for each census block. Socioeconomic diversity is one of &lt;the school district&gt;'s priorities for boundary planning. Does that play into how you think the boundaries should be drawn? Are there other types of diversity that should be factored in?</p>
<p>Reflection questions</p> <p>20 minutes</p>	<p>For the sake of time, I wanted to ask a series of reflection questions based on the activity we just completed.</p> <p>How would you like to share your feedback on possible changes to the high school boundaries like the one we looked at today? How does your answer compare with how &lt;the school district&gt; is asking for your feedback now?</p> <p>Are there any voices that you think are missing from the decision-making process on the relief high school? What would you want to know about what &lt;insert answer to previous question&gt; thinks? How might we gather feedback from &lt;insert answer to previous question&gt;?</p> <p>How would you like to stay in-the-loop while the boundaries for &lt;the relevant schools&gt; are iterated upon?</p> <p>Here is a more fun question: how would you complete the following sentence: "a platform that asks for my feedback on student assignment changes should be [blank]"?</p> <p>[Background question] How would you describe your comfort level with technology? How do you use technology in your everyday life?</p>
<p>Wrap up interview</p> <p>5 minutes</p>	<p>That was all the questions we had. Thank you so much for your time! Your feedback will help us improve how we ask the community for feedback on attendance boundaries.</p> <p>Do you have any closing thoughts that you'd like to share or any questions for us?</p>
Stop recording	

## S2 User Study Interview Plan

Goal	Interview Guide
Introduction	<p>Thank you for taking time out of your day to talk to us.</p> <p>Introduce each other (interviewers should go first and model example) Name, location, role</p>
Ask for consent to record	<p>First we wanted to ask for your permission to record this conversation. Just as a disclaimer: we won't share names or audio. We will reference the recording when iterating on a community engagement platform for student assignment changes. We are a third party and aren't working for &lt;the school district&gt;. As a result, we plan to report aggregated findings to our partners at &lt;the school district&gt;. Would you like to remain anonymous in those aggregated findings? Also, when sharing our findings with the public, your responses will be anonymized by default. Do you have any questions or concerns or requests? Are you okay with us recording this conversation?</p> <p>If not, then one of us will take notes</p>
Start recording	
Background	<p>We are researchers exploring how data and technology might help improve community engagement processes and outcomes around school attendance boundary changes in &lt;the school district&gt;. We have developed a computer program that produces a hypothetical boundary change for &lt;the redistricting location&gt; by trying to balance the four pillars. The platform we've developed then uses data tables and visualizations to present what impact we believe the proposed boundaries could have on SES diversity, school utilization, disruption to feeder patterns, and estimated travel times.</p> <p>We are working with data estimates, and so, some data may be different from what you're used to seeing — please call these out as you see it, but if possible, try not to let this keep you from fully exploring the platform and thinking about how it might be put to use.</p> <p>Importantly: the depicted boundaries are purely hypothetical — not necessarily something &lt;the school district&gt; is actually considering. But we want to show them to you to get your feedback, and more broadly, to get your input on how useful the platform might be in soliciting community feedback during boundary changes.</p> <p>As you explore, please “think aloud” and share whatever comes to mind ... this will help us get a sense of how you're thinking about what you're seeing; what you find confusing or unclear; etc. All of this will help us improve the platform in the future. We will also ask you some questions as you go along.</p> <p>Let's begin!</p>
Questions asked after interacting with the first part	<p>Give the participant a link to the platform (&lt;the link&gt;) and then ask them to screen share. Have them think aloud and go through the first two pages of the platform. Answer any questions they have in case they get stuck. Ask them to</p>

of the platform	<p><b>pause before clicking the “Next” button after the qualitative feedback feature.</b></p> <ul style="list-style-type: none"> <li>• How does this experience of seeing possible boundary changes and providing feedback on them compare to what &lt;the school district&gt; currently does?</li> <li>• What about this experience stood out to you?</li> <li>• What did you learn from this experience?</li> <li>• What do you think could be better about how the information is being conveyed?</li> </ul>
Questions asked after interacting with the second part of the platform	<p><b>Ask the participant to click “Next” and continue interacting with the platform until they hit the “Thank you” page.</b></p> <p>On a scale from 1 to 5 (1=terrible; 3=status quo; 5=amazing), how would you rate the current experience in terms of (ask for elaboration when it makes sense):</p> <ul style="list-style-type: none"> <li>• clarity of how new boundaries align with the four pillars?</li> <li>• clarity of how new boundaries would affect your family and others?</li> <li>• trust that &lt;the school district&gt; actually wants to hear what you have to say?</li> <li>• helping you understand how others might be affected by this rezoning and/or what they care about? Please elaborate.</li> </ul> <p>Did you find that the depicted rezonings and their impacts matched how you ranked the four pillars?</p> <p>We developed an algorithm that produces new boundaries by trying to balance tradeoffs between the four pillars. On the backend, an algorithm weighs the different pillars according to the initial ranking that you gave. So in your case, you rated &lt;insert first pillar&gt; first and then &lt;insert second pillar&gt;. The algorithm tried to produce new boundaries with a higher weight on those two pillars compared to the other two.</p> <p>Knowing that this rezoning was produced based on how you ranked the pillars, how do you feel about this approach?</p>
Reflection questions	<p>Do you think a platform like this would help members of the community pause and consider the impacts rezonings might have on other families beyond their own? How so / why not?</p> <p>Imagine a future where this platform is used for community engagement around boundary changes. What makes you worried? What makes you hopeful?</p>
Wrap up interview	<p>That was all the questions we had. Thank you so much for your time! Your feedback will help us improve the BoundarEase platform. We are hoping to eventually integrate the platform with &lt;the school district&gt;’s current rezoning process.</p> <p>Do you have any closing thoughts that you’d like to share or any questions for us?</p>

## S3 Codebook

The two-level hierarchical codebook consists of 15 parent codes and 38 child codes. Parent codes represent general topics (e.g. tedious participation and ease of use), and child codes (e.g. tedious participation.task time and ease of use.accessibility) represent various facets of a topic.

<b>Code name</b> (parent codes are bolded)	<b>Definition</b>
<b>user characteristics</b>	ways that users describe themselves
tech literacy +/-	user mentions that they do / don't feel comfortable with tech and data
active parent	user was very involved in the rezoning process and/or acted as sources of information to fellow parents
new parent	user is new to <the school district> community either because they moved to <the school district> recently or recently became parents
other	other notable user characteristics to flag (magnet parent, full-time job)
<b>feature impressions</b>	any positive and negative impressions that users had towards aspects of the platform or when comparing the platform as a whole with the status quo.
platform +/-	user says something positive / negative about the platform as a whole compared to the status quo
algorithm +/-	user says something positive / negative about the algorithm
perspective-getting +/-	user says something positive / negative about seeing another perspective
modify feedback +/-	user says something positive / negative about being able to modify one's feedback after seeing another perspective
rating +/-	user says something positive / negative about the rating question or open-text box at the end of the 2nd page
adding stats +/-	user says something positive / negative about the ability to add stats in the qualitative feedback feature
map+/-	user says something positive / negative about the map feature
distance text +/-	user says something positive / negative about the text used in the home to school distance section
first page +/-	user says something positive / negative about any of the content on the 1st page
utilization text +/-	user says something positive / negative about the text used in the utilization pillar
utilization viz +/-	user says something positive / negative about the interactive viz in the utilization pillar
feeder text +/-	user says something positive / negative about the text used in the feeder pattern pillar
feeder viz +/-	user says something positive / negative about the viz in the feeder pattern pillar
diversity text +/-	user says something positive / negative about the text used in the SES diversity pillar
diversity viz +/-	user says something positive / negative about the viz in the SES diversity pillar



<b>tedious participation</b>	user mentions that participating in the community engagement process is very demanding in terms of time and cognitive effort or the tediousness has been reduced
process length	user mentions that the community engagement process is tedious because of how long the process is (e.g. repetitive, hard to stay in the loop, and engagement fatigue) OR they mention that the tediousness of the process length has been reduced
task time	user mentions that completing individual tasks during the community engagement process takes a lot of time (e.g. manual labor, taking time to digest the change) OR they mention that the tediousness of individual tasks has been reduced (e.g. all the information is in one place, "one stop shop") OR other people had to help reduce task time in order for people to participate
<b>collective reaction to process</b>	group-level reaction to the community engagement process. Includes mentions of the users reactions to the process and/or when they connect their personal reaction to a group; also include mentions of people having different responses
interpersonal tension	mentions of tension between community members (e.g. heated, contentious, emotionally charged, broken friendships)
community manipulation	mentions the risk of having vocal parents manipulate or weaponize the community engagement process and, as a result, dominate
echo chamber	mentions that people tend to hunker in camps and create echo chambers during the engagement process (e.g. become siloed, hyper focused, selfish)
<b>trust info</b>	mentions of the presence or lack of trust in the information released by <the school district> during the community engagement process. This includes interactions between <the school district> and the community
<the school district> manipulation	mentions of purposeful misleading / manipulation from <the school district> (e.g. pretending to listen, assign blame to <the school district>, <the school district> did this on purpose, <the school district> singling our community out)
poor communication	ineffective / poor communication (e.g. didn't get specific questions answered, lacking info / context, hard to find info, conflicting info, inaccurate data, sharing results back to the community, the need for next steps, poor/confusing information design); specifically communication from <the school district> to community (one direction)
transparency	mentions that district or BoundarEase platform is or isn't transparent (e.g. not transparent sensemaking process or "black box")
hope	people feeling hope in <the school district> for being involved in this project
<b>involvement in process</b>	references to user involvement in the process in terms of knowing the impact of a new boundary change and being able to share preferences on the boundary change
sharing feedback	explicit mentions of users sharing preferences on the boundary change
learning community	mentions of learning about the impact of a boundary change on the community at large (e.g. big picture impact, changes at a global scale, district-level context, comparative info). Also mentions of the importance of acknowledging other perspectives and having responsibility to the community. Also includes possible responses to perspective-getting, specifically combating assumptions, changing minds, taking a step back, and having a new frame of reference.
learning personal	mentions of learning about the impact of a boundary change on one's own family (e.g.

	personalization) OR learning about impact on any individual, not just the user
<b>informed decision-making</b>	user mentions being knowledgeable and empowered to give feedback (e.g. make informed decisions, give informed feedback, constructive) OR user mentions being able to understand more context around the boundary change
<b>lack awareness</b>	mentions of community members not being aware of aspects of the community engagement process, either in terms of what different concepts mean, the community context, possible outcomes, or how they can get involved (e.g. blissfully ignorant, blind agreement, free for all). Also include lack of awareness towards other people in the community (e.g. didn't know that this school was underutilized)
<b>responsive</b>	mentions of being able to see the boundary changes and/or impacts of boundary changes in real-time and in an interactive manner AND includes the ability to try different configurations (e.g. simulation)
<b>process structure</b>	mentions of how the community engagement process should be structured (e.g. when to introduce the BoundarEase platform and having a multi-part process)
<b>ease of use</b>	—
conciseness	user mentions that the platform has less text / information or emphasizes the important things OR mentions that the platform doesn't have those characteristics. This doesn't refer to the platform feeling fast (that would be "task time")
understandability	user mentions that the BoundarEase platform is simple/easy to digest in terms of language (e.g. being clear on definitions, informative text) and the visualizations and the interactions (e.g. 1 vs multiple scenarios, clear, easy) OR user mentions that the platform doesn't have those characteristics; this doesn't include understanding the context around a boundary change
accessibility	user mentions that the BoundarEase platform is accessible in terms of language support, or access to tech, or having different types of information OR user mentions that the platform doesn't have those characteristics
UI-	based on user actions, there was confusion about the UI (discoverability of affordances aren't clear, proximity of elements is confusing as to what affects what, visual readability [e.g. colors])
scaffolding	user mentions the scaffolding that the platform does or doesn't supply when providing feedback (e.g. pros and cons, split by pillar, talking point, concrete ask);
<b>data vs human</b>	—
data-driven	user mentions a preference for data over emotions (e.g. detail oriented, snapshot of data, framing things with the 4 pillars) OR data can defuse emotions. Data-driven can apply as a feature of the platform or as a personal value that the user emphasizes
human-driven	user mentions a preference for a human nuance/knowledge to be incorporated into data outputs. OR user mentions that data/computer can't accurately capture all info
<b>specific suggestion</b>	concrete suggestions that users have on the BoundarEase platform (e.g. make the text larger, change the color, replace this with bar graphs)
<b>points of confusion</b>	anytime users express confusion in the moment while interacting with the BoundarEase platform, including clarifying questions that they ask
<b>bug</b>	moments when users encounter or elevate bugs in the BoundarEase platform

## S4 Data and Code Release

All code and data required to run BoundarEase can be found [here](#). All identifying references to our partner school district has been removed.