(Co-)Designing for Diversity
Games across afterschool programs

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Overview

• What is a cobot? What is a cobot game?
• From monolith to collection
• What happened when we tried this approach?
What is a cobot?

• A **collaborative robot** that works with humans in close proximity and with awareness of the human’s intent.
What is a Cobot Game?

• A game where players program a robot partner to play alongside them

• Our project focuses especially on low-resource learners in out-of-school-time (OST) environments
From monolith to collection
From monolith to collection

• Method combines measures of prior experience with robots, coding, and gaming with co-design ideation
  • ~20 sessions
  • Activities + Free play + Prototypes
From monolith to collection

• Example: What three games do you play the most?
  • Establish preference patterns
  • Reference points for co-design conversations
From monolith to collection

- Within-site diversity of interest
  - Gendered differences in games reported
  - Interindividual differences presumably by other interests

- Between-sites diversity of interest
  - Confirmed through additional sites added later
  - Responses reflect complex cultural influences
  - We’ll come back to this later
From monolith to collection

• So what does it mean for our cobot game design?

  **Takeaway #1:** No single game is likely to capture broad interest in a free-choice environment, or across sites in different neighborhoods

• And for our design-based research?
Co-Designing a cobot collection

• **Hypothesis:** Games codesigned with different learner populations will produce games that are interesting and culturally appropriate for those populations

• **Methodologically:** We should co-design games at purposively diverse sites to explore the design space more completely and enable analysis through contrast
Sites & Games
# The Sites

<table>
<thead>
<tr>
<th>Site</th>
<th>Description</th>
<th>Sample Size</th>
<th>Race</th>
<th>Gender</th>
<th>Sample Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>Golden Grove</td>
<td>Gentrifying urban neighborhood</td>
<td>~10 youth</td>
<td>Mixed race, mixed gender</td>
<td>Convenience Sample</td>
<td></td>
</tr>
<tr>
<td>Sunnypond</td>
<td>Inner suburban neighborhood</td>
<td>~10 youth</td>
<td>Mixed race, mixed gender</td>
<td>Convenience Sample</td>
<td></td>
</tr>
<tr>
<td>West Creek</td>
<td>Inner suburban neighborhood</td>
<td>~20 youth</td>
<td>Primarily Black, mixed gender</td>
<td>Convenience Sample</td>
<td></td>
</tr>
<tr>
<td>Clear Bridge</td>
<td>Small town center</td>
<td>~10 youth</td>
<td>95% White, mixed gender</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cinderella Club</td>
<td>Former industrial neighborhood</td>
<td>~30 youth</td>
<td>Primarily Black, mixed gender</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Central Rise</td>
<td>Low-SES urban neighborhood</td>
<td>~20 youth</td>
<td>Primarily AA, split gender: Boys &amp; Girls</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Designing across diverse sites

Takeaway #2: Work with partners to include sites/cohorts that may not be the ones they’re used to showcasing. This requires trust on both sides.
Expert-Designed Game
Super Slime Battle

- Role-taking (character and “pet”)
- Base(less) defense genre
- Some prior coding skill
Acceleration City

- Their rules, not ours
  - Playground rules
- Sometimes multiplayer
- Familiar setting
- Role-taking (which car)
Zillah City & Zillah Beats

- Real* setting
  - “Why do we have to do this? The Avengers should do it.”
- Extensive character customization
- “Make money”
- 2\textsuperscript{nd} game in observed genre: Beat & Rhythm
Best Friends Forever

- Horror-puzzle game genre
- Strong narrative & visual aesthetic
Battle for the Hill

• Our constraint: Non-digital game
• Complex mechanics
• “Take that” abilities
Designing across diverse sites

Takeaway #3: Different sites give input that leads to dramatically different game designs.
  • Supports hypothesis about across-sites variance in preferences

Takeaway #4: Expressed preferences are incomplete. Build protocols that allow for revealed preferences as well.
  • Freedom from external rules in Acceleration City
  • Hidden genre familiarity leading to Zillah Beats
Discussion
Explicit responses are incomplete

• We don’t know the exact cause
  • Prompt only activated a narrow conception of “games”?
  • Socially acceptable response because we asked out loud?
  • Public vs. Private games?
  • Control scheme confusion?

• But the explicit favorite-games responses definitely underinformed design!
Where Do Differences Originate?

• Think Nested Contextual Models
• Local culture around:
  • Digital Games
  • Play in general
  • Site culture
  • Regional culture
Next Steps

• Test multi-game Cohort Capture Hypothesis
  • Where is critical mass? Diminishing returns?
  • Is our collection of games enough?

• Polishing games for release
Summary

• **Takeaway #1**: A collection of games may serve diverse players *and researchers* better than a single option.

• **Takeaway #2**: Work with partners to include sites/cohorts that may not be the ones they’re used to showcasing. This requires trust on both sides.
Summary

• **Takeaway #3:** Different sites give input that leads to dramatically different game designs.

• **Takeaway #4:** Expressed preferences are incomplete. Build protocols that allow for revealed preferences, such as free play.
Backup slides
Is it codesign?

• Constrained co-design process
  • Need to include co-robotic elements
  • Need for scalability
  • Our team’s expertise
Explicit responses are incomplete

• Revisiting: What three games do you play the most?
  • During the design of Zillah City, most respondents said they played the same 3 games: GTA, Madden, 2K
  • But they rejected sports game designs and themes
  • And when we built a third person game (like GTA), the controls and camera caused problems for many players
  • And when we asked about things they liked about those games, they didn’t have much to say
Explicit responses are incomplete

• But between co-design activities, we noticed participants playing games on their phones...
  • Games that never showed up on their Top 3 but they had clearly invested time in, and had mastered extensively
  • We built a second game, *Zillah Beats*, as a single-button beat & rhythm game around these observations, which was largely understood and accessible
Explicit responses are incomplete

• In another case, a central design pattern was in the dots between feedback

• Acceleration City
  • 6 design concept pitches rejected by codesigners
    • Even though they were made of ideas they had given us!
  • Strong pushback every time we tried to explain the rules of a game during its pitch
  • But the pattern itself, plus watching free-play clued us in
Explicit responses are incomplete

• We concluded the feedback “signal” was that they didn’t want *us* to specify in-game goals

• So we built a “Playground” instead
  
  • Fluid individual and small group specification of goals
  • Built attractions, provocations, and things to play with