

H20	H19	H18	H17	H16	H15	H14	H13	H12	H11	H10	H9	H8	H7
Julian	Brian	Anirudh									Ross		
		Abeer											
G20	G19	G18	G17	G16	G15	G14	G13	G12	G11	G10	G9	G8	G7
								Yiteng	Hesper		Yuan	Nilesh	Jason
F20	F19	F18	F17	F16	F15	F14	F13	F12	F11	F10	F9	F8	F7
Alexis	Brandon	Henry			Kayla	Rachel							
							Don					Joshua	
E20	E19	E18	E17	E16	E15	E14	E13	E12	E11	E10	E9	E8	E7
					Tyden	Thanh-Nha							
Yang	Cheng				Mokshita				Andres				
D20	D19	D18	D17	D16	D15	D14	D13	D12	D11	D10	D9	D8	D7
Eric				Nicholas				Jacob	Tuan		Michael	Ethan	
C19	C18	C17	C16	C15	C14	C13	C12	C11	C10	C9	C8	C7	C6
Qingyang													
Ye	Qisen			Nishanth								Liangchun	Zoe
					Shreyas							Yunyi	
B14	B13	B12	B11	B10	B9	B8	B7	B6	B5	B4	B3	B2	B1
Harrison													
	Anahita							Isabella	Ainaz	Taggert		Ziyan	
A14	A13	A12	A11	A10	A9	A8	A7	A6	A5	A4	A3	A2	A1

Row A = empty



CSE 216 - Research Topics in HCI

Nishanth Chidambaram, Nicholas Rittler,
Shreyas Kadekodi



CommunityCrit: Inviting the Public to Improve and Evaluate Urban Design Ideas through Micro-Activities

ACM Reference Format:

Mahyar, N., Mayfield, E., Gibson, J. P., Eschler, J., & Carpendale, S. 2018. CommunityCrit: Inviting the Public to Improve and Evaluate Urban Design Ideas through Micro-Activities. *In Proceedings of the 2018 CHI Conference on Human Factors in Computing Systems* (CHI '18). ACM, New York, NY, USA, Paper 195, 1–14. DOI:<https://doi.org/10.1145/3173574.3173773>.

Background

- urban design: seeks to engineer urban spaces on the scale of blocks or neighborhoods with a eye towards economic, social and environmental value
- local community engagement/reception/feedback is vital to a successful urban design





How Urban Designers Traditionally Solicit Community Feedback

- Public workshops/town halls
 - Muddled by legalese and bureaucracy considerations, can hard to attend because of scheduling conflicts, dominant voices tend to over-influence
- Opinion polls/surveys/ online forums
 - May be time consuming, lack features which allow users to know preferences of other community members



How Urban Designers Traditionally Solicit Community Feedback

- Existing online tools designed to support urban design:
 - Often require design expertise, large time commitment, and do not support early-stage participation



CommunityCrit – a prototype for collaboration towards community-driven urban design

- Explores how to engage the public more complex stages of urban design projects, while limiting required time commitment.
- Online system that looks to combine the social aspects of a town hall, with the upsides of existing urban design tools which allow users to give feedback on existing plans whenever they can



CommunityCrit – a prototype for collaboration towards community-driven urban design

- “Democratic” vision of urban design: designed around small and diverse “micro-activities” which allow community to quickly contribute, regardless of outspokenness and schedule constraints

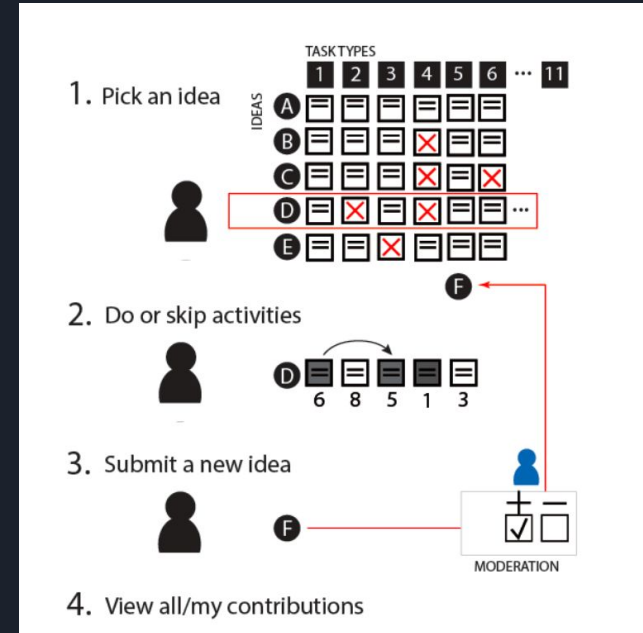


CommunityCrit – What is a “microactivity”?

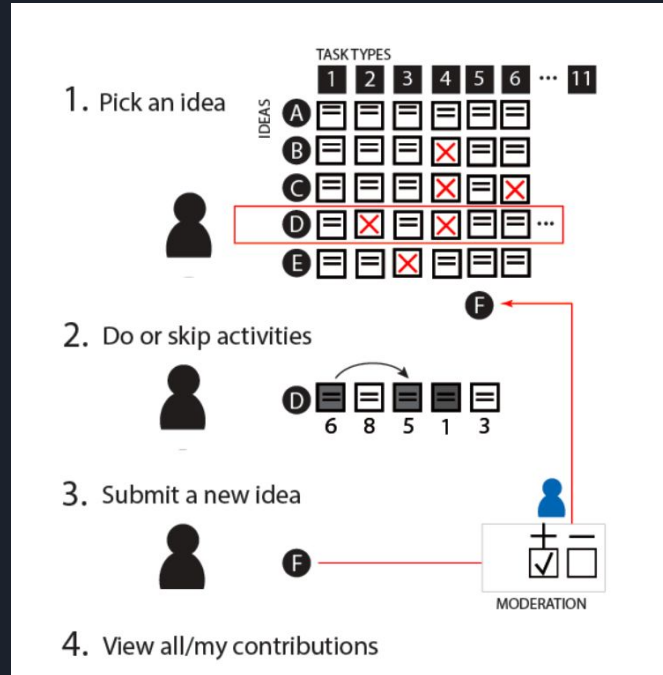
- inspiration from interactive approaches to crowdsourcing, which have explored complex interaction mechanisms and incentive structures to more effectively harness crowd work
- In these systems, a “microtask” is a small unit assigned to an individual; recombined later towards the larger goal
- In CommunityCrit: “microactivities” are brief content contributions (an anecdote, idea critique, improvement, follow-up question)

CommunityCrit: Micro-Activity Workflow

- Users experience in CommunityCrit:
 - Choose an idea (e.g. traffic circle at xyz intersection) for a given project (how to redesign an intersection to improve pedestrian safety) that needs evaluation
 - Complete a few microtasks related to the idea
 - Have the opportunity to submit a new idea for the project
 - Have the opportunity to see all submitted contributions (ideas and feedback) for the project



CommunityCrit: Micro-Activity Workflow



CommunityCrit “in the wild”

- Authors tested the CommunityCrit system on an ongoing urban design project
- Goal was to redesign the area around an intersection in San Diego: to facilitating commerce, walkability, sustainability



CommunityCrit “in the wild”

- Proposed ideas included green spaces, open-air farmers market, a walking bridge, closing a section of one of the streets from traffic





CommunityCrit “in the wild”

- Tested on a diverse set of community members recruited through the planning group organizing the project, local business orgs, and a local residents group
- Over 4 weeks of use, 39 community members made a total of 352 contributions
- Users spent an average of ~ 14 minutes on the website, with most making 1-5 contributions

Discussion Question



The number of contributions per user turned out to be heavy-tailed (a small number of users made a large number of contributions).

Do you find this to be an issue, given that one of the goals was dampening the influence of “outspoken individuals” (in a town hall setting)?

How might the system be modified to more evenly distribute contribution?

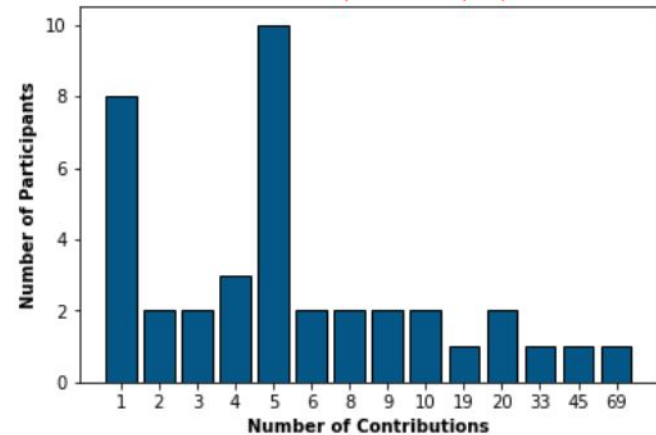


Figure 4. This graph shows the number of contributions per person. Most participants provided 5 contributions with the min of 1 and max of 69 contributions.

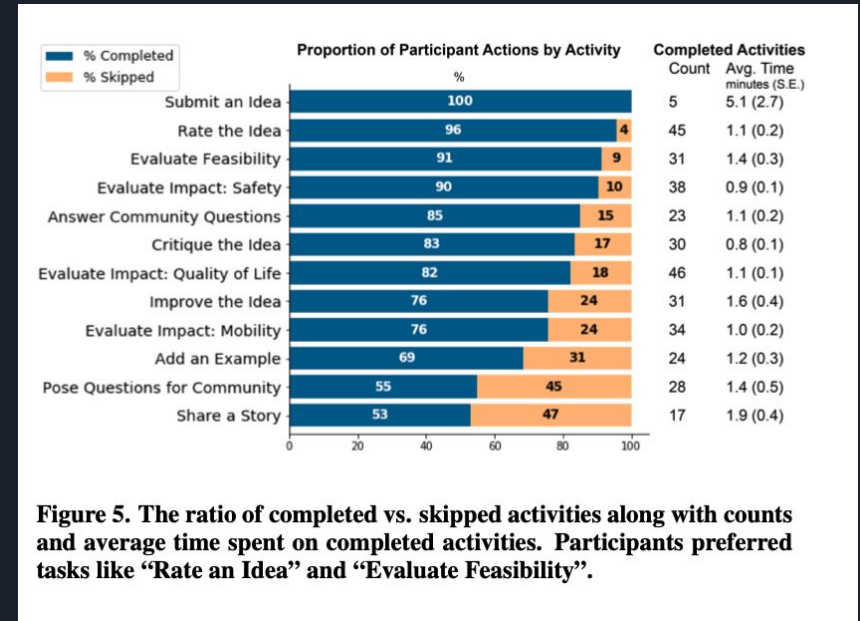


Reception of CommunityCrit

- Conducted a user survey which solicited opinions on the 'micro-activities' workflow and platform generally
- Respondents were generally positive, praised the the workflow for giving users the right amount of work
- Complaints: no information on what type of people had which opinions, some desire for more social aspect, aggregate metrics (e.g. reported ratings) on ideas

Reception of CommunityCrit

- Authors measured what sorts of ‘micro-activities’ and tasks users engaged in, how much time they spent
- Rating ideas was the favorite activity; certain microactivity types were skipped at a high rate





Discussion Question



3:00

How might the system be better designed to incentivize more participation across the set of micro-activity types? What other types of micro-activities could be added to generate engagement?



CommunityCrit and Ability-Based Design

- Many diverse tasks/methods through which users can contribute
- Online: allows users to engage at their own pace, when they are able
- Online: allows less outgoing users to make their voice heard



Some Criticism

- How evenly are communities members engaged?
 - Mentions that the intersection separates distinct culture groups, but we never learn how equally they are engaged by the system
- Seems like there really should be some comparison (user-study) versus more traditional forms of engagement (like forums etc.)



Discussion Question



3:00

What do you think are potential advantages and disadvantages of assigning users 'micro-activities', as opposed to engage with and propose ideas in a more open-ended way, as in a traditional forum?

Would you expect 'micro-activities' to increase or decrease engagement over a more open-ended system? What sorts of metrics might be important for this specific application?



Conclusion for general ability based design

Ability-based design attempts to shift the focus of accessible design from disability to ability.

Rather than focusing on what a certain percentage of users might not be able to do, ability-based design focuses on what users *can* do, and works within their capabilities to develop methods of interaction.

Although prior approaches to accessible computing may consider users' abilities to some extent, ability-based design makes ability its central focus, centered around researching methods to work with user-bases of all abilities.



Ability-Based Design: Concept, Principles and Examples

ACM Reference Format:

Wobbrock, J. O., Kane, S. K., Gajos, K. Z., Harada, S., and Froehlich, J. 2011.
Ability-based design: Concept,
principles and examples. ACM Trans. Access. Comput. 3, 3, Article 9 (April 2011), 27
pages.
DOI = 10.1145/1952383.1952384 <http://doi.acm.org/10.1145/1952383.1952384>



Different ability, not *dis*-ability

User interfaces still pose access challenges for many people with disabilities.

Part of that may be due to a consistent centralization of disability may be partly to blame.

By its very name, a *dis*-ability means the lack of ability. Taking this perspective, a person with a disability is unable to perform certain tasks, and requires assistance to compensate for his or her limitation.

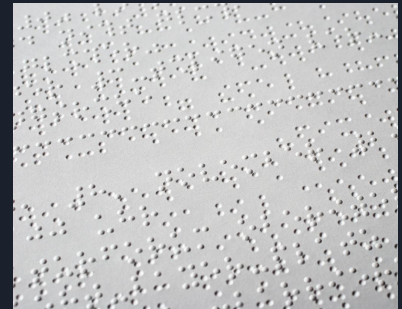


What is Ability-Based Design?

Ability-based design is a focus on designing around abilities, not disabilities.

“What can a person do?”, not “What disability does a person have?”

The challenge is to identify abilities in a reliable fashion



Prior Approaches to Accessible Computing



- “Assistive Technology”: various approaches focused around fitting “non-standard users” to existing technologies, often via add on inserted between the user and system
 - “Separate but equal” imagination of solutions which may stigmatize users and require them to adapt
- “Rehabilitation Engineer”: focuses on measuring users ability and often prescribing an “assistive technology-like” solution, often some add-on technology

Prior Approaches to Accessible Computing

- “Universal Design”: development of “one-size-fits-all” solutions which can be enjoyed by everyone
 - Often hard to apply this philosophy to complex interactive computer systems





Inclusive Design

Inclusive design focuses on factors that cause “design exclusion”

Design exclusion is the unintentional creation of products or services that exclude users because of subconscious biases and assumptions about users’ abilities.

This is one reason why design itself cannot scale to address the needs of every individual with abilities different than the societal “average.”



Inclusive Design

Ability-based systems that can observe and accommodate users directly have a much better chance at scaling



Extra-Ordinary Human-Computer Interaction

Extra-ordinary human-computer interaction [Newell 1995] is similar to ability-based design in that it recognizes that all users have some abilities, and that some users have extraordinary abilities.

An important feature of extra-ordinary human-computer interaction is its acknowledgement that context can temporarily reduce a user's abilities.

Situational impairments arise when aspects of a user's environment adversely affect his or her ability to perform certain activities.



Other Ability-Based Approaches

Very few papers explicitly focus on “ability” in design.

One example discusses “ability-centered design”, in more of a reflection than a prescribed design method, and its intention is to provoke thought and discussion.

Another example is articles that address only cognitive abilities and make no mention of people with disabilities.



Discussion Question

Discuss some more modern ability-based approaches that are currently being used that have developed from these methods.



3:00

Principles of Ability-Based Design - Nishanth

STANCE	1. Ability.	Designers will focus on ability not <i>dis</i> -ability, striving to leverage all that users <i>can</i> do.	<i>Required</i>
	2. Accountability.	Designers will respond to poor performance by changing systems, not users, leaving users as they are.	<i>Required</i>
INTERFACE	3. Adaptation.	Interfaces may be self-adaptive or user-adaptable to provide the best possible match to users' abilities.	<i>Recommended</i>
	4. Transparency.	Interfaces may give users awareness of adaptations and the means to inspect, override, discard, revert, store, retrieve, preview, and test those adaptations.	<i>Recommended</i>
SYSTEM	5. Performance.	Systems may regard users' performance, and may monitor, measure, model, or predict that performance.	<i>Recommended</i>
	6. Context.	Systems may proactively sense context and anticipate its effects on users' abilities.	<i>Recommended</i>
	7. Commodity.	Systems may comprise low-cost, inexpensive, readily available commodity hardware and software.	<i>Encouraged</i>

Projects Informing Ability-Based Design

DESKTOP TEXT ENTRY	5.1 Dynamic Keyboard Model [Trewin and Pain 1997]	keyboard typing for users with motor impairments	ability, accountability, adaptation, transparency, performance, commodity
	5.2 Invisible Keyboard [Trewin 2002]	keyboard typing for users with motor impairments	ability, accountability, adaptation, performance, commodity
	5.3 Input Device Agent [Koester et al. 2005, 2007a]	keyboard typing and mouse pointing for users with motor impairments	ability, accountability, adaptation, performance, commodity
	5.4 TrueKeys [Kane et al. 2008b]	keyboard typing for users with motor impairments	ability, accountability, transparency, performance, commodity
	5.5 Trackball EdgeWrite [Wobbrock and Myers 2006a, 2006b, 2007]	gestural text entry from trackballs for people with spinal cord injuries	ability, accountability, adaptation, transparency, performance, commodity
MOUSE POINTING	5.6 Steady Clicks [Trewin et al. 2006]	mouse pointing for users with motor impairments	ability, accountability, performance, commodity
	5.7 Angle Mouse [Wobbrock et al. 2009]	mouse pointing for users with motor impairments	ability, accountability, adaptation, transparency, performance, commodity
	5.8 SUPPLE [Gajos et al. 2007, 2008, 2010]	mouse pointing for users with motor impairments	ability, accountability, adaptation, transparency, performance, commodity
	5.9 Automatic mouse pointing assessment [Hurst et al. 2007, 2008a]	automatic assessment of mouse pointing performance	ability, accountability, adaptation, performance, commodity
	5.10 VoiceDraw [Harada et al. 2007]	paintbrush control for users with motor impairments	ability, accountability, adaptation, performance, commodity
MOBILE DEVICES	5.11 Barrier pointing [Froehlich et al. 2007]	stylus pointing for users with motor impairments	ability, accountability, performance, commodity
	5.12 Walking user interfaces [Kane et al. 2008c]	touch screen access for walking users	ability, accountability, adaptation, context, commodity
	5.13 Slide Rule [Kane et al. 2008a]	touch screen access for blind users	ability, accountability, performance, commodity
WEB	5.14 WebAnywhere [Bigham et al. 2008, 2010]	Web access for blind users	ability, accountability, adaptation, transparency, context, commodity

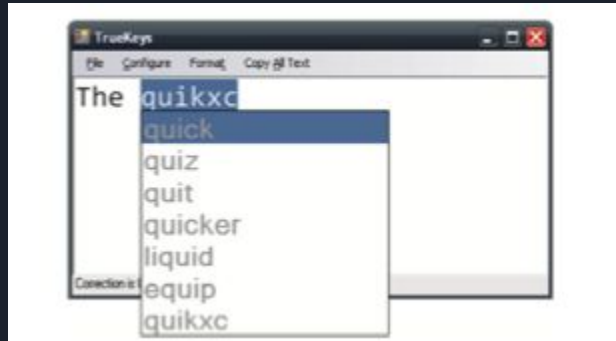


Prior Work Informing Ability-Based Design: Desktop Text Entry

- ‘Dynamic Keyboard Model’ (Trewin et al., 1997): facilitate accurate typing for individuals with fine-motor impairments by compare keyboard input to frequencies of english letter pairs
 - Principles: Adaption, Transparency, Performance, Commodity
- ‘Invisible Keyguard’ (Trewin, 2002): overcome stigma of physical keyguards, used to prevent sliding unintentionally to adjacent keys, with a software solution
 - Principles: Adaption, Performance, Commodity
- ‘Input Device Agent’ (Koester, 2005): observe user performance and recommend settings of existing operating system features
 - Principles: adaption, performance, commodity

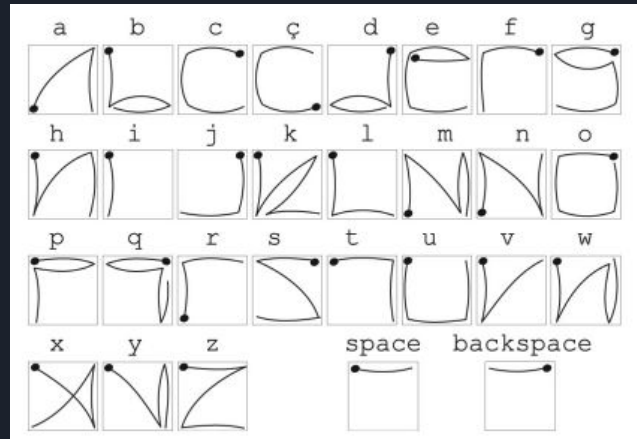
Prior Work Informing Ability-Based Design: Desktop Text Entry

- 'TrueKeys' (Kane et al., 2008): instead of modifying input on a key by key basis, recommend fixes at the word level with language modeling
 - Principles: Transparency, Performance, commodity



Prior Work Informing Ability-Based Design: Desktop Text Entry

- Trackball 'EdgeWrite' (various works by Wobbrock et al.): individuals with spinal cord injuries relying on point and click typing via trackballs could see speed improvements via 'gestural' inputs to the trackballs
 - Principles: Adaption, performance, transparency, commodity



Prior Work Informing Ability-Based Design: Mouse Pointing

- 'SteadyClicks' (Trewin et al., 2006): reduce errors occurring from unintentionally sliding mouse while attempting to click by locking the movement of the mouse while mouse is being clicked
 - Principles: Performance, Commodity
- 'Angle Mouse': Software correcting pointing for users with fine-motor impairments (taking advantage of the fact that initial, directional thrust is often correct, with errors occur in final phase before the click)
 - Principles: Adaption, performance, commodity, transparency
- 'Supple': Adaptation in the space of UIs with the goal of minimizing the movement time of the user
 - Principles: Adaption, transparency, performance, commodity



Prior Work Informing Ability-Based Design: Mouse Pointing

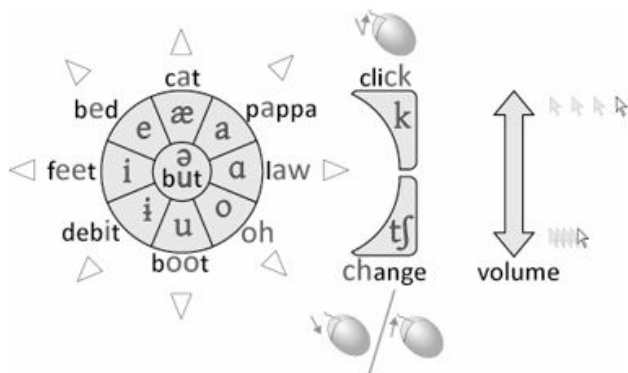
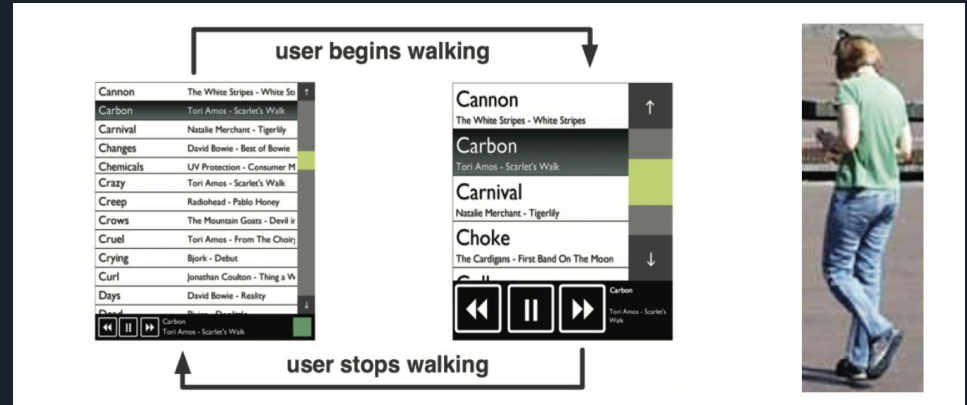


Fig. 7. The vowel map used in VoiceDraw allowing for continuous movement control.

- 'Automatic Mouse Pointing Assessment'(Hurst et al. 2007, 2008a): Automatic assessment of mouse pointing performance to estimate user's prior experience, which then updates help menu information
 - Principles: Ability, Accountability, Adaptation, Performance, Commodity
- 'VoiceDraw'(Harada et al. 2007): Paintbrush control for users with motor impairments by mapping movement directions to vowel sounds
 - Principles: ability, Accountability, Adaptation, Performance, Commodity

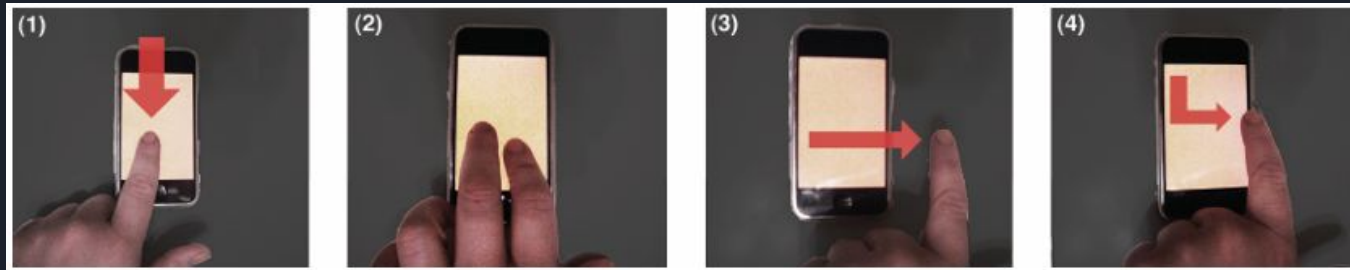
Prior Work Informing Ability-Based Design: Mobile Devices

- “Barrier Pointing”: utilization of bezels on screen edges to stabilize selection movements by placing click targets on edges
 - *Principles:* performance, commodity
- “Walking User Interfaces”: increasing size of on screen controls for a walking user, to alleviate contextual ability changes
 - *Principles:* adaption, context, commodity



Prior Work Informing Ability-Based Design: Mobile Devices

- Slide Rule: Use of audio output to guide blind users through the UI : output content over which the user's finger is hovering.
 - When a blind user attempted to lift-and-tap a target on touchscreen, the user lost his or her sense of location, leading to a 'second-finger tap' scheme
 - *Principles:* Performance, Commodity, Ability, Accountability



Prior Work Informing Ability-Based Design: Web

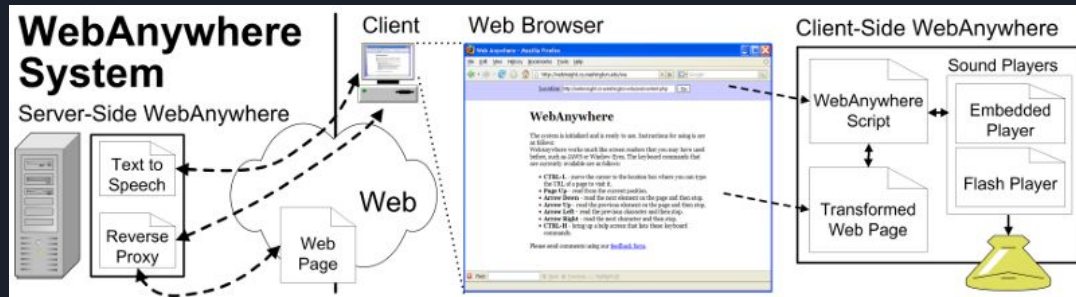
WebAnywhere

WebAnywhere was a website that reads aloud other websites,

A significant advantage of WebAnywhere over existing screen readers was that WebAnywhere required no additional software to be installed, allowing it to be used on shared terminals in libraries, classrooms, agencies, and so on.

Blind users played a formative role in the design of WebAnywhere, giving suggestions for its many features.

Principles: Ability, Accountability, Adaptation, Transparency, Context, Commodity



Discussion Question

A graphic of a timer showing 5:00 in large white digits with a black outline, set against a colorful, abstract, pixelated background.

How might your current project benefit from using the Principles?

STANCE	1. Ability.	Designers will focus on ability not <i>dis</i> -ability, striving to leverage all that users <i>can</i> do.	<i>Required</i>
	2. Accountability.	Designers will respond to poor performance by changing systems, not users, leaving users as they are.	<i>Required</i>
INTERFACE	3. Adaptation.	Interfaces may be self-adaptive or user-adaptable to provide the best possible match to users' abilities.	<i>Recommended</i>
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	7. Commodity.	Systems may comprise low-cost, inexpensive, readily available commodity hardware and software.	<i>Encouraged</i>



Not just Atmosphere: Game Music Design for Accessible In-Game Information Communication

ACM Reference Format:

Rudolf Westerholm, Kai Tuuri, and Lobna Hassan. 2024. Not just Atmosphere: Game Music Design for Accessible In-Game Information Communication. In Proceedings of the 27th International Academic Mindtrek Conference (Mindtrek '24), October 08–11, 2024, Tampere, Finland. ACM, New York, NY, USA, 9 pages. <https://doi.org/10.1145/3681716.3681735>



Q and A



Current Approaches in Game Sound

Traditional Use of Sound

- Primarily aids players by conveying gameplay actions (e.g., enemy attacks, item pickups)
- Music typically enhances atmosphere and immersion







Discussion Question



3:00

How is media affected by the music composition? How have your experiences with pieces of media been altered by a score?

DESIGN



EVALUATION



Study Composition

Participants:

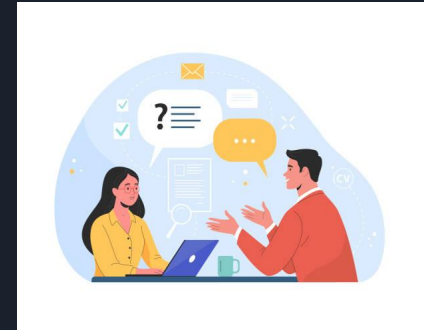
- 6 sighted participants with varied gaming backgrounds
- 6 VIB participants with varied gaming backgrounds
 - Different levels of blindness, ranging from low vision to 90% blindness.
- All 32-46 years old



Study Phases

Stage 1: Interviews and Insights

- Collected perceptions on game music from both VIB and sighted participants using gameplay videos.
- Non- VIB group demonstrated a greater focus on the emotional and narrational aspects of music.





Prior Views

“I’m thinking mostly about how I can turn it (the music) off and how I can make the actual sound effects in the game do the things I need them to do.
(Participant Them/They, 32 years, 90% blind from birth)”

“It’s extremely rare in the games I play at the moment for music to be utilized in that sort of fashion [to facilitate accessibility]. But it’s not to say it couldn’t be done or be really interesting.

(Participant Male, 90% blindness, blind from birth, British)”

Gameplay videos

Pre-recorded gameplay videos of "Returnal" by Housemarque to ensure consistent conditions across sessions.



PS5

4K

RETURNAL FULL GAME

Gameplay videos

Pre-recorded gameplay videos of "Returnal" by Housemarque to ensure consistent conditions across sessions.





Discussion Question



3:00

Could using pre-recorded gameclips instead of live gameplay meaningfully impact the results of the study?



Phase 1 feedback

- Immersion vs. Distraction
- Provision of functional information
- Sound effects over music



Information Priority

“The Doom soundtrack consists of elements that are brought into the game when the situation demands it. For example, certain enemies have their own instruments that, when they appear, bring that instrument to the front.”

(Participant, Female, 46, blind from birth, translated from Finnish)

“Tempo and pitch changes and modulations could help as well in music; the closer you are to a treasure box, the higher the pitch would go.”

(Participant Male, 32, color-blind, translated from Finnish)



Study Phases

Phase 2: Music Composition and Evaluation

Three compositions:

- Elements – Functional cues (e.g., enemy location, health).
- Flavor – Thematic music
- Flavor + Elements – Combination

Participants evaluated each composition's accessibility and informativeness.

Data Analysis

- Largely Qualitative data
 - Thematic Analysis
 - Participant Responses





Phase 2 Feedback

- Participant Comparison and Preferences
- Follow-Up: Participants discussed which version was most informative and accessible
- Criteria for Evaluation: Ranked based on accessibility, informativeness, gameplay, and emotional impact.



Results

Composition Feedback:

- **Elements:** Highly informative but lacked thematic engagement.
- **Flavor:** Provided thematic depth
- **Flavor + Elements:** Best received, balanced



Results

Participant Preferences:

- Sighted participants valued thematic elements more, while VIB participants prioritized functional audio cues.
- VIB group unanimously reported that music was disruptive to their gameplay and could never be the main game access vehicle

Discussion Question:

Is it realistic to follow these findings without taking away from the game?



3:00

Table 1: Interview findings on how music can increase or decrease game accessibility.

Music that increases game accessibility according to VIB	Music that decreases game accessibility according to VIB
Night and Daytime Cycle. Different themed Map Zones (Plant Zone, Ice Zone) to help the player understand where they are. Music Changing if the enemies are cleared, indicating when attention is needed and when the player can relax. Place and location tied music (walk past bar, mall, station, stores) and enemy or boss tied music. Music that supplements visuals and is in sync. Adjustable Audio, ducking elements per importance. Helping with a sense of scale of the place and the situation. Intensity of the music could increase when the bullets catch the player, the music could be louder if there would be more enemies.	Too loud music. Adding pressure or emotional overload to an already intense situation through music. Unrealistic echoes that distract the player from understanding the space. Relying only on music instead of sound effects and narration. If the music is not in sync with what's happening. Enemy music which starts to play – then nothing happens in the game!

Table 2: Summary of findings from the second round of interviews.

Questions for the videos	Flavor and Elements	Flavor	Elements	Original
Q1: Which elements in the music helped you perceive what was happening?	Rhythm, progression, panning and rising chord progression.	Music made the situation feel desperate.	Constant drums kept the combat feeling. Drums, panning elements, intro buildup, outro salvation.	More background mood soundtrack, Intro and outro, the violin part felt like 'horror action'.
Q2: How did the music feel in this?	Sort of intense, progressive in the sense of movement and intent.	There wasn't that sense of momentum. It felt like there was only background music with "no accessibility hints".	With less music, it's easier to concentrate on "audio hints" like the panning things. Still I miss at least the scoring arpeggios.	Sounded like a classic horror movie soundtrack.



Critique

- Extremely small sample size
- Age distribution
- Almost no Quantitative information
- Clips vs live gameplay

Discussion Question:

3:00

In you groups, discuss how music or sound in general has increased or decreased the accessibility of other experiences fin your opinion.

Table 1: Interview findings on how music can increase or decrease game accessibility.

Music that increases game accessibility according to VIB	Music that decreases game accessibility according to VIB
Night and Daytime Cycle. Different themed Map Zones (Plant Zone, Ice Zone) to help the player understand where they are. Music Changing if the enemies are cleared, indicating when attention is needed and when the player can relax. Place and location tied music (walk past bar, mall, station, stores) and enemy or boss tied music. Music that supplements visuals and is in sync. Adjustable Audio, ducking elements per importance. Helping with a sense of scale of the place and the situation. Intensity of the music could increase when the bullets catch the player, the music could be louder if there would be more enemies.	Too loud music. Adding pressure or emotional overload to an already intense situation through music. Unrealistic echoes that distract the player from understanding the space. Relying only on music instead of sound effects and narration. If the music is not in sync with what's happening. Enemy music which starts to play – then nothing happens in the game!



Discussion Question



3:00

Knowing what we know about music and accessibility, do you think we will see greater adoption of these methods?