Practical Considerations for Participatory Design with Rural School Children in Underdeveloped Regions: Early Reflections from the Field

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Motivation (1)

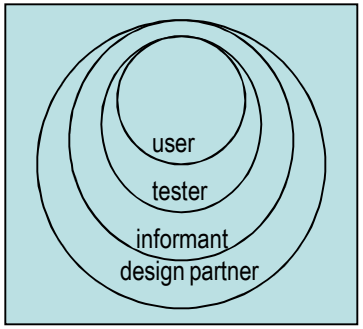
What do rural school children in underdeveloped countries need?

Motivation (2)

Surprisingly, there are some computing initiatives out there!

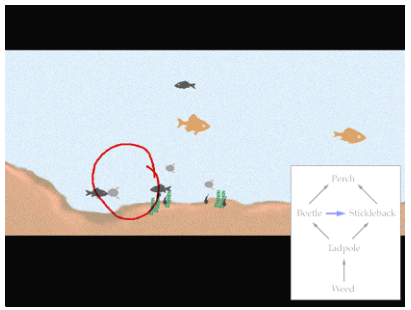
But what software will they use?

Related Work



Allison Druin: Roles of Children in Technology Design

Scaife, Rogers et al: Informant Design



CBC4Kids Storybuilder (Antle '03): Children as informants & users

Azim Premji Foundation: School Children as Testers

Gibson et al: Child-centered design

Why Involve Children as Partners?

Druin ('02)	Developing Countries
(1) Child empowerment →	• Ownership • Self-directed learning • Sustainability
(2) Immediate feedback →	Cultural relevance
(3) Engaging ideas →	Encourage interest in learning

The Question

- *But* rural school children in some underdeveloped regions have limited
  - exposure to technology
  - experience in creative exercises in school curriculum
  - parental support for "unproductive" activities

In what ways can the design of educational software for these children benefit from their participation?

Our Work

- Conducted a 10-day workshop at a rural school in Uttar Pradesh, India
- Goal: participatory design of electronic games for learning English as a second language (ESL)
- English literacy enables:
  - Educational & employment opportunities
  - Internet & computer usage
  - Higher social status

Participant Selection

- Participants were recruited by NGO staff prior to our arrival

- 10 girls and 2 boys
- Grades 4-8
- Ages 10-16, (2 unknown)
- High academic performance
- Some experience with Word, Paint and electronic games

Facilitator Selection

- Recruited 2 adults and 5 urban school children as facilitators
  - Served as translators for foreign researchers
  - Helped participants generate design ideas

- Child facilitators could not spend more than 3 days
  - **Phase 1: Warm-up (3 days)**
  - **Phase 2: Low-tech prototyping (3 days)**
  - **Phase 3: Hi-tech prototyping (3 days)**
  - **Phase 4: Evaluation (2 days)**

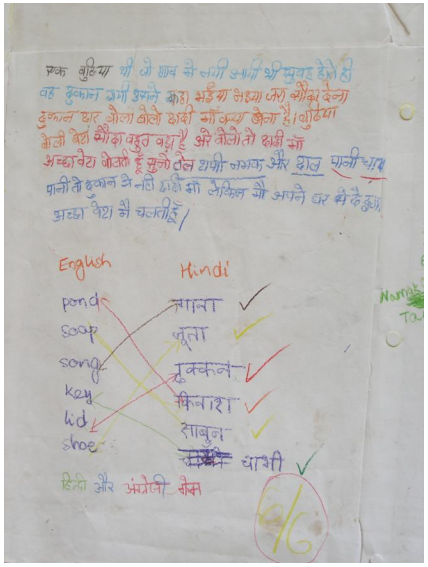
Phase I: Warm-up

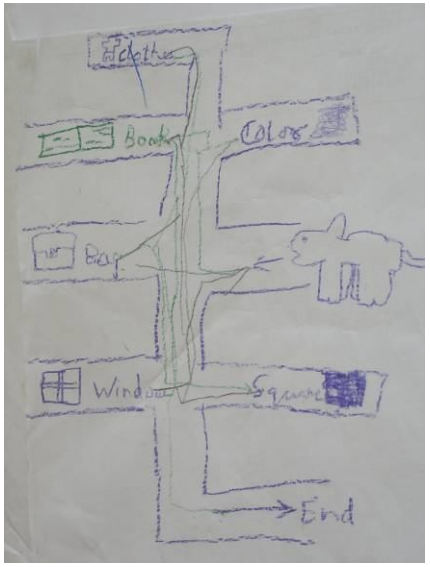
- Built a digital photo collage in Paint
  - Practice/refresh basic familiarity with GUI
  - Engage creativity

- Played a sample ESL learning game

Phase II: Low-Tech Prototyping

- Brainstormed fun ways to teach English
- Designed (on paper) a game to teach 6 Hindi words
- Tested their own translated games
- Played another ESL learning game

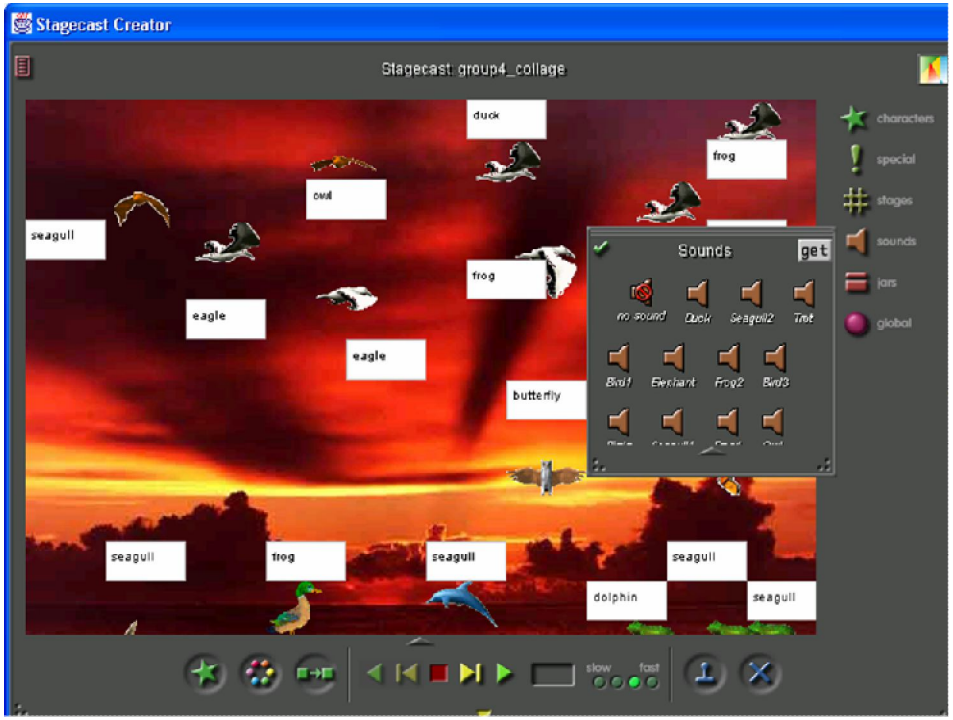




Phase III: Hi-Tech Prototyping

- Played another ESL learning game
  - Clifford

- Used Stagecast Creator
  - Library of themed backgrounds, characters, sounds



- Designed word matching game

Why Involve Children as Partners? (1)

Druin ('02)	Developing Countries
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Why Involve Children as Partners (2)

- Sense of ownership

Feeling of Ownership

Facilitator: How does [your game] compare to Clifford?

Student: I like our game more.

Facilitator: What is in this game that you like that's not in the Clifford game?

Student: The numerical point system and the messages constantly spoken by the central character.

- Immediate feedback
  - What is fun
- Implications for new design ideas
  - Prevalent feelings towards learning
  - Culturally relevant scenarios for content

Culturally Relevant Scenario

Facilitator: … give me an idea I can design using the goat.

Student: …When the farmer comes close to the goat, he will shout and drive the goat away.

Facilitator: Okay, good idea.

What are some practical considerations that might help maximize these types of contributions?

1 Equal Partnership

First Impressions

Teacher-student power differential

Researchers need to develop a relationship with rural school children that is fundamentally different from teacher-student.

1 Equal Partnership

Daily ice-breaker

Star award ceremony

Camera interviews

Displaying a genuine interest to learn about the local culture could help build a more equal design partnership.

2 Local Facilitators

- Adult facilitators
  - Provided valuable information about local culture
  - Helped us communicate with local stakeholders

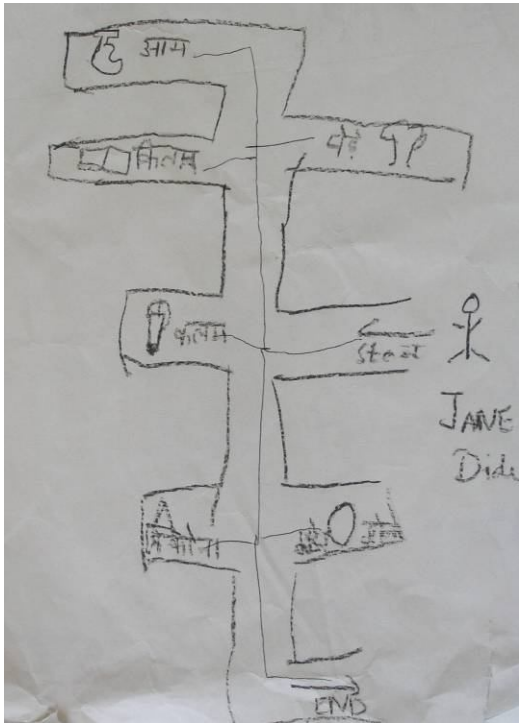
- Child facilitators
  - Formed quick bonds with participants
  - Created enthusiastic, light environment

Adult facilitators can serve as better cultural guides and local intermediaries but child facilitators help build a more encouraging atmosphere for their rural peers.

3 Prototyping Process

Lo-Tech Prototyping

- Used large poster and colored markers
- Objective was to teach 6 Hindi words in a shopping scenario



Facilitator: Why did you like the game Word Munchers?

Participant 2: Because of the frog and the way he laughed.

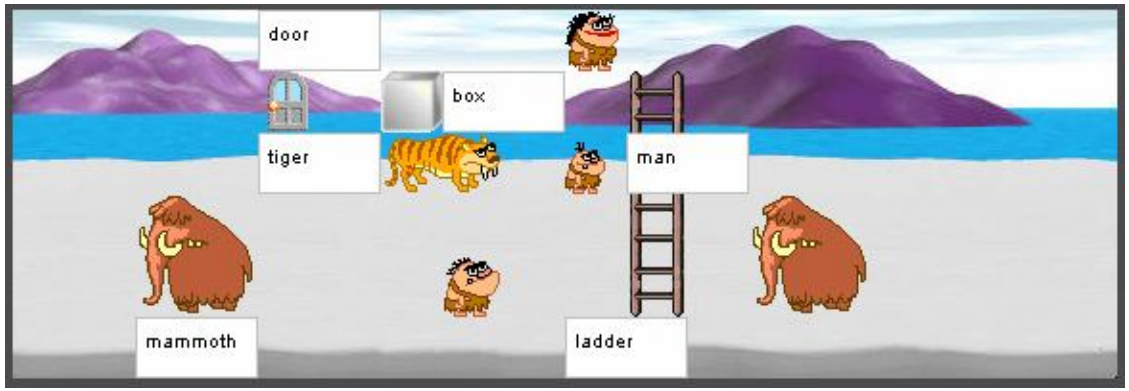
Researcher: …So the frog seems to be very important to the game, right? It is the reason you want to play the game, right? So your game should have something about it too that makes people want to play it many times.

(Participants did not respond for several minutes).

3 Prototyping Process

Hi-Tech Prototyping

- Laminated cut-out model with characters, sounds and simple animations
- Objective was to create a matching game with text and pictures



Researcher: Right now, you're matching labels to pictures. How can you change that to be more fun…What did Clifford do every time you got something right?

Participant 2: (nodding) When we see a door, we can make the door open. The tiger in the picture can roar...

Participant 3: If we write the man's name correctly in the box, maybe he can climb up the ladder. Can we do that?

3 Prototyping Process

Lo-tech Prototyping

Participant: I can just tell you the meanings **whenever you want.**

Researcher: …I like this game, but how can I learn the words from the game itself?

Participant: …I can't think of anything…I don't understand.

3 Prototyping Process

Hi-tech Prototyping

Participant: I will tell [a new user] that this is a matching game and they have to type in the names of the animals in the labels next to them.

Researcher: What if the person has never heard of a tiger before? How will they know what it is?

Participant:…Click on it and the word will show.

Participant 1: If the player is taking too long on one level of a game, the sun behind him will set and stars will come out, showing that it's night.

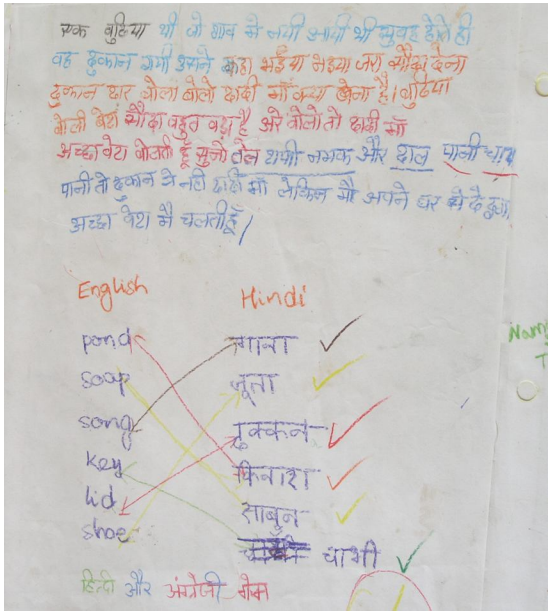
Participant 2: And after some more time, the night stars will disappear and the sun will rise again. The player will know from this that he is just not fast enough.

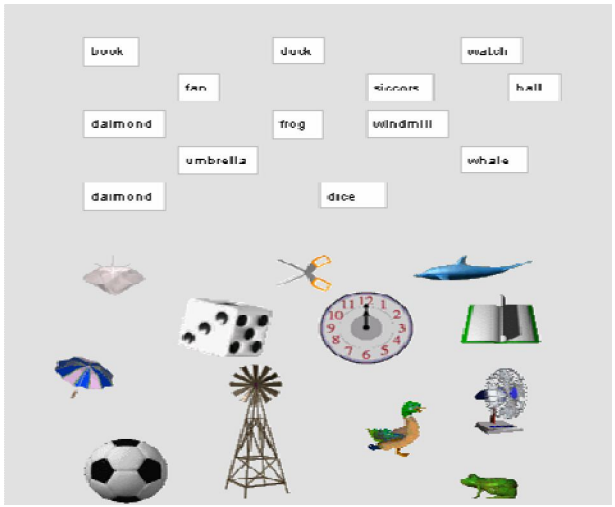
Participant 3: And a rooster will give the call for daybreak showing that time is up.

3 Medium vs. Technique

- Superficially, hi-tech medium appears to be more effective

- Important to note difference in technique
  - Using low-tech prototyping laminated cut-out model (Scaife et al, ’97)





3 Appeal of Hi-Tech

- Participants continued to request use of computers
  - Perhaps appeal holds for parents as well

- Demonstrating primitives was feasible for teaching the tool's features and getting participants thinking about design possibilities
  - Used low-tech medium to sketch ideas they could not implement in hi-tech

Conclusion

What are some practical considerations that might help maximize contributions from rural school children in the participatory design process?

- Support from children, parents, teachers through local facilitators is secured

- Use hi-tech media along with lo-tech methods for a more creative co-design experience

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Any Questions?