Orality, Gender & Social Audio in Rural Africa

Nicola J Bidwell[1], Thomas Reitmaier[2] and Kululwa Jampo[3]

[1,3] Dept. of Informatics, University of Pretoria, South Africa; [2] Dept. of Computer Science, University of Cape Town, South Africa. ([1] Digital Ethnography Group, Royal Melbourne Institute of Technology, Australia).

Abstract We claim that digital platforms designed for people in low-income, low-literacy rural communities to share locally relevant, voice-based content did not widen dissemination because they were incompatible with the nuances of co-operation. We base this on a long-term study of interactions with prototypes to record, store and share voice files via a portable, communally owned display in South Africa. We discuss how men and women used, appropriated and interacted with the prototypes, and how the prototypes and use contexts supported different genres of orality and nonverbal elements of co-present interactions. Rhythm and mimicry of nonverbal elements participated in cooperation and, we argue, that engaging with such qualities enriches creativity in designing media sharing systems.

Introduction

Short-term studies show that digital platforms designed for people in low-income, low-literacy rural communities to share locally relevant, voice-based content did *not* widen dissemination. We argue that this is because design did not respond to the nuances of cooperation, and that engaging with co-present oral practices can enrich designing media sharing systems for use by different social groups in rural Africa. We support this claim with insights about relations between gender and interactions with voice-based prototypes in a long-term study in rural South Africa.

Efforts to design platforms for people in rural communities to create and share voice-based media intensified with increased access to phones in the "global South". Many efforts aim to mimic the benefits of exchanging livelihood-relevant information that local radio brought to technology-sparse settings. Some involve communal displays, such as to share audio-photo stories authored on camera-phones [16]. Most strategies for accessing voice-based information, however, focus on personal access to phones and distributed asynchronous interactions, such as Interactive Voice Forums (IVF) across lower-cost channels on phone networks. There are few prolonged studies, but some analyses show systems for personal access to digital information can amplify inequalities. For instance, few farmers in India conveyed what they learnt via an IVF to people researchers excluded [33]; and men participated more than women in IVFs in Tanzania [37] and India [29].

Focusing on personal access to digital information neglects the ways oral users in low-income communities share devices and media in co-present interactions. Some analyses in Africa relate sharing practices to collective ethics. In South Africa interactions with phones are affected by expectations about, and an ethos of, sharing and mutual support in low-income societies [2, 8, 42]; and, in Ghana, an illiterate woman's expectations of an intermediary's help to use a Talking Book links to social obligations and rights [18]. These practices echo an emphasis on the communalist self in 75% of African societies [19] and logics, described by key African philosophers, that a person "owes his existence to other people, including those of past generations and his contemporaries" [25:141]. Some analyses suggest that sharing phones in Africa disadvantage women and that various differentiations participate in purchase, ownership, access and control e.g. [42]. In Uganda and Morocco moral orders and familial or gender hierarchies limit women's private access to phones, as well as cost and text-literacies [9, 13].

We often relate personal access to phones and digital content to democracy, independence and individual freedoms. Yet, bias towards individualist concepts of self often overlooks the effects of corporate power in embedding meanings in technology and neoliberal economics [3]. Further, while individual rights can benefit women, individualist concepts of self can also alienate people from their communities and disrupt the co-operation that enables their survival [41]. Obligations and conveniences intersect with experiences of pleasure in sharing [42] and wellness based in a sense of belonging; and, women often suffer most when communal practices collapse. In southern Africa, such issues may contribute to parents, authorities and religious groups' concerns about young people's use of social media [10] and, indeed, use of social media does seem to factor in altering social constructs [34]. Tensions arise between Western and African thought on emancipation. Postcolonial feminist critiques argue for addressing African social relations by starting in Africa [32]. Oyewumi (1997, 2010), for instance, claims that gender was not an organizing principle in Yoruba society prior Nigeria's colonization [19, 31] and calls for attention to the process of gendering [32].

When considering gender and oral users we tend to ignore the gendering processes of producing, using and studying technology and the way these processes also embed a certain writing culture. While authors note that complex language environments of phones are barriers to illiterate women's use [13], they do not discuss the deeper ways that technologies embed 'design languages' [26] and the logics of certain writing cultures [3, 7, 41]. For instance, formal schooling and gender affected people's ease with the speech styles required for voice input [11]. We often attribute multi-vocality and plurality to writing, but politics and economics privilege certain genres [28]. Gendering processes contribute to the way that men comprise 85% of Wikipedia authors and dominate interactions in online forums, where women post and receive fewer messages [22]. Thus since more technologists are men their preferences, such as for broadcast writing styles and displaying subject knowledge [21, 39], might limit designing to support women's styles, such to express emotions, seek or offer support and acknowledge their imagined audi-

ence [1, 21, 24, 38]. Indeed the logics of certain writing cultures in technology design might limit affordances for the diverse oral practices that contribute to communality in Africa [3, 15, 41]. For instance, reconstituting Somali verse in print embodies the individual subject more than orature [28]. Studies on oral users show links between social relations and orality; for instance, Botswanan users were at ease with voice-input to access football updates but favoured phone keypads to access information about HIV [30]; and, Indian women were uneasy using voice input in some circumstances [11]. Yet, design rarely responds to these links.

Deploying devices, such as phones, in new ways may improve access for oral users [13] but we propose that technologists can design systems more creatively by engaging with elements of co-present oral practices. We develop this claim by referring to men and women's use of systems to record, store and share voice files using a portable, communally owned display in rural South Africa. Thus, next, we introduce the setting and how we engaged with inhabitants to gain insight about communication practices and deploy prototypes. Then we describe men and women's interactions with prototypes and reflect on how prototypes and use contexts supported different oral genres and nonverbal elements. We conclude that nonverbal qualities in remote and co-present interactions participate in cooperation and engaging with them can significantly enrich design.

Research Approach, Setting & Prototypes

Our research in Mankosi, in Eastern Cape's Wild Coast, was prompted by ethnography in an adjacent area [2, 5], and the difficulties that local Xhosa people have in communicating between villages. Mankosi consists of 580 households in twelve villages, spread over 30km^2. Up to 15 adults and children live in each homestead, which comprise clusters of thatched, mud-brick rondavals, an occasional tin-roofed two-room dwelling, animal corrals and a garden for subsistence crops. Inhabitants do not have domestic electricity or water supplies so, over the day, they walk the very hilly terrain to communal resources. Inhabitants have many kin across villages but almost nobody has a car. There is only one bus a day that can take 2-hrs to traverse Mankosi and does not go to all villages. Households survive on around $150 per month, mostly in government grants and payments from family members who temporarily migrate for work.

We frame endeavors in Ethnographic Action Research (EAR), a methodology that links research to community-oriented in media/technology initiatives in real-world situations [38]. Central to our use of EAR is sustained local immersion and considering Mankosi's inhabitants as fellow researchers. Author-1 (A1), a woman in her 40s, lived in Mankosi for two years in total from 2010 to 2013 and Author-3 (A3) is in a team of five female and five male Local Researchers (LRs), aged 17 to 27 years at the time. LRs generate and interpret data, advise in design, trial prototypes and translate linguistically and culturally to mediate external understandings.

Generating Insights

We generated data on communication practices and needs using varied methods, including observation; contextual inquiry; interviews; diary studies; workshops; auto-ethnography; and, deploying earlier prototypes. Few local people speak English and in most activities A1 spoke in English, others spoke in isiXhosa and LRs translated. We recorded activities in handwritten notes, video or audio and sometimes photos. LRs verbally translated audiovisual records and we transcribed audio and/or annotated video. We used descriptive statistics to analyze responses to closed questions in interviews and thematically coded other responses and observations after activities. We cross-linked themes between activities and validated or revised interpretations of themes hermeneutically as new meanings emerged.

From the start LRs and other inhabitants insisted we consult the Tribal Authority (TA) to gain approval to experiment with systems that might enable people to communicate between villages. We subsequently met the TA 40 times, often within community-wide meetings, to discuss ideas, plans and issues in trialing and sustaining systems. In Mankosi the TA consists of the Headman, a Subheadman in each village and messengers. TAs govern 36% of South Africa's population and are independent of other political bodies, although Headmen receive a small state stipend. Headmen relate by clan to Chiefs and inherit their role patrilineally but they can re-place Subheadmen and women can assume TA roles.

After first meeting the TA we began to generate data that led to designing voice prototypes. LRs and other people video-recorded their own interviews, conversations, storytelling and presentations. They accumulated over 50 items featuring some 60 people, aged 14 to 80 years. We (A1, LRs) also began interviews about communication practices and phone use. We interviewed 141 people about phone ownership and use, and another 16 people about appropriating low-cost services [4]. Then, we generated data on the ways people manage mixtures of communication in their daily routines in diary studies across periods of 4 to 10 days. This involved individual or group interviews at the start and end, and 72 short individual interviews in between. We included six male and six female older owners of low-end phones, half of whom are illiterate and, ten younger, literate owners [8].

We deployed two Android tablets along with solar-powered, cell-phone Charging Stations in April 2011 [7]. Inhabitants chose two sites for the Stations that were 2.5km, or 25-mins walk, apart that are used for local administration and meetings: the homesteads of the Headman and a Subheadmen in Mankosi's poorest area, Ridge. We observed each Station site for over 80-hrs at different times of day and on different days of the week and times in the year, interviewed 40 people who left or collected phones and logged the distance between Stations and the homesteads of 40 users who charged phones each day. The tablets ran MXShare, a media sharing prototype developed in the UK that, we hoped, people would use when they came to charge their own phones [43]. We logged use of MXShare automatically and (A1, LRs) ran seven workshops to introduce MXShare to 24 in-

habitants, including members of the TA and local Community Association, and six men and women in Ridge. We also ran two workshops to explore how tablets might support the popular, local soccer league and uploaded audio commentaries, video and photos from matches to promote tablet useage.

Communication Practices & Needs

Some 700 inhabitants charged phones at the Stations, many regularly, but few used MXShare. However, insights from deployments and our other data on communication practices [3, 4, 6, 7, 8], informed the design of the voice prototype. In 2011, approximately 56% of females and 76% of males owned a cellphone, of which 25% were feature-phones and none were smartphones. People under 35 years old are twice as likely to own a phone as older people, and younger males more likely to own a phone than younger females. Older people often said they were not educated to use cheap text-based phone services and SMS comprised only 1.4% of their use. In fact some 40% of adults in Mankosi cannot read and write, although they often recognize some names or numbers. Inhabitants favour voice calls but keep these brief as they spend on average only ~$0.75 a week on airtime. Despite infrequent phone communication people have enduring social ties. Inhabitants are identified by their social relations, and many can trace their ancestry over 5 generations across Mankosi and adjacent areas. An everyday visibility within villages contributes to senses of belonging and security, and mutual familiarity and expectations of co-operation enable people to access phones via intermediaries. Such practices suggest that communality acutely shapes local concepts of self [7].

People exhibited preferences for recording voices in workshops and their own videos recorded or explained oral practices, such as telling poetry at ceremonies and folktales night, that related to gender, age, protocols and sense of identity. People also mentioned a need to record meetings. Meetings often entail walking for over 2-hrs and attending for 3-hrs, which limits turnout, so Subheadmen and Headman's messengers are the main conduits for information across villages. The TA's voluntary secretary does not disseminate the minutes and attendee's details, which he writes on paper during meetings, and Community Association members said that minutes did not always accurately report what was spoken. These practices fuel allegations about the TA's inertia, opacity and "forgetfulness". Yet, other inhabitants are not more likely to use phones to contact people farther than an hour's walk from their village and tend to split phone use between communicating with close contacts in their village and very far away for support. People's daily tasks often occur in places with poor network coverage and, with limited electricity access, they conserve charge by switching off phones; so, phone use is more planned than impromptu. People sustain close ties without frequent contact and do not judge the efficacy of information sharing according to Western time scales.

Prototypes

To respond to local preferences for voice and constraints on using cellphones we sought to use the tablets to trial systems to record, store, share and listen to voice recordings. A1 sent a technical specification to A2, in Cape Town, for Audio Repository (AR) [7], and then we (A1, A2) spoke, over the phone, about interactions on tablets that might support qualities of communication. An LR also visited Cape Town to discuss A2's provisional UIs, design constraints and opportunities and their respective experiences in designing, evaluating or trialing past prototypes [5]. Before we wrote the specifications for the next iteration, Our Voices, we (A1, A2) discussed ideas in Cape Town and during A2's first visit to Mankosi. After developing the most complex elements, A2 returned to Mankosi for two weeks and final UI and interaction design entwined with, and was inspired by, impromptu discussions with inhabitants and technical work at different sites where inhabitants were installing a wireless mesh network between villages [35].

Both AR and OV enable unregistered users to create and listen to public recordings and registered users to store audio files and send/receive files to/from other registered users on that tablet and their own phones over Bluetooth. OV also enables sharing files between tablets when they connect to the new Wi-Fi. We reluctantly opted for text-based registration, as speech recognition processing involves high quality recordings and electricity supplies that are unfeasible in Mankosi. Users register with names; a photo, taken using the tablet; and an alphabetic or numeric password on both AR and OV, and select their 'home' tablet for OV. AR enables creating 'Groups' of registered users, but OV enables users to alter the order of profiles on each tablet to cluster profiles by, say, social roles. To find their accounts users scroll vertically through profile photos for AR and OV.

For both AR and OV users press a button below a cassette tape icon to record (Fig. 1a). OV also enables users to attach, to the audio file, a verbal summary and/or a photo, taken with the tablet's camera. This aims to help users find their main audio files, but also offers a way to populate a voice-based help and feedback system.
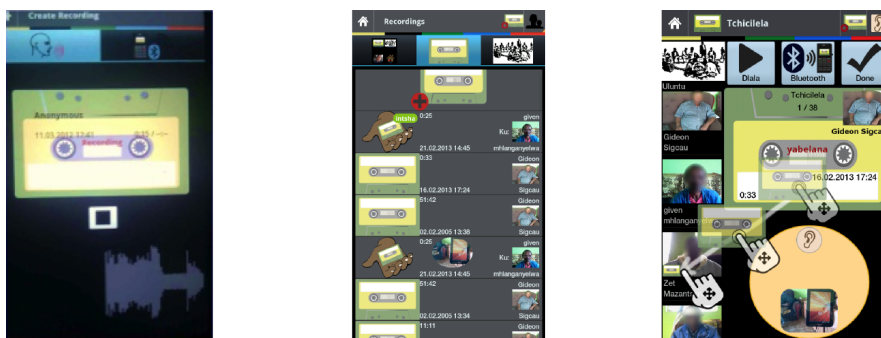

Fig. 1 AR/OV's interface to record (a); and OV's interfaces to find (b), tag and share (c) files.

For both AR and OV, users scroll vertically to find a voice file, displayed alongside photos of those sharing it. Inhabitants did not always find a specific file easily in AR, partly because incorrect date stamps affected file ordering, after the tablet's battery drained. Thus, OV displays audio and/or photo tags; sorts files in the order they were recorded; highlights files that users have not yet played; and, plays the main file, or the short abstract about it, as users scroll (Fig 1b).

To share a file a user 'long-presses' on a tape icon and drags a small copy of the tape over a target user's photo or the 'public' icon, where it stays when the user lifts his/her finger to show that file is shared (Fig. 1c). AR enables users to share to 'Groups' of registered users, but OV enables re-sharing files and displays the provenance of sharing.

Use of and Interactions with Prototypes

Inhabitants used AR and OV for 10 and 9 months, respectively. Our account emphasises men's appropriation and use of AR and women's interactions with OV.

Audio Repository

We introduced AR in 7 workshops, lasting 2-hrs to 4-hrs, in which LRs taught 50 women and men to use the prototype, in groups of 2 to 8. Illiterate and literate, old and young women and men readily learnt and taught each other to use AR, including the Headman who would not try MXShare. We interviewed 23 people in three groups, about their opinions of AR and sharing digital media. Inhabitants were enthusiastic and twice 30 women came to workshops when we expected six. They said they would use AR to leave messages for family members that might become mementoes and updates about events e.g. church, funerals. We observed use and after 9 months analyzed recordings and interviewed users and other inhabitants.

Despite wide interest in AR, access was restricted. The Charging Station at Ridge, overseen by women, was damaged and not re-deployed until after trialling AR [8]; and, the Headman moved the Station in his homestead and began to charge the tablet using another system, so AR was not easily accessible to people charging phones. Thus, AR was mostly used to record and store files in the Headman's account of which 35 were of meetings, 12 contained background chatter or no audible sound, a chat about the tablet and a song on the radio. The Headman said he had not deleted any files and used AR to remind himself of topics after a meeting and "to deliver information" to the TA. The Headman called the tablet his "witness". He listened with other TA members rather than sharing to their accounts, Groups or to 'public' or logged-in to his AR account for his secretary to listen alone in order to augment the minutes. This might relate to opinions, voiced

by other inhabitants, that all recipients own shared files. The Headman recognized the topic or setting almost the instant he played a file and easily found a part of a recording of which 22% were shorter than 10-mins; 26% of 10 to 20-mins; 44% of ½ to 1-hr; and, 7% exceeding 1-hr, including one over 4-hrs.

Table 1: Number of recordings in community meetings grouped into broad genres, and the mean and standard deviation of different voices when we could distinguish them

Content of files	Number of files	Mean (St. Dev.)	
		Male	Female
Communal resources: Land issues (2); Land & sand (2); Community Trust; Community Trust records (2).	7	7.3 (4.8)	0.4 (0.5)
Cases: Insult to TA; Insult related to circumcision; Pregnancy damages (2); Building without TA consent (2); Drunken fight; Fight at the soccer game; Fight within a family.	8	7.0 (4.1)	0.8 (0.42)
Narratives, notices, problem-solving: How royalty conferred a Subheadman his role; Subheadman's; dream about an ancestor (2); Circumcision & health; Insult at initiation school related to inter-community rivalry; Wage delays for community project workers; Wi-fi pilot; Charging Stations; White man's request to build.	9	6.0 (2.5)	0.3 (0.52)
Guest speakers & ceremony: Social support grant (2); Municipality (2); Welcome speeches at a pre-school opening.	5	2.0 (2.4)	4.2 (3.0)

Most recordings were made in community or TA meetings that address local issues, host counselors or municipal officers, resolve tribal law cases or involve a ceremony (Table 1). There were usually less than 5 recordings a month but in one month there were 17. The Headman decided that an issue warranted recording based on who spoke and "what they start to say". Only two files recorded a whole meeting and most files recorded one main topic from a meeting. Over half of files were recorded outdoors and wind, ambient music or children's chatter were audible in many. Most files contained only male voices and only two files contained exclusively female voices - at the opening of a pre-school (Table 1). Often 40% of attendees at community meetings are women who, like young men, sit in groups on the ground; but men represent families. Indeed, the Headman asked us to delete temporary accounts made in workshops, of which 70% were women, because other Headmen had reproached him for having too many female friends.

Various qualities of recordings indicated protocols of community meetings, where up to 100 people listen without interrupting and speak only after raising a hand, standing and removing their hats, if they are men. Speakers use different oral styles for testimony, argument and apology in cases; accounts of customs and experiences; and, notices and debate about communal resources. Older men speak boldly and gesture broadly to engage listeners and emphasise words (Fig. 2b & d); women and younger men are more discrete (Fig. 2c). The Headman, seated on chairs with other TA members and elder men, was usually silent until debate ended when he stated how an issue would proceed or be resolved (Fig. 2b & c). A

young man carried the tablet between people as each stood to speak, thus many files included long pauses in speech and sounds of movements that connoted the relative orientation of recorder and speakers and distance between speakers (Fig. 2b-d). The recorder's movement and the tablet's size also afforded visibility and twice in meetings men resisted recording as their permission had not been sought.

Many interactions with, and remarks about, AR articulated links between bodies and sociality. In workshops, women sat on grass mats huddled around tablets, which they held for each other and men, sat on chairs, bent their bodies together to listen (Fig. 2a). The ways they physically shared the tablet resonated with the slow drag interaction for sharing files that was inspired by qualities of speaking and passing messages (Fig. 1c). In meetings men's movements responded to others' and in workshops men and women often made rhythmic hand gestures to depict interactions as they taught others to use AR. Younger people adapted their gestures to elders and protocol and the Headman related gestures and social roles to the display of profile photos in saying that a photo directly above his own implied disrespect as it depicted a young man using a rap-style gesture "over" his head.

Fig. 2 LRs teach TA members to use AR in workshops in the Headman's office (a); in meetings the TA, seated on bench (b) chose a young man to carry the tablet between speakers (c), (d).

Our Voices

The TA's control of AR, selectivity in recording and co-present sharing improved information reliability for those who have few ways to use phone services, but did not widen access. However our respect for local protocol and governance meant the TA supported our proposal to deploy OV on three tablets to be overseen by: the Headman; women in Ridge; and, male and female Community Association members, an hour's walk south of the Headman's. Seven men and 44 women participated in six workshops that introduced OV. Community Association members, aged 35 to 40 years, said they would use OV to record their meetings. Women in

Ridge, aged 25 to 45 years, said they would record church to share with other women; children singing or saying funny things to share with close friends; and, TA members to share with the Headman; and, the radio. In the next 8 months the TA and Community Association used OV sporadically to record meetings but women in Ridge, who were proficient in use, rarely used their OV. They said they had been too busy; yet they asked us to run more workshops, and showed us video filmed using the tablet. In the video women sang in harmony and tapped sticks as they walked in two close ranks to a syncretic church where they moved to pray and praise, which oriented us to qualities of their co-present interactions.

We adapted a phenomenological method to explore nonverbal elements [14] of co-present interactions. A2, the 28-year old, male designer in Cape Town, and A3, an 18-year old female LR, independently watched videos filmed during workshops that introduced OV 3 months before (Table 2). Videos varied in length and focus on interactions between people and with OV. First, A3 handwrote descriptions of the meanings of gestures she saw in 7 videos, then seven women who had attended earlier workshops, watched 4 videos on a laptop. A1, a women, and A3 then showed 10-20 second clips around the gestures A3 noted, with the sound off and in a different order than A3 had watched them, then longer sections to gain more insights. A3 translated and handwrote women's comments in English, which A1 emailed to A2 to compare with his own notes. A month later another group of seven women, who had also attended OV workshops, commented on video that interested A2, again with the sound off while A1 filmed. Finally, A1 and A2 watched video of the women's analysis sessions.

Table 2 Number of gestures that A2 and A3 analysed in a total of 17 clips of workshops with the TA and Community Association (CA) and three workshops with women in Ridge (R1, R2, R3)

Work-shop	People in video			Total length analysed hr:min:sec		Total number of gestures	
	Men	Women	Including	by A3	by A2	A3	A2
TA	4 – 8	0	LR	00:12:52	-	6	-
CA	1	1		00:19:25	00:30:24	9	10
R1		9 – 10	LR, A1, A3	00:35:46	01:00:40	6	14
R2		1 – 8	A1, A3	01:49:28	02:29:20	29	15
R3		3	A3	00:43:19	-	3	-

A2 and A3 noted many different gestures and meanings about gestures (Table 3) and A2 noted more gestures than A3. Both noted women's symbolic gesture to pray at the start of a workshop and neither noted gestures of any children in video. Sometimes the same gesture was given different meanings; for instance, A2 noticed a woman laugh as she saw her photo, on the tablet, while A3 noted that she was shy because she put her hands to her face. A2 and A3 noted 26 and 36 gestures, respectively, that directly related to OV. A2 noted details of fingers that pointed, poked, clicked, wiggled and swiped horizontally and vertically to learn, practice and gain proficiency in interactions, especially in close-up shots. In con-

trast, A3 often described gestures that explained an interaction or an abstract concept relating to OV but without directly touching the tablet. A3 also noted more full-body gestures, in fact A2 watched video focused on a proximal tablet three times before noticing a woman in the background who A3 had noted. A2 and A3 noted 3 and 17 gestures, respectively, in dialogues that did not directly relate to OV. Over half of the gestures that A3 noted enriched a vocal utterance and/or expressed a felt-experience and many that indexed people or objects.

Table 3 Examples from A2 and A3's notes on gestures in video of women, W, and men, M.

Gestures to …	A2 and A3's descriptions
Talk in general	A3's hand is trying to make sure that everyone is clear about what she was saying; The W's hand is pointing side to side for explanation; W's hand is moving to show that she didn't know; Her hand is showing that something is easy; M moving his hands to try to explain his feeling.
Index object, place, self or another person	The W is putting her hand to her cheek trying to show that she is talking about herself; LR's hand touches the person she is addressing; The old W is waving her hand to show that the other W must move far away; The old W is pointing her finger to the W next to her; A3's hand pointing to the tablet; The W is pointing to show that she needs something; LR's hand/finger is pointing to the tablet; All the W pointing their fingers to show us something; M pointing of fingers.
Enhance teaching OV without touching the tablet	A3's hand is showing that something will follow; LR's hand shows that you must keep or save something; W's hands show that you must accept; A1 moving her hand side to side trying to say 'between you and I'; W's hand is trying to explain how to share the recording; W's hand is trying to explain to the W that after you press this something will appear; A1 pointing to show how to move; M gestures a sequence or recording amplitude timeline; The headman moving his hands to show the change; Moving his hands up and down the tablet but not pressing or touching the tablet, to explain a question; Twisting his hand to show a change; M scrolls back and forth and then questions through a gesture.
Sculpt another's interaction with OV	A3 moving her finger forward and backward; A3's finger to the tablet to show the W; W showing her to press the tablet; A1 telling and showing the M to hold the tablet firmly.
Co-ordinate touching the tablet between people	Helping each other swipe through the recordings; Scrolling slowly and deliberately with the backside of the finger, then accidentally logging on, neighbor presses cancel; One W points, then another at the same screen item, finally the third W presses; Swiping through the recordings one-by-one. Occasionally the other Ws poke at the tablet; W laying on floor is also pressing the tablet; W and M alternate their touches in a sort of unnatural way - only one person can press the tablet at a time.

The women and men usually sat close to each other, which A3 said 'Blacks' prefer. A2 noticed that people learnt that the tablet permits only one press at a time. For instance, at first three young women's interactions interfered with each other as they pressed the tablet but within minutes they developed a rhythm in alternating touches and interacting with each other (Fig. 3f). One who had her arms wrapped around the shoulders of another laying in front of her holding the tablet,

pointed to an item on the screen, then a second woman pointed to the same item, as if to concur, and a third pressed it (Fig 3f). When the women in this video watched it, they said their proximity and mutual dexterity was unsurprising but was not due to any special intimacy - they were not kin, close friends or members of the same churches and only spend time together when they walk to the forest to collect fire-wood every week. In contrast, co-ordination between a man and woman in the Community Association seemed unnatural (Fig 3b). A2 noted that some participants, or an LR, held the finger of another to physically sculpt an interaction with the tablet, such as to drag a file. Women in sessions said that children learn by watching and that mothers rarely physically position a child's arm, hand or finger to sculpt fine body actions, such as to weave grass mats or grind corn.

Women finely coordinated gestures such as instantly pointing in unison in the same direction to confirm the location of a home they spoke about (Fig. 3c). They brought gesture and voice into correspondence when they analysed video and complex conversations of entwined gestures and voice evolved. For instance, as one woman explained what A3's gesture in a video meant others chimed in and mimicked the gesture they saw. Their hands made vertical chopping motions with the same rhythm as they said, "this thing goes like this, this one like this". Women did not mimic video when they watched video without talking about it.

A2 and A3 observed movements that coordinated people spatially, such as leaning towards the tablet to listen, and noted 10 and 2 gestures, respectively, that physically moved tablets. Both also noted that people overtly give tablets and rarely take them from another's hand, and that gestures often indicated a bodily readiness for social prompts. In fact, A3 noted 11 instances when fingers or hands were "ready for action" in awaiting prompts or instructions to use OV or assist others. Gestures that indicated a bodily readiness also functioned symbolically, for instance one woman cupped her hands together as if to receive a tangible thing as she explained an "accept" button on the interface (Fig. 3e).

Fig. 3 In workshops a TA member (a) and women in Ridge (c) point in talking; and in learning to use OV Community Association members take turns (b); women listen together (d), to explain an accept button on the interface (e) and, co-ordinate their interactions (f).

Interactions & Settings Supporting the Nuances of Co-operation

Women's engagement in analysis sessions, and appreciation of the relevance of non-verbal qualities of orality to OV, confirms the value of considering gestures and movements in co-present oral practices to design. Touch interfaces to shared tablets offer affordances for nonverbal communication and some of the interactions we designed reconciled with body movements in talking. AR and OV's interaction for sharing files resonated with flows of movements when people handed or carried the tablet to others or interacted together with it. We symbolized sharing with a palm-up open hand icon (Fig. 1b), which was similar to gestures women used to explain an "accept" button (Fig. 3e) and congruent with the phenomenon of taking only when given that we observed in different settings and social groups.

Women did not prioritize using OV but keenly joined in workshops, clustered in groups on grass mats, and seemed to enjoy camaraderie and helping each other. Their postures and movements differed from men who sat further apart on chairs. Men's gestures were larger and women's were more frequent and elaborate. These styles manifested in interactions with prototypes, the tablet and the content of recordings. This suggests different elements of orality contributed to accessing AR, along with the social patterns that privilege the Headman. Social relations shape bodily interactions, and bodily interactions participate in meanings about social roles; for instance, the Headman read meaning in the spatial arrangement of the photos of himself and a young man gesturing.

Distinct rhythms arose when men took turns to talk in meetings, without touching or looking at AR, and women coordinated to learn to use OV. The overall tempo is shaped by the richness of IsiXhosa - often three times longer in duration than its English translation. People's rhythms in speaking and/or interacting with the prototypes continuously adapted to each other but coordination was more natural between women than between women and men. This is compatible with videos, that LRs recorded, where inhabitants described former practices that encouraged conversation only between people of the same gender. Women in Ridge and men in the TA, respectively, have similar daily practices even though they do not spend time together every day. Each gender shares patterns of walking and talking and the macro rhythms of their daily practices shape their literacies in reading others' routines [8]. Our preliminary analysis, here, suggests that micro rhythms also tune co-operating.

A2 suggested that A1 adopted a rhythm in interacting with women that differs from talking with other researchers or with the TA, and that her inflections helped to guide him through the video. He also realized that he mimicked body movements in videos, especially those when people coordinated, such as to interact with or pass tablets. Thus, design discussions and conceptual translations were implicitly sensitized by the tempo of life in Mankosi, that A1 came to embody, and A2 experienced in mimicking body movements.

Conclusions

A3 often related gestures to felt-experiences, consistent with the way women are said to use "rapport talk" to set up intimacy [39] and share emotional content in speech [36]. A2 more often related gestures to the details of interactions, consistent with the way men use "report-talk" [39]. Women use gesture, body orientation, proximity, eye and bodily contact to establish immediacy and more adeptly send and discern nonverbal cues than men, who are more likely to misread nonverbal cues if not invested in conversation [27]. However, we apply these analytic categories cautiously, but not just because A2 and A3's languages, expertise and rural and urban locations differ. These differences are made [40] using a visual lens on data, and Oyewumi argues that Western visual logics are implicated in social division and hierarchy [31]. More important to our claim is that men and women *can* adapt to each other's cues to evolve common oral styles to increase communication efficiency, even remotely [25]. Convergence, from one conversational turn to the next, occurs for many elements including words, syntax [21], pauses, frequency, pitch and gesture [12]. Thus, while power asymmetries exist between men and women's oral practices, men, like A2, can adapt if they want.

In South Africa, 'ubuntu' refers to human's existential interdependence and in Mankosi people sometimes refer to "acting as one". Their practice, however, in speech, song, gesture and movement, is not merely symbolic but is a bodily becoming into a synchronized whole that performs in the cohesion enabling their resilience. Women often sing, and some dance, at the end of workshops and when they do A1 experiences a profound sense of togetherness. Diverse research from music to neuroscience, suggests that the rhythmic synchrony of bodies and voices is integral to sociality and enables being-together [17]. Self-synchrony supports inter-personal coordination by enabling us to adapt our speech to others and time syllables and pauses as we converse. Gill cites a study in which pairs of participants finely tuned their body movements to their own and the other's voice, while in isolated rooms using microphones [17]. Their rhythms aligned with the language they spoke but concurrent movement also arose without speech.

Jousse argues that gestes, or audible and visual movements in 3-D space, link thought, action, people and settings [23]. He relates gestes to *mimicry* and *rhythmicity* in our constant interaction with micro- and macro- settings. We suggest that men and women's daily practices and shared settings, respectively, contribute to tuning their bodies in co-present interactions and to meaning making. We also suggest that engaging designers' bodies in knowing that are alive and lived [23], through mimicry and felt-experience, entangles their meaning-making within processes for synchrony [6] and, thus, entangles creativity in the rhythmicity and flow of the lives of the oral users for whom we design.

Intel's new smartphone, designed specifically for Africa, has a radio but no speaker for people to listen together; and, so-called, "multi-touch" interfaces to tablets are not designed for multiple people to interact. However, methods to en-

gage designers' bodies in oral practices, through rhythm and mimicry can offer ways to balance the effects of bias towards individualising logics in technologies for creating and sharing digital media content in the global South. Our two iterations of modest voice prototypes enabled illiterate elders, with few ways to use low-cost phone services, to record and review community meetings and women to co-operate in and enjoy design activities. Engaging more fully in oral practices can also benefit design in the global North where users also share devices and files in co-present interactions [20], where nuances communication can mean women can go unnoticed online [22], and where personal mobile devices increasingly seem to sever people from their proximal physical and social settings.

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