I think we need to talk about tone of voice and I know we need to talk about design.

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design for conversation
from design ethnography to product launch
Remote controlled submarine, just part of Spyfish STV (Submarine Telepresence Vehicle) system
but the interface is the product

Hand controller and screen with live video and information graphics
interaction design combines thinking and crafting
Table Talk by IDEO, exhibited at the V&A Museum, London
as part of HearWear exhibition, curated by the RNID and Blueprint

design for conversation
IDEO CEO, Tim Brown, attends World Economic Forum

Tim Brown

Chief Executive Officer, IDEO, USA

BA in Industrial Design, University of Northumbria; Master's in Design, Royal College of Art, London; Visiting Professor, University of Northumbria. Council Member: External Advisory Council, Art Directors’ Club, UK. Expertise: Industrial design, Interaction design, Innovation, Sustainability, Design Thinking, Leadership.
design meets disability
expression meets information

David Crystal, Alan Newell, Annalu Waller
Art Honeyman & Erik Blankinship, Stephen Hawking, Laurie Anderson
Ben Rubin & Mark Hansen, Duncan Kerr & Heather Martin
Violeta Vojvodic, Richard Ellenson, Erik Spiekermann
Somiya Shabban & Johanna Van Daalen
9 ways to say “yes” & 17 ways to say “really”
the Speaking Mobile & Listening Post
recording poems & communicating kisses
The Dictionary of Primal Behaviour & Tango!
expression meets information

189 differences between speaker and listener.

But they are also intrigued by ambiguity and the room left for interpretation. They cite French information theoretician Abraham Moles’ theory that aesthetic pleasure is determined by the balance of the originality of the message and the ability of the recipient to understand it. Clearly intonation plays a role on both sides of this equation: it helps decipher meaning but, as importantly, it affords more originality of expression. At the moment it seems that AAC is more concerned with understanding than expression.

The Dictionary of Primal Behaviour is described as an art project and not only is aesthetic pleasure a theme of the research, it is also manifest in its presentation. If this level of design were routinely brought to AAC, devices would be more satisfying to use but also send out more positive signals about their users to others. Too often communication aids designed for adults look as though they are intended either for young children or for computer programmers, and perhaps even designed by young children or computer programmers. In our culture we take for granted a visual sophistication in most things, from newspapers to book covers to websites to packaging. How much more appropriate to find this in something as profound as a communication aid?

Tango!

Richard Ellenson is an advertising executive whose son, Thomas, has cerebral palsy. When Ellenson founded the company Blink Twice to create a product to help young children to communicate, he did not attempt to design everything himself or even to build a company that would design everything itself. He approached it as he might have any major campaign: by seeking out a diverse cast of world-class specialists to each bring what they did best. So he engaged not only the speech language professionals Pati King-DeBaun, Patrick Brune and Beth Dinneen, but also
companies with no prior involvement in AAC: product design groups Smart Design and frog design, who brought the same sensibilities as they would to a product for able-bodied kids, whilst electronics manufacturing company Flextronics brought consumer-market technology and build quality. Ellenson even involved the kids’ television network Nickelodeon, to develop cartoon characters and voices for the interface, whereas the graphical user interfaces on most AAC devices have never even involved a graphic designer. “The sensibility that has infiltrated the toothbrush section of Target has not yet reached assistive technology and there is no world where first impressions are more important” says Ellenson. Whatever our opinions of the excesses of toothbrush marketing, this is an incontrovertible yet chilling observation.

Tango!, the resulting product, has been compared to an overgrown Sony PSP (PlayStation Portable), an appropriate and positive association given its target market and their peer group. This attention to aesthetics is not just applied to the surface, but from the inside out, from the fundamentals of the user interface itself. Even the choice of voice qualities is tuned to a child’s need to express themselves in particular ways, between speaking, yelling, whispering and whining. Tango! has set a new standard not just in AAC or assistive technology but in design for disability in general.

**you cannot not communicate**

“You cannot not communicate” is a much-repeated statement attributed to Erik Spiekermann, founder of graphic design group MetaDesign. Whether or not graphics are consciously designed, they will inevitably express strong messages to different people, positive or negative. There is no such thing as a culturally neutral design language, and this applies equally to other modes of communication: a lack of intonation speaks volumes.

Somiya wearing the badge she designed with Johanna Van Daalen.
Communication aids are not a neutral technology or a transparent medium. Alongside the messages they transmit, they inevitably send out other signals themselves. Their physical design, their interactions, their voice qualities and their intonation or lack of it all communicate something too. How important for these signals to have been considered as part of the design process and for the person using the device to be supported by these layers of communication, not undermined by them.

Somiya has the last word
Design for communication can be both simple and profound.
Somiya uses a dialogue book in order to communicate with other people, in which she points to words or images. This is versatile, but can be laborious. When Somiya was still at school, Johanna Van Daalen from design group Electricwig worked with her to help her to express herself more fully. In particular, Somiya wanted the freedom to express frustration more spontaneously, so together they designed a badge that she could activate using a switch next to her head, whenever she wanted to.

When she does this, the badge lights up with the words Somiya says "SOD OFF".
This message is wonderfully direct and disarming, and yet the badge expresses so much more besides this information. It also communicates that she is the kind of person who will use this language; that she is the kind of person to whom this is important enough to dedicate a button to; that she doesn’t mind who knows this. Perhaps it seems inefficient to produce such a limited communication device, one that can only be used for one sentence. But this is to ignore its other role: the short-term utterance is also a long-term badge - a label of Somiya’s own devising, to express her individuality and her identity, rather than any stereotype associated with her impairment.
Six Speaking Chairs
So improving the expressiveness of communication aids may demand thinking about interacting with synthesized speech in a totally different way, not just advancing the underlying technology. Professor Alan Newell has been pioneering AAC research at the University of Dundee for 25 years and considers that the field has settled into rather conservative ways of approaching communication devices. As early as 1991 he was advocating a “paradigm shift” in thinking about AAC: a shift that is yet to take place. Interaction designers could make a valuable contribution, complementing the Human Computer Interface (HCI) specialists already in the field by bringing a design culture, design sensibilities and design skills to our interactions with technology and communication with each other. Designing any communication aid is about designing interactions.

playing with speech

One example of a radical new interaction with synthesized speech can be found in the Social Mobiles project, the extreme telephones that reduced anti-social behavior. The second phone in the series, the Speaking Mobile, didn’t deter people from using their phone, but allowed them to speak with their hands, in circumstances where it would be inconsiderate to talk out loud. This inhibition could almost be viewed as a socially-contextual speech impairment.

If TTS offers a full vocabulary but little or no control of intonation, the Speaking Mobile is all intonation, at the expense of vocabulary. In fact the user can say only “Yeah” or “No”, but can intone these any way they want to by manipulating their timing and pitch with a joystick. With practice, it is possible to produce all of the variants described by Crystal and more.

Can anything be learnt from this extreme approach, that might have relevance to communication aids? In accordance
exclaim  say  question
Higher voice
Deeper voice

\[ y \quad e \quad s \]
easy whimpering Whispering

Please customise
17 ways to say yes
Chair No.6 The Terse/Whispering Chair

please customise
1. Question
2. definite
3. sarcastic
4. tentative
5. enthusiastic
6. supportive
7. embarrassed
8. thoughtful
9. defensive
10. neutral
11. encouraging
12. probing
13. empathic
14. brisk
15. non-committal
16. irritable
17. agreeing

your 17 ways
timid / shy
sexy
angry
elated
bored
sad
unbelieving
drunk
accepting
accusing
anticipating
slyly
frightened
controlling - in power
formal
schoolyard slang

40+ respondents
500+ tones of voice from ISAAC 2008
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<td>Complaining</td>
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*250+ distinct tones of voice*
4 points of view on tone of voice

- speaker's *emotional* state
- vocal qualities
- *conversational* intent or effect
- *social* and relational context
Introducing Map of Landscape of Tone of Voice (MoLoToV)

- **Speaker's emotional state**
- **Vocal qualities**
- **Conversational intent or effect**
- **Social and relational context**

4 points of view on tone of voice:

- Flatly
- Rising
- Whispering
- Excitedly
- Anxiously
- Contentedly
- Politely
- Affectionately
- Authoritatively
- Questioning
- Challenging
- Emphatically
mapping 250 tones of voice
<table>
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**vocal**

- 16 on this sheet: 20%
- 25 on this sheet: 32%
- 16 on this sheet: 20%
- 22 on this sheet: 28%
- 79 coloured in: 100%

**conversational**

- 20% on this sheet: 20%
- 32% on this sheet: 32%
- 20% on this sheet: 20%
- 28% on this sheet: 28%

**social**

- 16 on this sheet: 20%
- 22 on this sheet: 28%

**emotional**

- 16 on this sheet: 20%
- 22 on this sheet: 28%
- 79 coloured in: 100%

Mapping 250 tones of voice
six dilemmas
much more choice?... ... yet quick enough in use?
points of view on tone of voice?... ... yet coherent?
personal and flexible?... ... yet intuitive?
more nuanced?... ... yet feasible?
more expressive?... ... yet engaging?
more sophisticated?... ... but in whose terms?
Speech Hedge
Speech Hedge

an illustration
hedges lend structure and constrain choice
At Work

- Simply Confident
- Apologetic
- Bemused
- Forceful
- Quietly Convincing
- Bewildered
- Persuasive
- Politely Addressing
- Unsure
- Inquisitive
- Passively Questioning
- Proud
- Unconsciously Confident
- Blahsay
- Angry
- Calm
much more choice...  
... yet quick enough in use
two user interfaces

much more choice...
... yet quick enough in use
two user interfaces
more nuanced...
... yet feasible
more nuanced...
... yet feasible

tones described subjectively after crafting
Ryan created this tone, and then labeled it "Quietly Convincing"

"For speaking to colleagues at work"

Created by Ryan McLeod 30.03.10

Tones described subjectively after crafting
more sophisticated...
... but on whose terms?
more sophisticated...
... but on whose terms?
support the emergence of sub-cultures
Adobe Kuler supports creation and peer review of themes. This platform has supported the emergence of sub-cultures through its features.
because crafting tones of voice might appeal to other people than just users of tones of voice.
I eventually tracked down this iconic object in San Francisco, having long admired the contrast between its organic form and geometric holes, the combination of subtle surfaces and crisp edges. I am not describing a sculpture by Barbara Hepworth, but a mass-produced product by Charles and Ray Eames. It is not even a piece of domestic furniture, but a leg splint they designed for injured and disabled servicemen in the US Navy.

The splint is made of plywood that has been formed into complex curves. Its design language was radical in 1942 and is still inspiring today. It appeals to me not because of its medical purpose, but as good design on any terms. How many other examples of design for disability might that be said of? How often do we qualify, even excuse, design in this field because of the market for which it is intended? Perhaps this standard of design is not even considered appropriate?
Charles Eames believed that “design depends largely on constraints”. It was the particular constraints of the US Navy brief that led the Eames to develop their own technology for forming plywood in complex curvature in the first place, in order to make a lightweight but stiff structure that accommodated the form and variation of the human body. But this technique had a far-reaching influence on the future work of the design partnership and on design in general.

Organic plywood forms underpinned the iconic mainstream furniture manufactured by Herman Miller in the 1940s and ’50s, through which the Eames became famous and influential. This sequence of events challenges the so-called trickle down effect, whereby advances in mainstream design are expected to eventually find their way into specialist products for people with disabilities, smaller markets which could not have supported the cost of their development. Flow in the opposite direction is just as interesting: when the issues around disability catalyze new design thinking and influence a broader design culture in return.
nurturing healthy tensions

The journey from leg splints to mainstream furniture was not a direct path. Ray Eames began by making (actual) sculptures out of spare leg splints, cutting into them with a jigsaw. She was exploring the visual languages that this new material could support, a natural mode of enquiry for an art school graduate - apparently playful, but with serious intent. Within the Eames’ work, two cultures existed side by side, in a healthy tension: the first directly solving problems and respecting constraints, the second more open-mindedly, even playfully challenging these constraints and exploring further freedoms beyond. The plywood furniture arose from both sides, from the splints and the sculptures.

Within design for disability, where teams still tend to come exclusively from clinical and engineering backgrounds, the dominant culture is one of solving problems. A richer balance between problem solving and more playful exploration could open up valuable new directions. The following chapters explore this and other tensions, each of which is currently biased in one direction; each of which could benefit from a healthier balance.
to support, not replace, dysarthric speech
designed with and for people with ataxia

participatory design
designed material used to seed discussion about design qualities

‘Cultural Probes’
iPhone running modified Dragon speech recognition software, typography, software and knitwear by Calum
you cannot not communicate
early experiments with scrolling text proved too distracting

subtle transitions
Digital Interaction Design is run across DJCAD college of art and the School of Computing at the University of Dundee

the physical design is as important as the interface...
when idle, screen visually recedes into knitted scarf...

... and most of all, conceiving the two together...
interaction design

HCI

interaction design

product design

graphic design

... this is interaction design
... this is what good interaction designers do